School of Nutrition and Translational Research in Metabolism

Faculty of Health, Medicine and Life Sciences, Maastricht University

Maastricht University Medical Centre

Director: Prof. Annemie Schols

Preamble for NUTRIM research lines

External Review

2009-2014

TABLE OF CONTENTS

Preamble

1. General introduction

NUTRIM is a graduate school within Maastricht University Medical Centre+ (MUMC+) and member of the national graduate school VLAG. Maastricht University was founded in 1976 and is the youngest university of the Netherlands. Maastricht University (UM), the most international university in the Netherlands, is characterized by its multidisciplinary and thematic approach to research and learning. Maastricht University is the best performing young university in Europe (under 50 years old). In the third edition of the QS 'Top 50 Under 50' ranking (2014), Maastricht University climbed from 7th place to 6th . In the Times Higher Education 100 under 50 ranking, UM has maintained a sixth place for 3 consecutive years (2013, 2014 and 2015). The Faculty of Health, Medicine and Life Sciences (FHML) is the largest faculty of Maastricht University. The FHML officially exists as of January 1st 2007 after a merger of the former faculties of Health Sciences and Medicine. The main reasons for this merger were a new vision of health and health care, and the creation of an excellent partner for strategic educational and research alliances. In 2008 the FHML merged with the Academic Hospital into the Maastricht University Medical Centre, the Maastricht UMC+. It is a centre for integrated research and education that covers the entire spectrum of the molecular life sciences, the health sciences (including public health and primary care) and medicine. The '+' added to the name is an expression of this broad and integrated vision. The dean of the faculty is also vice-chair of the board of Maastricht UMC+. Through a combination of biomedical, (clinical) applied, public health and primary care research, concentrated in six graduate schools, the FHML aims to strengthen the research and increase knowledge transfer by incorporation and implementation of the 'integrated care concept' within Maastricht UMC+. In the Times Higher Education World University Ranking for clinical, pre-clinical & health 2014-2015, Maastricht Universities' FHML ranks among the Top 50 in the last three years (49th place in 2012-2013, 43th place in 2013-2014 and 45th place in 2014-2015). In the graduate schools masters' students, PhD students and researchers work together. In addition to research the schools are responsible for training PhD students and providing masters-level education coordinated by the educational institute. The six research schools are NUTRIM School of Nutrition and Translational Research in Metabolism, CARIM School for Cardiovascular Diseases, MHeNS School for Mental Health and Neurosciences, GROW School for Oncology and Developmental Biology, CAPHRI School for Public Health and Primary Care and SHE School of Health Professions Education.

Figure 1: Academic Profile of Maastricht UMC+ 2015-2020

One of the most important goals of Maastricht UMC+ is the linkage between successful research themes and academic patient care. Until 2014 this linkage took place within four so called *chains for care, education/training and research* (ZKO's), and NUTRIM's research and educational activities merged with clinical activities into the ZKO 'Chronic Diseases'. However, in the most recent Maastricht UMC+ strategic planning document for 2015-2020 NUTRIM succeeded to position "metabolism and nutrition" as an "innovation platform" within Maastricht UMC+ making it possible to contribute to the academic position of four established disease oriented profiles (cardiovascular diseases, respiratory diseases, cancer, and neuro intervention) to strengthen the academic profile of the specialty "movement" and to link the disease oriented profiling of Maastricht UMC+ to a focus on "healthy living". This unique position illustrates the distinct international profile of NUTRIM and also offers a platform to explore not only the origin and metabolic complexity of a particular disease in a systematic way, but simultaneously unravel relationships between apparently distinct (patho)phenotypes.

2. Objectives and research area

2.1 Vision, mission, and objectives

Vision:
NUTRIM strongly believes in connecting and integrating different disciplines to create truly new scientific insights and innovative health solutions for society. NUTRIM focuses on biomedical research to capitalize on its unique strengths but with a strong link to health promotion. It actively maintains a local, national and international network to contribute to the solution of global health concerns. In our vision an excellent educational infrastructure plus an innovative and challenging research environment are of crucial importance for the academic development of young researchers such that they can develop themselves by acquiring skills and expertise.

Mission:
NUTRIM promotes translational research into chronic metabolic and inflammatory disorders with a high societal burden that will contribute to personalized lifestyle and medicine approaches. In its PhD programme NUTRIM aims to meet the demand for scientists who are acquainted with novel fundamental research concepts and are equipped to optimize the translation from science to the clinic and to public health.

Objectives:
The mission is implemented by the following objectives:
- To enable and manage an excellent research programme that encompasses the entire spectrum of basic, translational, clinical, and prevention projects providing NUTRIM with a distinct international health sciences profile that optimally fits within the Maastricht UMC+ care vision and organization.
- Availability of unique patient cohorts and biobank as well as an internationally distinct, state of the art infrastructure for metabolic phenotyping allowing a network-based approach linking tissue and organ systems within chronic metabolic disorders.
- To mentor scientists at different stages of their academic career.
- To facilitate the sharing of knowledge and expertise both within the national graduate School VLAG and by collaboration with other universities, research institutions, and national and international networks.

Translation of vision and mission into research, education and sharing of knowledge and expertise
<u>Research</u>
In order to perform high quality translational research optimally aligned to the health care policy of Maastricht UMC+, it is crucial to integrate the different disciplines in our research portfolio. The research within NUTRIM is positioned around two major chronic conditions ultimately leading to chronic diseases: firstly the metabolic syndrome of which obesity is a key feature, ultimately leading to diabetes and cardiovascular disease, and secondly chronic inflammatory processes within colon, liver and lung, leading to tissue degenerative processes as for instance fibrosis, carcinogenesis and wasting. We focus on specific chronic diseases as clinical models (i.e. diabetes, COPD, IBD) to disentangle disease specific and common lifestyle induced denominators in aetiology and disease progression.

Education

An important part of our mission to ensure quality in research and scientific development of young scientists is to provide an environment that stimulates their further development, deepens scientific understanding, and stimulates the development of a broad society oriented perspective.
We achieve this through several activities:

- Contributing to discipline specific postgraduate courses in Wageningen organised by the national Graduate School VLAG.
- Contributing to the organisation of the general courses offered by FHML.
- Organising Master classes, Capita Selecta and the Annual NUTRIM Symposium in Maastricht.
- Awarding the VLAG education certificate to PhD candidates that fulfilled the criteria set within the Training and Supervision Plan (TSP).
- Contributing to the organisation of a number of Master's programmes, such as 'Human Movement Sciences', 'Biomedical Sciences', 'Physician Clinical Investigator', 'Global Health' and 'Health Food Innovation Management'

Knowledge and expertise sharing

We actively stimulate collaboration between different disciplines and groups within and outside the Netherlands. This comprises a number of activities:

- Organising scientific events in collaboration with national and international partners.
- Up-to-date and informative NUTRIM website and a Periodic Electronic Newsletter
- Stimulating and initiating national and international collaboration, which may lead to new joint initiatives for international research programmes (e.g. Horizon 2020, Innovative Medicine Initiatives) and networks (e.g. European Clinical research Infrastructure Network (ECRIN), Joint Programming Initiative a Healthy Diet for a Healthy Live (JPI HDHL) and the public private Top Institutes Food and Nutrition (TIFN), TI Pharma and the Centre for Translational Molecular Medicine (CTMM).

2.2. Research area and programmes

At Maastricht University, NUTRIM is embedded in the FHML. NUTRIM is one of six graduate schools within FHML for which procedures are aligned with regard to quality assurance of MSc and PhD education and for non-specific PhD courses. The specific PhD courses are embedded within VLAG (see general VLAG document). Sixteen basic research and clinical departments collaborate in four research lines. Thus, all our research is structured in those four integrated multidisciplinary research lines (figure 2). This arrangement facilitates intensive communication and scientific interaction between basic scientists and medical specialists.

NUTRIM collaborates within several Dutch governmental and public private initiatives including the National Genomics Initiative, the Parelsnoer Initiative of the Dutch University Medical centres (topics: IBD and diabetes) and three national top institutes including Top Institute (TI) Food & Nutrition (TIFN) (topics: cardiovascular health, weight management, gastrointestinal health), TI Pharma (topic: COPD), the Centre for Translational Molecular Medicine (topic: diabetes). Participation in multiple Top Institutes within our research focus illustrates the unique position of NUTRIM within biomedical research by applying novel concepts focusing on inflammation and metabolic disturbances in the aetiology and progression of chronic diseases that provides a novel perspective for nutritional and pharmacological modulation as well as for technology platforms. An overview of large collaborative research projects at the national and international level is shown in appendix 1.

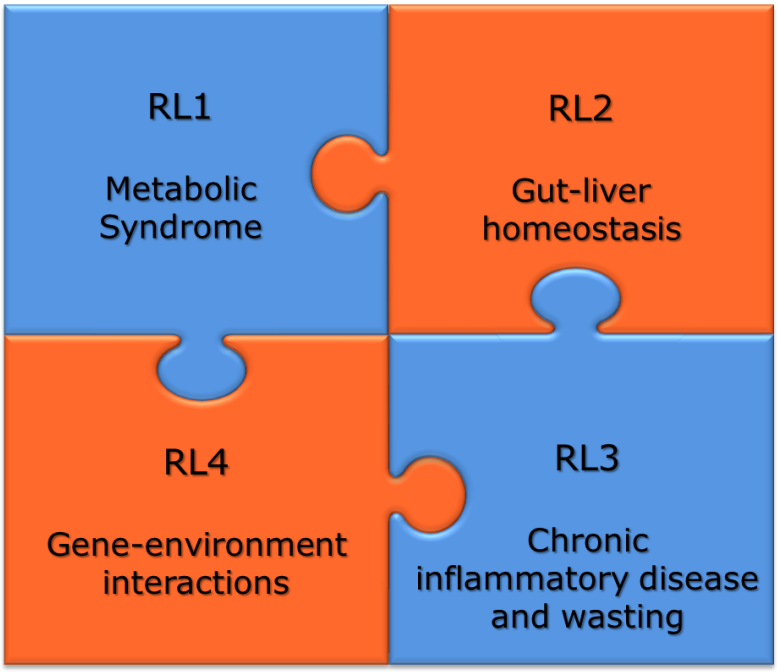

Figure 2: NUTRIM research: four integrated multidisciplinary research lines

NUTRIM is partner within VLAG on equal terms with Wageningen University; NUTRIM research is embedded in VLAG Research Theme 'Nutrition, Metabolism & Health' (see general VLAG document). This collaboration is considered crucial to maintain and further build on the strong position of the Netherlands in food & nutrition research. Furthermore Maastricht is excellently located within the EU-triangle Eindhoven, Leuven, Aachen allowing unique collaborations in Agro-Food and Life Sciences between the Netherlands, Belgium and Germany. To strengthen and maintain strategic alliances at the international level we focus on a broad EU network as illustrated by our participation in the Foodbest Knowledge and Innovation Centre initiative, the Joint Programming Initiative for Healthy Nutrition, the IMI (Innovative Medicine Initiative) Open PHACTS (Pharmacological Concepts Triple Store) project, and the European Clinical Research Network (ECRIN). Additionally we maintain strategic collaborations including a structured exchange of research staff, master and PhD students with selected centres as shown in appendix 2 (a) University of Vermont in Burlington, US (topic: respiratory biology & COPD), (b) National Institute of Ageing in Baltimore and Bethesda, US (topic: body composition, muscle biology, ageing, epidemiology), (c) University of Manitoba, Richardson Centre for Functional Foods and Nutraceuticals, Canada (topic: functional foods), (d) the German Diabetes Centre in Dusseldorf, Germany (topic: non-invasive assessment of metabolic pathways in humans), (e) University College London, UK (topic: liver metabolism, (f) RWTH Aachen, Germany (topic: liver and intestinal health), and (g) the St. Johns Research Institute and St John's National Academy of Health Sciences in Bangalore, India (topic: human nutrition and metabolism).

2.3 Recent developments within the research community

Appendix 3 provides a summary of the previous external (2009) and midterm review (2012) of NUTRIM. Recent developments in line with these recommendations are presented below:

- In 2008 the scientific director of NUTRIM initiated the MUMC-MOVE network (www.mumcmove.nl) that was recognized by the Netherlands organisation for medical research (ZonMw) as one of the 4 National Centres for Sports, Physical Activity and Health, with a "personalized lifestyle centre" as open innovation facility that is currently being developed at the Maastricht Health Campus (Mosae Vita: www.mosaevita.nl). The MUMC-MOVE network has furthermore contributed to the Specialty "Movement" (figure 1) with strong involvement of researchers and infrastructure from NUTRIM RL3.
- NUTRIM was selected by the Maastricht University Board as a Centre of Excellence in 2009 and awarded an investment grant. This grant was used for coaching NUTRIM's young talent and creating

new positions to strengthen our integrative biology approach (as outlined in NUTRIM's strategy document for 2008-2011: "Peaking by integration") and cross-fertilization between the four research lines.

- In 2011 NUTRIM was awarded a prestigious grant by the National Research Council NWO for the graduate programme "metabolism and chronic diseases". In the jury report the research was judged "excellent". This programme aims at creating an excellent educational and research environment for highly talented young researchers. The grant included scholarships for 4 excellent MSc students who will write their own PhD project proposals and execute them within the research group of their choice. NUTRIM decided to continue this successful Graduate Programme by offering each year three new scholarships.
- In 2012 FMHL assigned 2.0 research fte to NUTRIM for the establishment of a Bioinformatics group headed by prof. C Evelo and embedded within RL4.
- In 2012 the scientific director of NUTRIM initiated the Maastricht University Interfaculty Programme "Eatwell" (www.um-eatwell.nl) involving four faculties (Health, Medicine and Life Sciences (FHML), Psychology and Neurosciences (FPN), Law (FLaw), Business and Economics (SBE). In 2013 Eatwell was awarded a grant by the University Board for its research programme "Eatwell combats Globesity".
- In 2014 "Metabolism and Nutrition" was positioned as innovation platform within the Maastricht University Medical Centre portfolio 2020 with an outlook towards four disease oriented profiles (Respiratory, Cardiovascular, Oncology, Neurosciences) and a focus of the UMC+ towards "healthy living". This strengthens the distinct international profile of NUTRIM and broadens the perspective of NUTRIM scientists to interact with the clinic and to translate mechanistic research across diseases in line with a systems approach towards chronic diseases. In line with this development, the school proposed to change its name from NUTRIM School for Nutrition, Toxicology and Metabolism to NUTRIM School of Nutrition and Translational Research in Metabolism which was approved by the University Board.
- During the past six years several initiatives were taken by Maastricht University, the Province of Limburg, Private Companies and other knowledge institutes to strengthen the knowledge infrastructure in the Province of Limburg. Two intertwined Campuses (the Chemelot Campus and the Maastricht Health Campus) were established to strengthen the Technology Platform and their connection with the biomedical focus and clinical environment of Maastricht UMC+. This is part of the so-called Knowledge-Axis of the Province Limburg and is visualised in figure 3 Large investments were made at the Maastricht Health Campus in high field MRI scanners for innovative brain imaging. This initiative has among other things stimulated interfaculty research collaboration between NUTRIM and FPN focusing on the "gut-brain axis". In 2012 "Enabling Technologies" was established to set up joint Facility Centres at both campuses. These are equipped with high-end analytical instruments such as high end microscopes, mass spectrometers, and IT infrastructure. Several NUTRIM research groups from all research lines are involved in this initiative. In 2014 Maastricht University appointed three top scientists (Prof. Ron Heeren (Imaging Mass Spectrometry), Prof. Peter Peters (Nanoscopy) and Prof. Clemens van Blitterswijk (Regenerative Medicine) as University Professors. In close collaboration with NUTRIM's RL2 the creation of a new European institute for molecular imaging, the Maastricht Multimodal Molecular Imaging institute M4I was established in 2014 to stimulate and accelerate integration of innovative imaging technology with existing technology for metabolic research (e.g stable isotopes, tissue analyses) and the clinic (unique tissue collection and surgical models).
- Several scientists within NUTRIM completed their FHML top-talent track and were appointed professor during the past years (Prof. Luc van Loon, Prof. Matthijs Hesselink, Prof. Patrick Schrauwen, Prof. Stef Kremers and Prof. Jogchum Plat). Three NUTRIM scientists were selected for the top-talent programme that started in 2014 (Dr Ronit Sverdlov, Dr Marieke Pierik and Dr Martijn Spruit, who is appointed at the CIRO Centre of expertise for chronic organ failure).

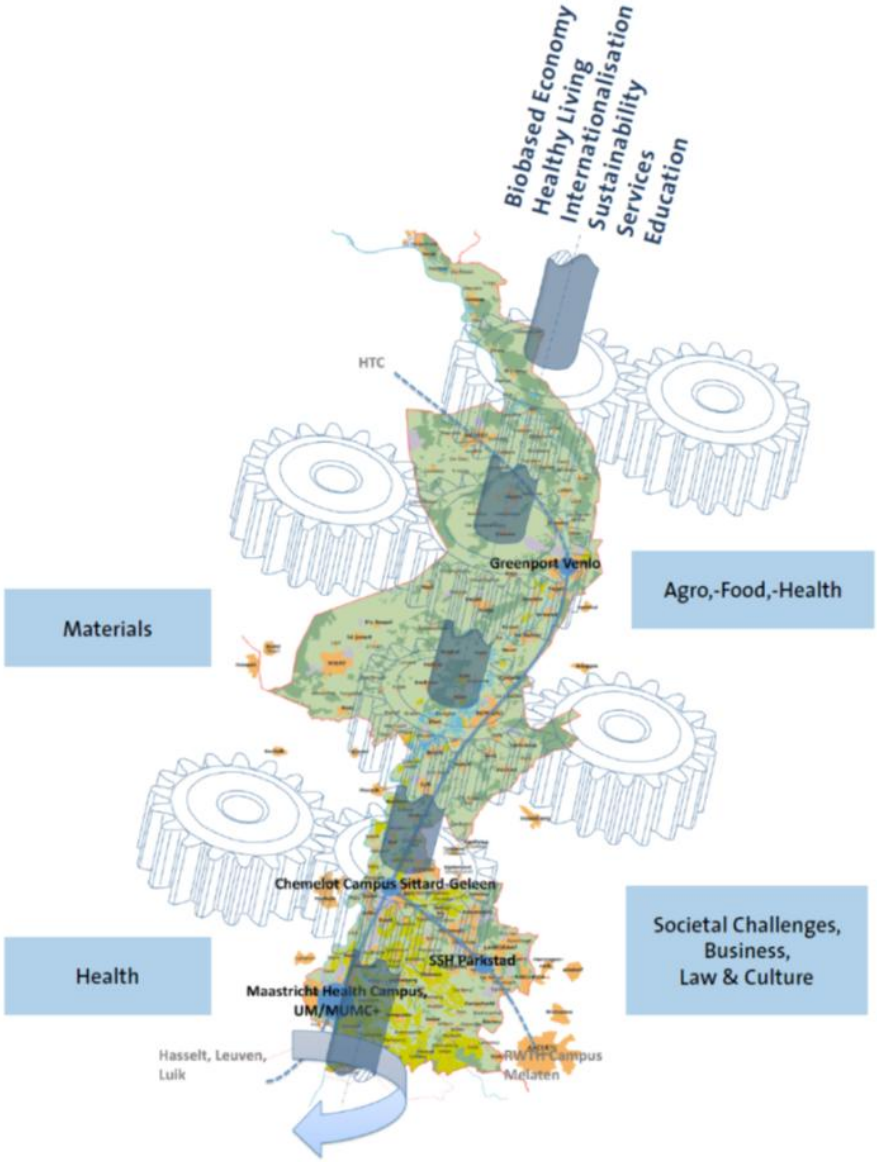

Figure 3: Knowledge axis Province of Limburg

- New investments were made in a) Complex Genetics by appointing Prof. Maurice Zeegers from Birmingham, in b) Medical Microbiology by appointing Prof. Paul Savelkoul from Amsterdam (including investment in two assistant professors focusing on the digestive and the respiratory system) and c) in Metabolic Imaging partly based on innovative work on brown adipose tissue by dr Wouter van Marken Lichtenbelt who was promoted as professor in 2014.
- Scientific research highlights and other new academic appointments are presented in the separate research line reports.

3. Organisation and Management

3.1 Formal structure and organisation of the Graduate School

The organisation of the NUTRIM School is presented in figure 4.

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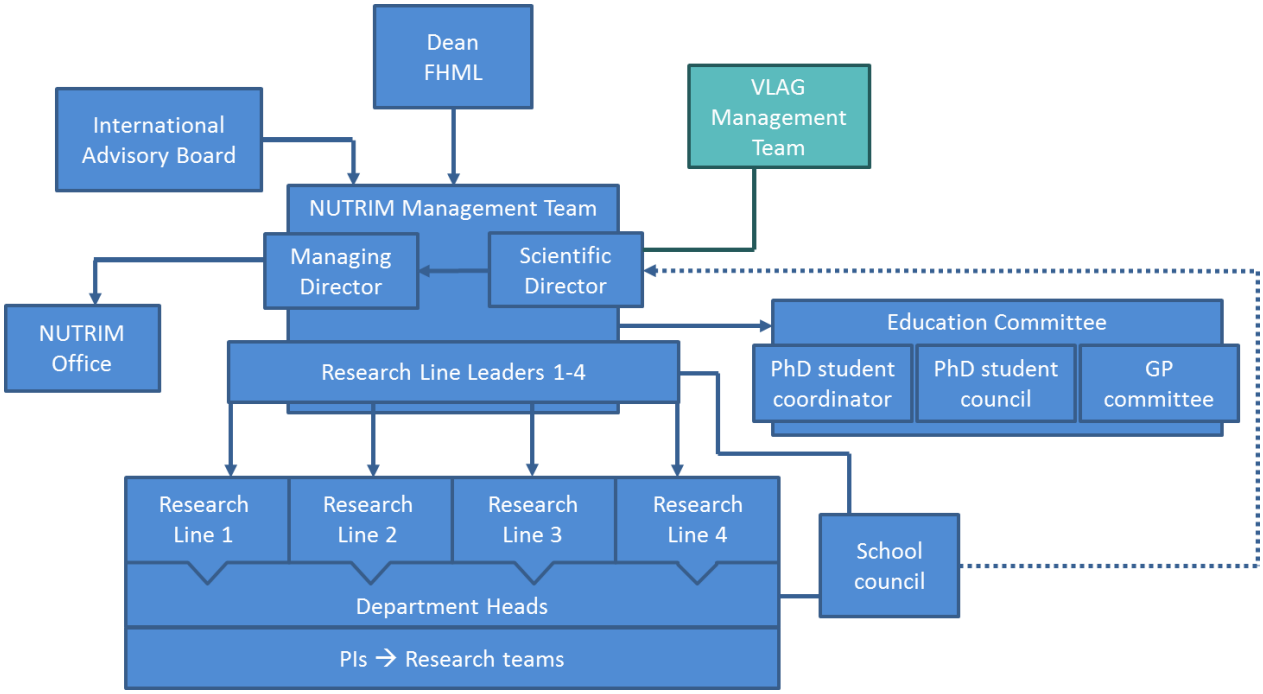


Figure 4: Organisation of NUTRIM

The NUTRIM Management Team (MT) consists of the Scientific Director, the Managing Director and the four Research Line Leaders. The MT meets monthly. The Scientific Director (Prof. A. Schols) has the full and integral responsibility for the school and reports to the Dean of FHML. The Scientific Director is also member of the VLAG MT. The NUTRIM education committee (EC) coordinates and advices on the PhD programme and consists of the PhD student coordinator (Dr R. Godschalk; chairman), the PhD student council and the NUTRIM Graduate Programme (GP) committee. The thematic needs and expertise of the disciplinary departments is attuned every 3 months within the NUTRIM School Council involving the MT, the chairman of the EC and the department heads. The International Advisory Board (IAB) provides advice on strategic issues concerning the direction and quality of the research and educational programme, and helps VLAG and NUTRIM to identify opportunities for academic and professional alliances. The IAB also performs mid-term reviews of VLAG and additionally for NUTRIM as a local graduate school, as requested by the University Board of Maastricht University. The NUTRIM PhD student council consists of representative PhD students of the different research lines supported by the PhD students coordinator and a member of the NUTRIM Office. One of the PhD students chairs this committee.

3.2 Management and Resources

At Maastricht University a senior professor is halftime appointed within NUTRIM as scientific director. Since 2006 this position is held by Prof. Annemie Schols, who was reappointed in 2012 for another six years. The scientific director is assisted in her tasks by a small but dedicated management office. The NUTRIM Office is exclusively active for the NUTRIM society. It supports the scientific director in the daily management of the school, and it is the place where all legal and financial-administrative tasks related to grant proposals and granted projects are carried out. The NUTRIM Office tries to take away as much as possible of the financial-administrative burden from the researchers so they can dedicate as much of their scarce time to research as possible.

The NUTRIM Office consists of a managing director (1,0 fte), a financial controller (0,7 fte), an assistant managing director (0,8 fte), a secretary (0,5 fte), a lawyer (0,2 fte) and three financial consultants from the Finance Department of Maastricht University who hold their workplace at the NUTRIM office (2,3 fte). The financial consultants are paid directly by the Faculty Health, Medicine and Life Sciences (FHML), the other fte's (3,2 fte) are mainly (80 %) financed by the yearly lump sum the school gets from FHML and partly by the NUTRIM society from the overhead charged on research contracts and part of the grants obtained by NUTRIM researchers. The annual budget for the NUTRIM Office amounts to 350 k€ per year.

3.3. NUTRIM Research staff

NUTRIM comprises 220.9 fte's (including 29.6 scientific staff, 27.5 post-docs, 109.9 PhD students and 53.9 support staff), as per 31 December 2014.

Table 3.5 – NUTRIM research staff at the institutional level

Table 3.5	2009		2010		2011		2012		2013		2014	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific staff [1]	91	34,7	91	35,0	83	29,8	83	31,9	82	30,9	83	29,6
Post-docs [2]	37	29,6	46	39,0	35	29,9	35	26,6	32	24,8	36	27,5
PhD candidates[3]	127	123,7	127	125,2	113	111,2	108	104,7	123	118,0	115	109,9
Total res. staff	**255**	**188,0**	**264**	**199,2**	**231**	**170,9**	**226**	**163,2**	**237**	**173,6**	**234**	**167,0**
Lab Technicians	77	59,9	72	56,3	65	50,5	59	45,3	54	40,2	64	48,0
Visiting fellows	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Total staff for research	**332**	**247,85**	**336**	**255,5**	**296**	**221,39**	**285**	**208,46**	**291**	**213,796**	**298**	**215,02**
Other (admin.) staff	13	8,1	13	9,0	9	5,5	9	5,8	8	5,3	9	5,9
Total staff	**345**	**256,0**	**349**	**264,5**	**305**	**226,9**	**294**	**214,3**	**299**	**219,1**	**307**	**220,9**

- *FTE: sum of actual FTE-factors (in fulltime equivalents) labelled on NUTRIM research activities on 31-dec on any year*
- *#: number of persons active on NUTRIM Research activities on 31-dec of any year*
- *Scientific Staff: Professor, Assistant Professor and Associated Professor (direct funding)*
- *Postdocs: researchers with completed PhD not belonging to Scientific staff*
- *PhD candidate: Standard PhD candidate with a contract.*
- *Lab technicians: technician, dieticians, data managers, research assistants etc.*
- *Other (admin.) staff: NUTRIM Office, personal assistants to PI's and project leaders etc.*

NUTRIM's tenured research staff has decreased in the past 3 years. Since 2007 our policy has been more on focus and integration than on growth. In line with that principle, in 2011, the Toxicogenomics group was transferred from NUTRIM to the graduate school for Oncology and Developmental Biology (GROW). Furthermore, the Nutritional Epidemiology group was transferred from NUTRIM to two other FHML Schools. One part of the group went to GROW (in 2007) and one part went to the CAPHRI School for Public Health and Primary Care in 2010.

Among all categories of professors 11% is non-Dutch which is close to the average in the Netherlands (15%). Unique to NUTRIM –in comparison to other research institutes in the area of nutrition and health- is, that 37% of the professors also has a clinical appointment. As far as the gender balance is concerned, currently 17% of NUTRIM professors are females which is substantially higher than at the other FHML graduate schools. Among the assistant and associate professors this percentage amounts to approximately 37%. Two female scientists were promoted to associate professor based on an Aspasia Fellowship obtained from NWO and one female Assistant Professor and one female Associate Professor participate in the 2014 Top-Talent programme at the moment. 72% of the PhD students is Dutch and 55% is female. These figures indicate that the NUTRIM community represents a balanced critical mass.

In contrast to most other FHML schools and also in contrast to the WU, NUTRIM has appointed only one endowed professor (Prof. A. Opperhuizen from the Dutch Food and Consumer Product Safety Authority). Negotiation with two Global Nutrition Companies concerning a Strategic Collaboration that may include an endowed Professor in the near future is on-going. Obviously NUTRIM maintains high standards for its endowed chairs as well as for the NUTRIM professors.

3.4. NUTRIM Funding

NUTRIM can exist because it receives government (direct) funding. The amount of direct funding per year has decreased over the years from M€ 4,5 in 2009-11, to M€ 4,3 in the years 2012-14. In the autumn of 2011 the FHML- through which the school mainly gets its government funding - decided that the basic funding of its graduate schools had to be cut back with 10% compared to 2011. The blow to the direct funding of NUTRIM has been softened by the simultaneous introduction (from 2012 onwards) of a performance related compartment within the direct funding of which NUTRIM took advantage. Furthermore the addition of the research capacity of the newly formed Bioinformatics Department to NUTRIM in 2012 tempers the drop in direct funding and somewhat obscures the challenge that the school faced at the end of 2011.

The direct funding is primarily used for paying the tenured staff (researchers and supporting staff). Over the period 2009-2014 NUTRIM holds and pays for approximately 25 fte scientific staff (60 tenured staff members) and 16 fte supporting staff per year that are appointed in 16 different departments. Next to this, 2,7 fte supporting staff per year is employed at the NUTRIM Office. The scientific director is appointed for (0.5 fte) and the school allocates part of the direct funding to talent programmes (see below), PhD-positions and PhD-training.

Apart from the direct funding from FHML, the school receives approximately 6 fte research capacity free of charge per year from the clinical departments active in azM. The authority of the school over this free-of-charge research capacity is, by experience, easily overrated. The possibilities to steer and manage this capacity is currently predominantly determined by the clinical department heads within the hospital. For NUTRIM more influence in the management of this incredibly valuable clinical research capacity could be beneficial for allignment with the UMC+ strategic plan for 2015-2020.

In 2009 the Executive Board of Maastricht University gave an extra stimulus of M€ 3,6 to NUTRIM for strengthening its research infrastructure. The money is used to finance a) the Metabolic research Unit Maastricht (MRUM), b) expanding two cohorts for translational research c) facilitating tenure tracks for young talented researchers and d) appointment of full professors. Half of the tenure tracks were successful and are now part of the permanent NUTRIM staff; the others left Maastricht University. By the end of 2014 all money was assigned to these initiatives, and currently M€ 3 has been spent.

The indicated reduction of 10% on direct funding in the autumn of 2011 was accommodated by a comprehensive set of measures that were implemented in 2012/13. First of all the research capacity of one underachieving department was drastically curtailed; the capacity of others was left untouched because these departments all performed well. The PhD-positions attributed to the research lines and bench fees related to research capacity were instantly put on hold. Last but not least, the scientific director in close cooperation with the school council decided to pass on part of the costs of the researchers (6% of the costs) and supporting staff (8% of the costs) to the research teams (not departments) active in NUTRIM who - on average – hold a vast amount of reserves. The latter measure brought back a lot of money (approximately k€ 250-300) and was combined with simultaneously raising the incentive (from k€2,5 to k€ 17) for completed PhD-dissertations. Looking back in 2015 this set of measures appears adequate to curtail the costs and was easily accepted by the research groups.

<u>Funding of PhD training and education activities</u>
The NUTRIM Office organizes and keeps track of the progress of the individual PhD-projects together with the PhD-coordinator of NUTRIM (currently dr Roger Godschalk), and organizes all training activities for PhD's. Most PhD courses are organized and financed by FHML and Maastricht University but specific NUTRIM courses are financed by NUTRIM and VLAG.

<u>Funding of research projects: VLAG open calls</u>
NUTRIM has participated in all VLAG Open Calls. For outcomes of the VLAG Open Calls, see VLAG document, part A. In all rounds one or two collaborative projects of teams consisting of researchers from

Wageningen and NUTRIM were awarded. Those projects have been partially (50%) funded by NUTRIM centrally or by the contributing research team.

Funding of research talents: NUTRIM Graduate Programme

NUTRIM holds a Graduate programme since 2013. The first year four talented students were offered a PhD-position within a NUTRIM research group financed by a grant provided for by the National Science Foundation (NWO). NUTRIM has decided to prolong the Graduate Programme using its own resources as it attracts excellent students. Each year 3 talented students (out of approximately 10-15 applications) are granted a PhD-position within this programme financed by NUTRIM. Through the NUTRIM Graduate Programme 540 k€ per year is invested in offering the best students to do their PhD study at NUTRIM.

Funding of research talent: Kootstra Fellowships

NUTRIM also co-finances (50%) Kootstra Fellowships. The fellowships are awarded by the board of Maastricht UMC+ to talented MSc students, and talented postdocs who just finished their PhD-thesis. Members of the tenured staff of the different research schools within FHML can apply for a fellowship for talented youngsters financed partly by the Faculty (50%) and partly by their respective research school (50%). A fellowship for a talented student amounts currently to approximately 42 k€, and for a talented postdoc approximately to 58 k€. The fellowships enable a research school to employ the fellows for a full year within a research group, including a bench fee and travel allowance.
In general, 25% of the Kootstra applications are awarded. In the table the number of Kootstra Fellowships that have been co-financed by NUTRIM over the period 2009-14 are given accounting for in total 650 k€.

Table 3.3 – Number of Kootstra Fellowships awarded (number of total NUTRIM-proposals between brackets) and co-financed (50%) by NUTRIM

Year	Talented student	Talented Postdoc
2014	4 (11)	1 (5)
2013	2 (9)	2 (3)
2012	1 (10)	2 (6)
2011	1 (13)	1 (6)
2010	2 (6)	5 (7)
2009	3 (12)	4 (6)

Summary and totals

The direct funding (permanent and temporary) by FHML/Maastricht University amounts to approximately 5 M€ per year. The latter has decreased and will decrease further in the near future because temporary funding by the Executive Board is exhausted in 2015. Funding from external sources amounts on average to M€ 11,5 per year. The financing by Maastricht University is approximately 30% of the total resources available per year.

The table below provides information on the funding of NUTRIM activities over the period 2009-14. Research contracts are the most important source of funding. On average nearly 50% of NUTRIM activities is financed through research contracts. NUTRIM is therefore mainly financed by external parties. More information on the relevant external parties can be found in the documentation of the research lines.

Table 2.2 - Funding NUTRIM - 2009-2014

	2009		2010		2011		2012		2013		2014		Average 2009-2014	
Research Unit														
Funding:	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding (1)	77,9 fte	30%	84,8 fte	32%	69,4 fte	30%	73,1 fte	34%	66,6 fte	30%	63,5 fte	29%	72,5 fte	31%
Research grants (2)	51,0 fte	20%	51,4 fte	19%	28,1 fte	12%	26,0 fte	12%	27,9 fte	13%	29,4 fte	13%	35,6 fte	15%
Contract research (3)	121,3 fte	47%	119,5 fte	45%	116,1 fte	51%	102,1 fte	48%	107,6 fte	49%	109,3 fte	50%	112,7 fte	48%
Other (4)	5,8 fte	2%	8,8 fte	3%	13,3 fte	6%	13,1 fte	6%	17,0 fte	8%	18,9 fte	9%	12,8 fte	5%
Total funding	**256,0 fte**	**100%**	**264,5 fte**	**100%**	**226,9 fte**	**100%**	**214,3 fte**	**100%**	**219,1 fte**	**100%**	**220,9 fte**	**100%**	**233,6 fte**	**100%**
Expenditure:	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%
Personnel costs	12743 k€	68%	12681 k€	67%	11311 k€	66%	10996 k€	73%	11209 k€	72%	11623 k€	74%	11761 k€	70%
Other costs	6065 k€	32%	6178 k€	33%	5907 k€	34%	4126 k€	27%	4301 k€	28%	4166 k€	26%	5124 k€	30%
Total expenditure	**18808 k€**	**100%**	**18859 k€**	**100%**	**17218 k€**	**100%**	**15123 k€**	**100%**	**15511 k€**	**100%**	**15790 k€**	**100%**	**16885 k€**	**100%**

1) Direct funding by FHML/Maastricht University (research staff, lab technicians (supporting staff) and PhD students)
2) Research grants obtained in national and international scientific competition (e.g. grants from NWO, KNAW and European Research Council)
3) Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations
4) Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within NUTRIM)

4 PhD Programme

A detailed description of the PhD programme is presented in part A of the VLAG report. In short, the training and education programme includes a) general courses for all research schools by the FHML institute for education, b) school specific courses organized by NUTRIM, c) 'nutrition, metabolism & health' focused courses organized with partners of VLAG, alternating in Wageningen or in Maastricht. An overview is provided in appendix 4. Master classes by internationally renowned guest speakers are regularly organized and a variety of quality controlled workshops focusing on specific research methodology or more general topics such as ethics, IP and business development. Students and post-docs are encouraged to not just work on their research projects but be aware of its context and develop and open and critical mind. This is attempted within the NUTRIM course portfolio but students are also encouraged to attend courses elsewhere or to spend part of the research time abroad. Students are encouraged to visit conferences and present their work in order to develop their own professional network. At the beginning of their PhD project, each PhD student and their supervisor jointly design a personalised training and education programme. This programme is annually evaluated by the PhD student, the supervisor(s) and the PhD counsellor using an electronic PhD student portfolio (appendix 5). When students have fulfilled all requirements, they can apply for a Certificate of the Graduate School VLAG. While the majority of students is eligible, only part of them (in particular the non-medical PhD students) apply for the Certificate.

The NUTRIM office, for some larger initiatives (e.g. annual NUTRIM symposium and International Meetings) supported by MINT institute for Postgraduate Education (www.mintonline.org) is in charge of the organization of all NUTRIM training activities together with the Scientific Director and the PhD student coordinator.

Furthermore, the NUTRIM Office keeps track of the progress of the individual PhD-projects together with the PhD-coordinator of NUTRIM. Since 2015 the electronic "track" system is implemented across all FHML graduate schools in order to improve and facilitate monitoring which will contribute to further diminishing the duration of a successful PhD trajectory.

4.1. Graduation rate

To be able to show a complete picture of the graduation rate and duration of PhD-studies at NUTRIM, the information given in chapter 7 of the VLAG document, including tables 7.2a and 7.2b (here named table 4.1 and 4.2) is repeated here. This is followed by a NUTRIM analysis of the time and reason for discontinuing a PhD-project.

Table 4.1 - Duration and the success rate of the PhD programme within NUTRIM (status end march 2015)

Enrolment				**Success rates**							
Starting year	Enrolment (Male / Female)		Total (M+F)	Grad. in year 4 or earlier (1)	Grad.in year 5 or earlier (1)	Grad. in year 6 or earlier (1)	Grad. in year 7 or earlier (1)	Grad. after 7 years (1)	Not yet Finished (1)	Discon-tinued (2)	ABD (2)
2003	9	18	27	1 / 4%	11 / 41%	20 / 74%	22 / 81%	2 / 7%	0 / 0%	3 / 11%	0 / 0%
2004	9	9	18	1 / 6%	4 / 22%	9 / 50%	12 / 67%	2 / 11%	1 / 6%	2 / 11%	1 / 6%
2005	12	27	39	2 / 5%	11 / 28%	23 / 59%	29 / 74%	2 / 5%	1 / 3%	7 / 18%	0 / 0%
2006	7	24	31	3 / 10%	9 / 29%	16 / 52%	20 / 65%	0 / 0%	7 / 23%	4 / 13%	0 / 0%
2007	14	25	39	5 / 13%	15 / 38%	26 / 67%	30 / 77%	2 / 5%	4 / 10%	3 / 8%	0 / 0%
2008	11	18	29	1 / 3%	9 / 31%	19 / 66%	22 / 76%	0 / 0%	3 / 10%	4 / 14%	0 / 0%
2009	18	17	35	2 / 6%	9 / 26%	16 / 46%	17 / 49%	0 / 0%	14 / 40%	3 / 9%	1 / 3%
2010	22	25	47	7 / 15%	15 / 32%	17 / 36%	17 / 36%	0 / 0%	27 / 57%	2 / 4%	1 / 2%
2011	13	21	34	3 / 9%	4 / 12%	4 / 12%	4 / 12%	0 / 0%	28 / 82%	2 / 6%	0 / 0%
2012	15	12	27	1 / 4%	1 / 4%	1 / 4%	1 / 4%	0 / 0%	25 / 93%	1 / 4%	0 / 0%
2013	28	25	53	2 / 4%	2 / 4%	2 / 4%	2 / 4%	0 / 0%	50 / 94%	1 / 2%	0 / 0%
Total	**158**	**221**	**379**	**28 / 8%**	**90 / 24%**	**153 / 44%**	**176 / 46%**	**8 / 2%**	**160 / 47%**	**32 / 8%**	**3 / 1%**

1) Percentages of continued PhDs (total enrolment minus the discontinued) in any year

2) Percentages of enrolled PhDs in any year

ABD = All But Discontinued (moved to other university together with promotor, moved to other school, etc.)

The numbers and percentages in Table 7.2 are presented in a cumulative way. For example, the data in the column 'Graduated in year 5 or earlier' also take into account the graduations in year 4 and earlier; 'Graduated in year 6 and earlier' also include the gradation in year 5 and year 4 or earlier; etcetera. Obviously this is not applied to the column 'graduated after 7 years'. The percentages in the columns about graduation / not yet finished are related to the total enrolment minus the discontinued; the other columns relate to the total enrolment. The column ABD (All But Discontinued) concerns those PhD-students who have moved to another university together with their promotor for example, or have moved to another FHML School, etc.

Time-to-degree is defined as the period between the start of the project and the PhD graduation. This time period is not corrected for various personal circumstances that might prolong the duration (e.g. illness, maternal leave, part time employment, extension, etc.) and it also includes the interval period between the approval of the manuscript by the thesis committee and the date on which the public PhD defence takes place.

Focusing only on the incoming PhD cohorts (all categories) about which we can draw definitive conclusions on the time-to-degree we see that:

- From the cohorts starting in the years 2003 up to and including 2010 the figures show that on average 9% of PhD candidates completed their thesis within 4 years
- From the cohorts starting in the years 2003 up to and including 2009 an average 35% of the PhD candidates obtained their degree within 5 years.
- From the cohorts starting in the years 2003 up to and including 2008 70% PhDs obtained their degree within 6 years
- From the cohorts starting in the years 2003 up to and including 2007 84% PhDs obtained their degree within 7 years.

As shown in the table below, for these PhD cohorts statistics show a mean time-to-degree value varying between 50 and 65 months, and median time-to-degree values between 51 and 65 months. However, since the PhDs that started during this period have not all completed their thesis, the mean/median duration will still increase

Table 4.2 – Summary time-to-degree (in months) per incoming cohort at NUTRIM

Total ALL PhD's	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Mean	50	65	62	53	65	65	57
Median	64	64	62	51	65	63	58
Employed PhD's	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Mean	67	67	65	63	61	60	61
Median	63	64	64	63	61	58	60
Other categories	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Mean	33	63	60	44	69	70	54
Median	33	63	60	38	69	68	57

The average duration of PhD's in all categories is 60 months. In spite of annual monitoring of NUTRIM PhD Students and providing regular feed-back since 2000 it has proven to be very difficult to decrease this number.

In total 32 of 379 enrolled PhD-students in the period 2003-13 have discontinued their PhD-study. Most discontinued projects were stopped in the first 18 months, however still a considerable number was also discontinued after 18 months. In a minority of the discontinued cases discontinuation was initiated by the promotors ("No-GO"), most of the time the PhD-student themselves took the initiative to stop or other reasons played a dominant role.

Table 4.3 Timing and reason of discontinuation PhD-project, NUTRIM-cohorts 2003-2013

		Discontinued <=18 months			**Discontinued 18-48 months**			
Starting year	Total Enrolment	No-GO	Own initi-ative	Other	No-GO	Own initi-ative	Other	Total Dis-continued
2003	27	0 / 0%	1 / 4%	1 / 4%	0 / 0%	0 / 0%	1 / 4%	3 / 11%
2004	18	1 / 6%	0 / 0%	1 / 6%	0 / 0%	0 / 0%	0 / 0%	2 / 11%
2005	39	0 / 0%	1 / 3%	4 / 10%	0 / 0%	1 / 3%	1 / 3%	7 / 18%
2006	31	0 / 0%	0 / 0%	1 / 3%	0 / 0%	1 / 3%	2 / 6%	4 / 13%
2007	39	1 / 3%	2 / 5%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	3 / 8%
2008	29	2 / 7%	1 / 3%	0 / 0%	0 / 0%	1 / 3%	0 / 0%	4 / 14%
2009	35	1 / 3%	0 / 0%	1 / 3%	1 / 3%	0 / 0%	0 / 0%	3 / 9%
2010	47	0 / 0%	1 / 2%	0 / 0%	1 / 2%	0 / 0%	0 / 0%	2 / 4%
2011	34	0 / 0%	1 / 3%	0 / 0%	1 / 3%	0 / 0%	0 / 0%	2 / 6%
2012	27	0 / 0%	1 / 4%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	1 / 4%
2013	53	1 / 2%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	0 / 0%	1 / 2%
Total	379	6 / 2%	8 / 2%	8 / 2%	3 / 1%	3 / 1%	4 / 1%	32 / 8%

4.2. Career prospects for alumni

The number of PhD students within NUTRIM has continually risen over the last few years. The industrial sector involved is traditionally stable and relatively unaffected by the economic crisis. The employment potential for NUTRIM alumni is excellent. 85% continued research in the Netherlands of whom 30% remained active in research at Maastricht UMC+. Less than 10% continued with a non-scientific career step and approximately 10% went abroad.

4.3 NUTRIM Graduate Programme

As was described in paragraph 3.4 NUTRIM has an active Graduate programme since 2013. In the first instance this was financed by a special NWO grant, and later on by NUTRIM itself, as the programme is very important in terms of NUTRIM's talent policy. Through the NUTRIM Graduate Programme 540 k€ per year is invested in providing the best students to elaborate their own research idea as a PhD project within NUTRIM. Applicants can be students from the Biomedical Sciences Master, the Physician Clinical Investigator master at FHML but also excellent foreign students are eligible. Each year 3 talented students (out of 10-15 applicants) are granted a PhD-position paid for by NUTRIM. This means that till now (2013 and 2014) seven talented students were employed within the Programme, and this summer the next three students will be awarded a PhD-position. Furthermore many other applications also stood out and achieved a regular PhD position within NUTRIM.

4.4 NUTRIM Overall Talent Policy

NUTRIM is proud of its dedicated research talent and therefore has adopted an overall talent policy that is aimed at NUTRIM researchers at every stage of their development: from MSc students to PhD students, and from postdocs to high potentials and TOP researchers. A key factor in a successful talent policy is that talents are spotted timely. Therefore, the scientific director spends much time in maintaining a low threshold and intensive interaction with these researchers, and makes sure all action taken is always carefully aligned with the dean and with the respective department heads. Furthermore, NUTRIM keeps track of when certain talents would be eligible for certain prestigious personal scholarships, such as VENI, VIDI and VICI-scholarships, or ERC-grants.

As was explained in paragraph 3.4, NUTRIM invests a considerable amount of money in the Kootstra Talent Fellowships to enable talented biomedical MSc students and talented PhD-students to apply for a personal grant, which will then give them a chance to work at NUTRIM for a full year and have some money for traveling abroad, which will enhance their CV. The Kootstra Fellowships have proven to be important to NUTRIM's talent policy: looking at the period 2009-2011, 6 MSc students and 10 PhD students obtained a Kootstra fellowship at NUTRIM. After their 'Kootstra year' all MSc students qualified for enrolment in the NUTRIM PhD-programme and none of them dropped out. In the same vein we should mention the NUTRIM Graduate Programme (see 3.4 and 4.3), which has – up until now- given 7 talented PhD-students the opportunity to work on a PhD-project. Furthermore, NUTRIM successfully acquired and coached 12 NWO-AGIKO positions for medical students to combine a PhD track with their medical specialist training. NWO decided to stop this programme in 2014.

NUTRIM also keeps a close eye on its so-called 'high potentials'. First and foremost, the School participates in the FHML talent track programme, which has led to the promotion of six highly talented researchers to professor in the period 2008-2014. In addition to this, the school keeps an eye on possible management skills of its high potentials to move these young people into management-positions within NUTRIM.

5 Research Results

5.1 Research Quality

Demonstrable research products for peers

In Table 5.1 research output is presented per publication category. Refereed articles (number and scientific impact factor) and PhD theses are considered as the most important performance indicators. The table is similar to table 6.1b of the VLAG document, but provides some added information on the refereed articles. Table 5.1 shows, that only a very small percentage of the refereed articles consists of refereed articles that are not published in Web of Science Journals, on average 33 articles. All other articles (500 on average over the last 6 years) have an impact factor (published in WoS journals)

Table 5.1- Main categories of research output at institute level

NUTRIM output:		2009	2010	2011	2012	2013	2014	Total
1. Academic publications	a. Refereed articles	451	521	567	605	558	498	3200
	a.1 Refereed articles in WoS Journals	425	483	542	559	519	474	3002
	a.2 Refereed articles non-WoS	26	38	25	46	39	24	198
	b. Non-refereed articles	6	14	8	17	10	11	66
	c. Books	1			1	2		4
	d.1. Refereed book chapters	4	2	1	14	12	7	40
	d.2. Non-refereed book chapters	1	1	4	4	1	3	14
	e. PhD Theses	26	30	33	39	26	48	202
	f. Conference papers	3	2	2	2	2	1	12
	Total publications	492	570	615	682	611	568	3538
2. Professional publications and products		6	19	24	11	10	4	74
3. Publications for the general public								
4. Other research output		4	17	10	9	10	3	53

NOTE: Refereed articles include full papers, letters, editorial material etc.
**Publications for the general public are listed in a separate document.*

5.1.2 Demonstrable use of research products by peers

Bibliometric analysis

In order for this review to align with Wageningen University, the library of Wageningen University performed the quantitative bibliometric analysis of scientific articles published in journals covered by the Web of Science. The objective of this analysis is to provide an overview of the publication output and international scientific impact of NUTRIM. Table 5.2 summarizes the bibliometric indices per publication year 2008-2013 for NUTRIM as a whole. During this period some 2708 of the scientific articles were published in journals covered by Web of Science.

NOTE: In table 5.1 the total number of refereed articles is notably higher, N=3200, than the totals in table 5.2, N=2708. This is caused by four factors:

1) Non-WoS articles are excluded from the bibliometric analyses in table 5.2 (approx. 200, analysis by WUR librarian)
2) Editorials(approx. 225) are excluded from the bibliometric analyses in table 5.2 (analysis by WUR librarian)
3) A small number of records (approx. 35) could not be retrieved by the WUR librarian in the WoS
4) The periods differ: table 5.1 covers the period 2009 – 2014; table 5.2 covers the period 2008 – 2013 (difference approx. 25)

Table 5.2 - Bibliometric indicators for NUTRIM over the period 2008-2013

year of publication	N	C	Wavg	CPP	RI	%T10 (#T10)	%T1 (#T1)
2008	400	13363	7312	33,4	1,94	23% (93)	3% (11)
2009	393	11570	5792	29,4	2,05	29% (113)	3% (11)
2010	453	11007	5300	24,3	2,17	25% (113)	4% (16)
2011	494	7927	4140	16,0	1,98	26% (126)	4% (20)
2012	503	5560	2640	11,1	2,10	26 % (133)	5% (23)
2013	465	2477	1066	5,3	2,37	31% (146)	4% (20)
all years	**2708**	**51904**	**26250**	19,2	2,11	**27% (724)**	**4% (101)**

N: Number of publications; C: Number of citations of these publications; Wavg ; World average number of citations for publication in same research field; CPP: Average number of citations per publication; RI: Relative Impact; %T10: Percentage of publications within the top 10% most cited publications; %T1: Percentage of publications within the top 1% most cited publications; %NC: Percentage of non-cited articles

NUTRIM produced on average 451 peer reviewed full articles in journals covered by Web of Science per year between 2008 and 2013. The number of publications has grown from 400 in 2008 to 503 in 2012 and 465 in 2013, and their impact has grown as well. The relative impact of these publications is 2,11 or more than twice the world average, and can be categorised as a "very high relative impact". The impact is reflected by the fact that on average 27% of the publications belong to the top 10% most cited publications in their field, and 4% of the publications belong to the top 1% most cited publications in their field.

5.1.3 Demonstrable marks of recognition from peers

In the recent relevant "special topics" rankings by Thomas Reuters Science Watch (www.sciencewatch.com), 3 NUTRIM senior scientists were ranked within the authors top 20:

Jan 2010; COPD: Prof. Emiel Wouters was ranked # 2 for number of papers and # 3 for citations
COPD: Prof. Annemie Schols was ranked # 6 for papers and # 13 for citations
April 2010 Obesity: Prof. Wim Saris was ranked # 6 for number of papers.

Other demonstrable marks of recognition are summarized in the research line documents.

5.2. Relevance to Society

NUTRIM's fields of activity receive significant attention from society and media (See NUTRIM website: www.maastrichtuniversity.nl/nutrim) for overview of press releases / media contacts 2009 - 2014). New insights on nutrition and metabolism in the battle against obesity and chronic diseases as well as the role of nutrition in medical care is incorporated in numerous national and international guidelines by the various medical societies and in policy documents. Technological advancement in monitoring is incorporated in diagnostic procedures and innovative counselling strategies. The prominent role NUTRIM plays in this area is also evident from the large amount of research projects embedded within the Top Institutes, financed by Charity funds and by ZonMw as well as strong involvement of NUTRIM within the Dutch Top sector Agro&Food and within the Top sector Life Sciences and Health.

The long-term goal of NUTRIM is to aim for a centre of excellence position in the academic world and at the same time stay attuned to societal needs and create an understanding and awareness within society for the scientific efforts and findings.
Valorisation is achieved in different ways: for example by integrating the research within the healthcare policy of Maastricht UMC+. Furthermore, NUTRIM is involved in several commercialisation activities of its research (e.g. clinical activity monitor, respiration chambers and other indirect calorimetry systems) by Maastricht Instruments, a high tech company that was developed by Maastricht UMC+ and is located at the Maastricht Health Campus. Strategic collaboration exists with several global companies (e.g. GSK, Danone, DSM, Philips) and SME within the region (e.g. Newtricious, Scelta) and NUTRIM participates in different public private collaborations as indicated previously.
There is also a strong interaction with governmental organisations and patient organisations and scientists and clinicians frequently participate in national and European debates and media which allows the direct communication of insights, findings and opinions towards a broader audience.
Patents and publications enable the development of new insights in start-up companies and in (inter)national guidelines. More specific examples are provided in the research line documents.

6. Research Integrity

Our scientists and PhD students are obliged to follow the national guidelines for Research Integrity (VSNU; Association of Universities in the Netherlands). We have whistle blowing and proper escalation procedures in place to handle suspected scientific misconduct. In addition, our research line is in charge of shaping a Research Integrity Policy that will be rolled in our School, Faculty and University. This policy aims to prevent misconduct and questionable research practices. Prof. Zeegers is leading in the construction of the Centre for Research Ethics and Integrity within the Maastricht University.

We stimulate all our research to undergo ethical review according the law on Medical Research Involving

Human Subjects Act (WMO), even if our research is not invasive or does not involve patients or body materials (non-WMO complicit medical research). For this a new ethical review committee for non-WMO research is being developed. Our aim is to reach full transparency and accountability in our research. We ask our researchers to register their study protocol and make their dataset available using the online Dataverse platform (www.dataverse.nl).

PhD students are supervised by a co-promoter (Assistant or Associate Professor) and a promoter (Professor). The co-promoter has the daily supervision and the promoter is more at distance involved in specific scientific and strategic issues. Regular meetings are scheduled to discuss progress, focus, problems and time schedule of the PhD project. NUTRIM has implemented a PhD TRACK system, a new software platform to facilitate communication between PhD Students and their supervisors and to monitor PhD trajectories more effectively. Once or twice a year PhD students and supervisors receive instructions, e.g., to complete an assessment of whether the project is proceeding according to plan. This track system allows for an effective management of the PhD student progress, monitoring possible bottlenecks and the completion of the PhD in time.

At the level of the Maastricht UMC+ a special research code was developed, which is published on the website (http://crispmaastricht.nl/en/?page_id=401). The Research Code Maastricht UMC+ provides those involved in research with a clear description of the rules for ethical and socially responsible conduct in scientific research, as it is very important for the Maastricht UMC+ Board that all its researchers work according to existing legal and regulatory requirements. Therefore, every new researcher (including PhD-students) who will receive their contract from the HR-department is informed about the existence of the Maastricht UMC+ Research Code.

At the UM level a special “Regulation for Scientific Integrity” was developed, which clearly describes the UM policy in this area. The Executive Board has appointed a counsellor on scientific integrity, who is the contact person for questions or complaints concerning scientific integrity. The counsellor will try to mediate in the complaint or otherwise to reach an amicable resolution. If this is not possible, he will guide the complainant to file the complaint to the Committee for Scientific Integrity UM, who will then take it further and will advise the Executive Board. Furthermore at the UM level, special ‘Days on Research Ethics’ were organised in 2014, aimed at PhD-students and postdocs. NUTRIM professor Maurice Zeegers was invited as a speaker on these days.

At the national level Prof. A. Schols contributed to a national policy on research integrity as member of the working group “Health Research” of the Dutch Health Council.

7. SWOT analysis, and strategy for the future

Strengths

- An excellent, state of the art research infrastructure to carry out in vivo human metabolic research.
- Integrated research programme that has the potential for unexpected and truly innovative connections.
- A balanced organisation with complimentary and internationally leading programmes that gives NUTRIM a strong and distinct international position.
- Clinical and societal highly relevant research themes.
- A strong portfolio in research funds and contracts with a balanced mixture between fundamental, clinical and applied science.
- Alignment of research and health care strengthens translational research and stimulates career opportunities for talented scientists and clinicians.
- Profound cross-disciplinary interaction between researchers and between researchers and the clinic.
- Internationally unique positioning of “metabolism and nutrition” as innovation platform within Maastricht UMC+.
- Attractive environment for strategic collaborations with global companies and SMEs.
- We have succeeded in not only maintaining excellent staff, but also attracting new talent and

established professors.
- Participation in various calls of Joint Programme Initiative “A healthy Diet for a Healthy Life”
- Leading position in the establishment of Mosae Vita as flagship for the ambition of Maastricht UMC+ towards “Healthy Living”.
- Coordinator of the Maastricht University Interfaculty Programme “Eatwell” that integrates expertise from Biomedical Sciences, Psychology and Neurosciences, Law and Economics to tackle major nutrition related health problems.

Weaknesses
- The nationally eccentric position of Maastricht remains a concern, as it complicates the recruitment of researchers to this area. Although this point remains a challenge, we will utilise our good position between Germany (Aachen) and Belgium (Liège) for further improvement.
- Less successful in obtaining personal grants at the top level (i.e VICI and ERC grants). In the coming years, NUTRIM will be more proactive in stimulating and guiding potential candidates for these grants.
- Despite active initiatives by the scientific directors of VLAG and NUTRIM, research collaboration between NUTRIM and WU within VLAG is limited.
- Although “Metabolism and Nutrition” has been identified as innovation platform within Maastricht UMC+, for various reasons not all scientists in this domain are embedded within NUTRIM.

Opportunities
- Application of postgenomics and systems biology tools to unravel the multi component pathology of chronic diseases.
- Making optimal use of the combined research infrastructure from NUTRIM and the faculty of Psychology and Neurosciences at the Maastricht Health Campus to contribute to the academic profile of the Neuro Intervention Centre (see figure 1).
- Further exploration of truly new research areas to join forces of NUTRIM and the other VLAG partners.
- The themes within NUTRIM are international priorities; the sectors involved are innovative and accept the concept of open innovation.
- Stronger visibility of NUTRIM’s research in some of the intended selected clinical centres of excellence (disease profiles) at Maastricht UMC+.
- Creation of a network of collaborating institutes throughout Europe may generate a wider network of courses, open up new research areas and stimulate and facilitate new and more coordinated actions. A nice example is the positioning of nutrition and NUTRIM within the European Clinical Research Network (ECRIN) and the initiative to join forces as Benelux academic group (involving Wageningen, Maastricht, Gent) within the EU Foodbest Knowledge Innovation Community (KIC) that is currently being developed. Maastricht University also participates in the KIC Health allowing NUTRIM to connect nutritional sciences to this initiative.
- The Enabling Technologies Grant by the Province of Limburg has stimulated a state of the art integrated technology platform between the Chemelot Campus and the Maastricht Health Campus focusing on microscopy and chemical analyses. This provides opportunities for new cross border collaborations.
- Campus Venlo could be an attractive hub to extent the research portfolio of NUTRIM within the interfaculty programme “Eatwell” and to stimulate joint research between WU and NUTRIM.
- Collaboration with the recently developed institutes MERLIN and M4I.
- Stronger involvement in MaCSBio which allows more development in the systems biology field to which we are already strongly connected and from involvement in the European ESFRI projects Elixir (bioinformatics via DTL), ISBE (systems biology via BioSB) and Eurodish (food and nutrition, Netherlands/Maastricht involved in getting that on ESFRI roadmap. .
- The positioning of NUTRIM as innovation platform within Maastricht UMC+ stimulated stronger collaboration with other FHML research schools that are one to one linked to specific disease profiles.

Threats

- Less funding from Government and EU
- Lack of resources in charity funds.
- Public-private collaborations increasingly determine the Dutch and European research agenda.
- A translational disease oriented approach may limit visibility and positioning of the more public health oriented disciplines such as toxicology.

8. Future strategy

NUTRIM has established a strong position within the field of “nutrition and metabolism” as illustrated by the recently awarded graduate programme grant by NWO. The interfaculty “Eatwell” initiative enhances and broadens the visibility of Maastricht University within the “nutrition and health” domain. The combined research infrastructure and scientific expertise in this area of FHML and the Faculty of Psychology and Neurosciences is internationally unique and initiatives such as Mosae Vita and Brains Unlimited at the Maastricht Health Campus are expected to further boost this connection and valorisation potential.

NUTRIM research is now well positioned as innovation platform within Maastricht UMC+ which even increases the involvement of clinicians in metabolic research and helps to accelerate the implementation of our scientific insights into health care. A better attunement with CAPHRI School of Public Health and Primary Care will also enhance our position in Health Promotion. Combining our metabolic expertise, infrastructure and clinical network with the recently established top institutes MERLN and M4I at the Maastricht Health Campus will accelerate valorisation but also facilitate really innovative research and thereby increase the success rate of acquiring most prestigious personal grants within the Netherlands and within Europe.

NUTRIM is leading in the field of clinical nutrition and translational metabolic research; there is some overlap with the WU which ideally should be better aligned and strategically managed. WU is also strong in food sciences and biomolecular sciences and recent initiatives have made clear that there is more to be gained for both WU and NUTRIM by connecting these WU disciplines more to NUTRIM. This will broaden NUTRIM’s impact in both the clinical field and in innovations in food production, but will also give further impulse towards a number of top sectors (Agri & Food; Health and Life Sciences) and the industrial partners related to those areas.

Intensification of international collaboration in research and education from both a nutritional as well as a clinical perspective will further enhance NUTRIM’s position and is also needed to combine our strength in translational research with systems biology.

9. Viability

The number of PhD students within NUTRIM has continually risen over the last few years and the core activities will all remain prominent in the coming period. The industrial sector involved is traditionally stable and relatively unaffected by the economic crisis. The employment potential for NUTRIM alumni is still excellent.

We appointed several new (young) researchers as assistant professors within all 4 research lines. These persons were first appointed as part of NUTRIM’s investment plan and successfully progressed in their tenure track. This guarantees sustainability of carefully established research themes as well as exploration of new promising research themes. We acknowledge that with the departure of some top researchers due to retirement we also have to invest in some new appointments at the associate or full professor level to maintain our earning power and international network. Furthermore many retired professors are still active within or for NUTRIM as consultant and mentor.

Recently the NUTRIM management team was expanded with 4 (vice) research line leaders to guarantee optimal interaction between basic science and the clinical and to prepare the next generation for leading positions within NUTRIM and/or Maastricht UMC+.

Appendices

Appendix 1 Overview of large collaborative research projects at the national and international level

Table: Large research projects in the Netherlands

public private organisations	research project	NUTRIM PI / coordinator
TIPharma	COPD: Transition of systemic inflammation into multi-organ pathology	Prof. A. Schols
TIFN	Effect of dietary protein, peptides and amino acids on blood pressure	Prof. M. van Baak
	Effect of prebiotic fibres on intestinal Health and Functioning	Prof. E. Blaak
	Dietary strategies to augment muscle mass and function	Pr. L. van Loon
	Nocturnal protein supply during sleep as a dietary strategy to improve muscle mass in elderly	Prof. L. van Loon
	Muscle mass preservation	Prof. L. van Loon
	The impact of the macronutrient composition and energy content of a nutritional supplement on post-prandial muscle protein synthesis in the elderly	Prof. L. van Loon
	Muscle Health and Function	Prof. L. van Loon
	Nutritional and microbial modulation of intestinal epithelial integrity	Prof. A. Masclee / Prof. C. Dejong / Dr. S. Olde Damink
	Gut nutrient sensing in relation to appetite control	Prof. A. Masclee
	Gastrointestinal health / Barrier and Immune	Prof. A. Masclee
	Cardiovascular Health – Human studies	Prof. R. Mensink
	Cardiovascular health - HDL functionality	Prof. R. Mensink
	Using metabolomic analysis of volatile organic compounds (VOCs) in breath as biomarkers for healthy and disturbed gut	Prof. F.J. van Schooten
	Insulin-related metabolic disorders Diet, insulin-resistance and chronic inflammation	Prof. P. Schrauwen
	Ectopic fat	Prof. P. Schrauwen
	Diet and early changes in endothelial function	Prof. C. Stehouwer
	Microbe-mediated gut metabolism / Microbial functionality and safety	Dr. F. Troost
	Oral perception and metabolic effect of proteins	Prof. M. Westerterp-Plantenga
	Sensory satiety, metabolic satiety and food intake regulation	Prof. M. Westerterp-Plantenga
CTMM	Cardiac lipotoxicity	Prof. P. Schrauwen / Prof. M. Hesselink
IOP	The role of inflammation in obesity induced type 2 diabetes: towards new diagnostic markers and therapeutic targets	Dr. S. Olde Damink
NGI-ICN-TIFN	Postprandial fatty acid handling and "Metabolic flexibility" in IGT	Prof. E.E. Blaak
	Steato Hepatitis	Prof. C. Dejong / Dr. S. Olde Damink / Prof. W. Lamers
	Peripheral tissues and metabolic stress	Prof. E. Mariman
	Diet and metabolic stress: Human studies	Prof. R. Mensink / Prof. P. Schrauwen
NGI / NCSB-NBIC	Flux visualization	Prof. C. Evelo
NGI	XAir Diagnostics; a metabolomic approach in exhaled air for diagnosis and monitoring of inflammatory	Prof. F.J. van Schooten

	diseases	
	A novel screening method on identifying human adipokine-receptor interactions	Dr. J. Renes
NFU	'Parelsnoer Irritable Bowel Disease' i.e. co-operation within 8 UMC's for setting up joint Bio banks	Prof. A. Masclee
ZonMw	MUMC-MOVE: one of the 4 national Academic centres for Sports, Physical Activity and Health	Prof. A. Schols / Prof. M. Hesselink
ZonMW	NUTRIM Graduate Programme: Metabolism and Chronic Disease	Prof. A. Schols

Table: Large collaborative EU research projects

European Community		**NUTRIM PI / coordinator**
EC 4-7th Framework		
	Spotlight: Sustainable prevention of obesity through integrated strategies	Dr. P. van Assema
	Flaviola: Targeted delivery of dietary flavenols for optimal human cell function: Effects on cardiovascular health	Prof. A. Bast
	AnastomoSEAL: Development of a resorbable sealing patch for the prevention of anastomotic leakage after colorectal cancer surgical treatment	Prof. N. Bouvy
	An open, integrated and sustainable chemistry, biology and pharmacology knowledge resource for drug discovery	Prof. C. Evelo
	Microgennet: Extension, enhancement and strengthening of established collaborations for the purpose of a community-driven knowledge base for micronutrient genomics	Prof. C. Evelo
	Recruitment and activation of brown adipocytes as preventive and curative therapy for type 2 diabetes	Prof. W.D. van Marken Lichtenbelt
	Seafood: Health promoting, safe seafood of high eating quality in a consumer driven fork-to-fork concept	Prof. R.P. Mensink
	SysmedIBD: Systems medicine of chronic inflammatory bowel disease	Dr. M. Pierik
	Food4Me: Personalised nutrition: An integrated analysis of opportunities and challenges	Prof. W. Saris
	Diet, Obesity, and Genes (Diogenes)	Prof. W. Saris
	Diet, Genome and the metabolic syndrome (LIPGENE)	Prof. W. Saris
	Full4Health: Understanding food-gut-brain mechanisms across the lifespan in the regulation of hunger and satiety for health	Prof. M. Westerterp-Plantenga
	PREVention of diabetes through lifestyle intervention and population studies in Europe and around the world	Prof. M. Westerterp-Plantenga
	Identification and prevention of dietary and life style-induced health effects in children and infants	Prof. K. Westerterp
	e-NanoMapper - A database and ontology framework for Nanomaterials design and safety assessment	Dr. E. Willighagen
Other EC initiatives / projects		
	European Nutrigenomics Organisation (NuGo): Bioinformatics; Innovation and standardisation	Prof. E. Mariman, Prof. C. Evelo
	European Strategic Research Agenda (SRA) of the European Technology Platform ETP Food for life, theme 'Nutrition and Health'	Prof. W. Saris

Appendix 2 Structured international collaborations of NUTRIM

University of Vermont, Burlington, USA
Topic: Respiratory Biology and oxidant-antioxidant metabolism
Contact person: Prof. Y. Janssen-Heininger, Department of Pathology
NUTRIM departments: Respiratory Medicine, Medical Microbiology, Toxicology
Collaboration since 1997
- Faculty exchange (Visiting professorships for Prof. Janssen-Heininger (NUTRIM) and Prof. E. Wouters (UvM)
- Joint PhD projects (4 PhD theses since 2003; 3 ongoing PhD projects)
- Joint laboratory facilities (NUTRIM: human tissue; UvM: transgenic animal models)
- Joint symposia, for example the Lecture and Master Class by Prof. B. Suratt 'Obesity and the inflammation paradox'
- Master classes

University of Birmingham, UK
Topic: Genetic epidemiology & evidence based medicine
Contact person: Prof. M. Zeegers
NUTRIM departments: Complex Genetics, Internal Medicine, Paediatrics, Respiratory Medicine, Ophtalmology, Toxicology
Collaboration since 2008

University College London, UK
Topic: Gut-liver homeostasis
Contact person: Prof. R Jalan, Institute of Liver and Digestive Health.
NUTRIM departments: Surgery, Molecular Genetics
Collaboration since 1997
- Faculty exchange (Part time position for Dr. S. Olde Damink
- Joint PhD projects (joint NUTRIM thesis of S. Olde Damink and

R. Jalan; 3 ongoing PhD projects)

RWTH Aachen, Germany
Topic: Liver inflammation and failure
Contact persons: Prof U. Neumann (Dept of Surgery) and Prof. C. Trautwein (Dept of Hepatology)
NUTRIM departments: Surgery, Hepatology and Molecular Genetics
Collaboration since: 2010
Development of Euregional HPB centre (since 2010 joint weekly HPB multi-disciplinary-team meetings and joint cross border operations)
Faculty exchange (Post-doc position of Dr. Veerle Bieghs)
- Joint PhD projects.

German Diabetes Centre, Germany
Topic: Metabolism and Diabetes, Düsseldorf
Contact: Prof. M. Roden
NUTRIM departments: Human Biology, Movement Sciences, Internal Medicine
Collaboration started in: 2010
- Joint research projects on ectopic fat accumulation, insulin sensitivity, mitochondrial function & BAT
- Organize yearly diabetes day

École Polytechnique Fédérale de Lausanne, Laboratory of Integrative Systems Physiology
Topic: Mitochondrial metabolism
Contact: Prof. J. Auwerx
NUTRIM departments: Human Biology
Collaboration started in 2011
- Faculty exchange

National Institute of Ageing, USA
Topic: Skeletal muscle weakness in chronic disease and aging
Contact person: Dr. R. de Cabo, Lab of Experimental Gerontology
Dr. T. Harris, Laboratory of Epidemiology, Demography, and Biometry
NUTRIM departments: Respiratory Medicine
Collaboration started in 2009
- Exchange at PhD and post-doc level
- Joint research projects
- Master classes

St John's Research Institute and National Academy, Bangalore, India
Topic: Nutrition and metabolism
Contact: Prof. A. Kurpad
NUTRIM departments: Human Biology, Toxicology, Respiratory Medicine, Internal Medicine
Collaboration started in 2009
- Joint PhD projects
- Faculty exchange

European "Biohealth computing" network
Topic: Systems biology and chronic disease
Key partners: Grenoble, Barcelona, Torino
Contact person: Prof. Ph. Sabatier (Grenoble) and Prof. J. Roca (Barcelona)
NUTRIM departments: Bioinformatics, Toxicology, Respiratory
Medicine, Molecular Genetics
- Joint MSc education and Summer school
- Faculty exchange

Richardson Centre for Functional foods and Neutraceuticals, Manitoba, Canada
Topic: functional foods and neutraceuticals
Contact: Prof. P.J. Jones
NUTRIM departments: Human Biology, Toxicology
Collaboration started in: 2011
- Joint research projects on plant sterol metabolism
- Organized international symposium on plant sterols and health

Appendix 3: Executive Summary of external Review of NUTRIM over the period 2006 - 2008

The last evaluation of the research of NUTRIM was conducted by an international review committee. The committee consisting of six international scientists (see appendix 8), visited NUTRIM on June 15th and 16th 2009.

Summary

It was clear to the evaluation committee that NUTRIM is energetically and effectively managed.

Close collaboration between clinicians and biomedical researchers based in NUTRIM with primarily non-medical scientists specializing in food sciences and nutrition undoubtedly adds strength and critical mass to the overall national research effort in these areas, and contributes significantly to the internationally competitive position of The Netherlands.

The research niche that NUTRIM has identified and fostered lies in the general area of human nutrition and metabolism, with a particular emphasis on the alimentary tract. This general research focus is organized and managed as four separate but complementary research lines. The evaluation committee was generally convinced by the appropriateness of these groupings, which provide both critical mass and coherence. The research lines also provide an effective framework for further collaborations, both within The Netherlands and in European collaborative networks.

The overall quality of the research staff in its scientific performance is seen as being rather impressive by the Review Committee. Several individual scientists are competing at high international levels within their respective fields. The Committee noted that there is an ongoing assessment of the scientific performance of the individual scientist as well as the performance of the different groups. The Committee supports this strategy and recommends its continuation.

NUTRIM has a strong international academic reputation and the citation indices indicate that in the areas of nutrition and diet, endocrinology, immunology, toxicology, public health and sports science the impact is high, as judged using bibliometric analyses.The bibliometric Hirsch-indices clearly demonstrated the high academic standing of tenured staff with a median score of 25 and the 75th percentile being 35 which indicates that NUTRIM is conducting world class research that is highly cited.

The Review committee stated that research at NUTRIM is of major public health significance, as metabolic syndrome is emerging as a major public health problem contributing to type-2 diabetes and cardiovascular disease. The research on inflammatory bowel disease and liver is also particularly relevant to clinical needs. The research on chronic inflammatory disease and wasting is particular relevant to the ageing population and sarcopenia which is emerging as a major health issue associated with age-related frailty. A particular strength is the translational aspects of the research, which will improve the clinical care and health of the general population.

Prospects and expectations according to the Review committee.
As NUTRIM is the only nutrition related institute really involved in the medical field, the translational patient-involved research, paying attention to subtle differences in phenotypic disease expression, is a unique niche for NUTRIM. The ambition of NUTRIM to achieve an academically excellent status will further increase the chance to obtain the most prestigious research funding. It can be expected that NUTRIM will grow to be more and more fruitful to both science and society, as part of their general strategy. Their long term goals aim for a centre of excellence position for NUTRIM in the academic world and at the same time understanding and awareness within society for their scientific efforts and findings. Therefore they are facing a natural field of tension between science and implementability, enforced by the wish to communicate their work to the general public.

Executive Summary of midterm Review of NUTRIM over the period 2009 - 20011

General remarks

This Research School is organised into 4 Research Lines, 2 of which are well established, with the other 2 being relatively new or recently re-organised. The overall standard of research is very good to excellent, but there are some opportunities for co-ordinated development which should help to consolidate this research in the future and ensure excellence is maintained.

There is some evidence of interaction between the Research Lines, but we feel this could be developed much further. In addition, there is an opportunity to develop core facilities and approaches across the school which will benefit all 4 Research Lines and make NUTRIM even more internationally competitive. Examples of such developments are a common approach to phenotyping, biobanking and databases across all disease areas being studied, exploitation of resources and competencies such as the human metabolic suite, stable isotope methodologies and MR imaging.

We are not convinced that the present structural diagram (with 3 horizontal and 1 vertical line) reflects the way the research is organised and delivered. We would recommend the 4 lines to be regarded as free-standing (in the same orientation – horizontal or vertical) with clearly indicated collaboration between them and identification of core techniques and facilities which span the whole school and are used as needed by each line.

We feel that line 4 needs to clearly describe its individual research activities as well as the current descriptions of the more service related support it provides to the other lines.

We are very impressed by the level of clinical academic involvement in NUTRIM, but would encourage this to also lead to a greater clinical presence in lines 1 and 4. There would also be benefits to be derived from increasing the number of senior non-clinical researchers in Research Line 2, which would enhance the bi-directional translation of research and also ensure continued effective management of the Research Line even if clinical priorities changed and greater pressure was exerted on the clinical academics to deliver services.

These Research Lines are much larger than the chair groups at Wageningen University, and we are pleased to see a larger proportion of postdoctoral staff in NUTRIM, which helps with day to day supervision and management of PhD students.

We were impressed by the 2 PhD students and the Postdoctoral Fellow whom we interviewed. The students were satisfied with the organisation of the graduate school and the level of supervision and guidance provided. The structures for student input and ability to register concerns appeared to be in place and effective.

There is little descriptive evidence of collaborations between Wageningen University and NUTRIM within the VLAG Graduate School, but when we probed deeper there clearly are a number of collaborative ventures. This may just be a case of poor presentation. We think there will be major opportunities going forward in linking the Food Science and basic Nutrition expertise at Wageningen University with the more clinical translational aspects in NUTRIM, to the benefit of both partners. But this will require a clear strategy for future collaboration, both at the level of PhD students (possibly joint studentships?) and other types of interaction such as joint Postdoctoral fellowships.

Appendix 4 Overview of education activities

General courses	Introduction into science Medical informatics Time and project management Biomedical skills Statistics Scientific communication in English Course in laboratory animal handling Course in radiology and safety Safe microbiology and genetic engineering
Professional courses (1 day)	Good clinical practice/laboratory practice Regulation of energy and substrate metabolism Use of stable isotopes in metabolic research Introduction into biochemical analysis Antioxidants: protective or toxic? Chronic inflammation and cachexia Evidence based medicine Nutrigenomics Liver day Lung day Annual diabetes meeting (jointly with Dusseldorf)
MINT courses (3 days)	COPD as systemic disease Clinical diabetology The patient with complex gastrointestinal disease
Master classes	Prof. G Manz; Prof. C. Newgard; Prof. B. Suratt; Prof. P. Trayhurn; Prof. P. Mohr; Prof. T. Gant; Dr. P. Texeira et al.
Capita Selecta	Approx. 20 per year, lectures by NUTRIM staff

Appendix 5 Supervision and monitoring of PhD Students

The Training and supervision plan consists of the research plan and of a personalised training and education plan and is designed jointly by the student and their supervisor. The research plan is based on the normal design of a 4 year project proposal. The personalised training and education plan is linked to the profile and background of each PhD candidate and the content of their proposed project and further research career aims. Student and supervisor will select training units to compensate for the deficiencies, as well as training units that enrich their expertise. These might be training units of the RM programme, the PhD programme, or others.

Formation of the supervision team for the individual PhD Student and monitoring of the performance of the supervision team

Supervision is provided by the student's supervisor (the professor who act as the PhD Student's main supervisor, called "promoter" in the Dutch PhD system) and at least one more staff member (called "co-promoter" in the Dutch PhD system). Performance is monitored by the promotion team, the "sounding board" and annually by the PhD Student Coordinator who is responsible for reporting to the executive board of NUTRIM.

Monitoring of progress of the PhD Student and measures taken if progress is insufficient

The PhD Student's progress is monitored in regular progress reports presented during meetings within the relevant research team as well as during the annual meetings of the PhD Student and his supervisors. According to the Maastricht University HRM regulations there must be a first and formal evaluation 9 months after the start of the contract, which is a formal go/no go moment.

If progress is regarded as insufficient, supervisors will implement or recommend the necessary changes to the project, the education plan, the supervision or the student's approach. If progress is still regarded as insufficient, a formal procedure will be started to end the contract. Disagreements or conflicts related to "go or no go" decisions are discussed by the Executive Board and finally decided on by the Scientific Director. If necessary, conflicts are discussed with the HRM Department and the Dean. The PhD Student Coordinator fulfils the role of mentor and "ombudsman" for the PhD Students, supporting initiatives to address problems and reporting to the Board. Maastricht University has a general complaints procedure and a confidential advisor for all employees, as well as specific regulations for scientific integrity.

Discussion of end terms for acquiring the PhD title with the PhD Student is part of the personalised training plan and made clear from the start.

A code of good practice regarding supervision is laid down in the Maastricht UMC+ Research code, and is stipulated and agreed to by the supervisor in the student's contract. The task of supervisors is described a that of a coach in the student's learning process. The supervisor is also responsible for the progress, and the student's progress is part of the annual performance appraisal of the supervisor. Students give feedback to supervisors, which is also taken into account in the annual performance appraisal. The supervisor has regular meetings with the student, and after one year there is a formal moment where it is decided whether the PhD student is allowed to continue.

Selection and training of supervisors

Supervisors are senior researchers in NUTRIM's research programme, the professor acting as main supervisor or "promoter" and the assistant or associate professor acting as secondary supervisor or "co-promoter". New supervisors are required to follow the UM-training programme "Supervision of PhD Candidates". An experienced NUTRIM supervisor will coach a new supervisor (buddy system). The number of PhD students who are supervised by one supervisor is 1-2 each year.

Electronic PhD Student Portfolio

NUTRIM PhD Students Progress Questionnaire / Appraisal and Personal Development Plan (POP) (to be completed by PhD Student)

1 General

- Date of appraisal / progress interview:
- Date of previous appraisal / progress interview: Faculty: Department:
- Date of Birth: Pers. Number:
- Name PhD student / (name and initials):
- Name(s) of supervisors / (co)promoter(s):
- Interview conducted by:
- Project title: Research line:
- Appraisal interview for the period:
- Completed years of project:
- This appraisal has been approved by:

signature(s) of promoter(s)	signature()s of supervisor(s)	signature of PhD Student	signature of PhD Students Coordinator

2 Evaluation of agreements made during the previous appraisal

- Were agreements met regarding improvement of competences:
- Were agreements met regarding core activities i.e. research, education and teaching:

3. Activities for personal development:

4A Discuss the following work conditions:
Housing
Work relations
Sick leave
Personal / other circumstances affecting work
Other
5. Initial project description (to be completed only the first time)
6. Description of research carried out last year/period
7. Description of research to be carried out in the forth coming year
8. Average number of hours per week you worked:
9. In your perception is this --
10. Is there sufficient support (machines, equipment, support staff etc.) to carry out your research activities?
If not, indicate where and how support can be improved:

4B Education
11. Frequency of meetings with supervisor / promoter

Supervisor: -- times per month	Promoter: -- times per month
Duration: -- hours	Duration: -- hours

12. Which of next items were discussed?

theory:	progress of publications:
practice:	congresses to attend:
design of experiments:	courses to attend:
progress of research:	feedback:

A. Satisfaction on the following aspects of supervision (to be completed both by supervisor(s) and PhD Student on separate forms)

		1	2	3	4	5
A.1	Frequency of meetings between PhD Student and supervisor(s)					
A.2	Content of meetings between PD Student and supervisor(s)					

13. List of educational activities during your promotion contract (enclose details such as dates, number of hours, (poster) presentations etc. on a separate sheet)
14. Indicate your wishes as to educational activities (courses, congresses etc. you would like to attend)
15. Educational activities planned next year 16. Indicate (in %) your presence during
research line meetings: -- other research meetings: --
17. Is the PhD Student informed about the PhD Students coordinator and his tasks/responsibilities? Y / N
18. Publications / List of articles (to be) published (include: authors(s), title, journal, year, volume and pages)
Category WI-1 (SCI-SSCI-indexed journals):
Category WI-2 (non SCI-SSCI-indexed journals):
Category WN (national refereed journals):
Category book (chapters):
Other types of publication:
(Poster) presentation at congress:
Interview (TV, radio, journal etc.):
19. Thesis completion (please complete from 2nd year of appointment)
-- % of text ready
-- complete text ready in draft
-- submitted to committee
-- approved by committee
-- thesis in print
20. Awards / prizes of last year:
21. Are there any bottlenecks in the (progress) of research:
22. In case of bottlenecks occurring, what steps/actions will be taken to solve them?
23. In your opinion, will you reach your doctoral degree within the specified time schedule? (to be completed from 2nd year of appointment) Y / N
24. If not within specified time schedule, how much longer will you need?
25. How many hours of leave were left from this year?
26. What arrangements did you make with your supervisor concerning these hours?
27. Have you made a planning with your supervisor for the coming period? Y / N
If Yes, check with paragraph 7, complete:
If not, why
28. Are any actions taken concerning the extension of your appointment including finances?
Y / N, If not, why:

4C Teaching
29. Did you perform any roles in the teaching of students? Y / N
30. How many hours of teaching does your department expect you to carry out? --hours average per year
31. How do you feel about the number of hours you have to carry out in teaching tasks?
32. Indicate any bottlenecks in teaching tasks
33. In case of bottlenecks occurring, what actions have been taken to solve them?

5 Aptitudes

B. Aptitudes of PhD Student in general (to be completed both by supervisor(s) and PhD Student, on separate forms)

	How does the PhD Student perform as to:	1	2	3	4	5
B.1	Creative: searches for new ways of problem solving both scientific and technical					
B.2	Initiative					
B.3	Flexibility: easily adapts to changes					
B.4	Self-development: searches for ways / uses opportunities for self-development					
B.5	Communication skills					
B.6	Co-operation skills					
B.7	Time management					

C. Aptitudes of PhD Student in research (to be completed both by supervisor(s) and PhD Student, on separate forms)

	How does the PhD Student perform as to:	1	2	3	4	5
C.8	Scientific knowledge about the research project					
C.9	Research skills					
C.10	Keep up with scientific literature					
C.11	Problem solving					
C.12	Quantity of research					
C.13	Quality of research					
C.14	Coping with deadlines					
C.15	Writing skills					

D. Aptitudes of PhD Student in teaching

	How does the PhD Student perform as to:	1	2	3	4	5	N/A
D.1	Lecturing						
D.2	Being a tutor in a tutorial group						
D.3	Giving skills training						
D.4	Other						

6 Future career, employability

34. Was your future career discussed during the progress meeting (to be completed from 2nd year of appointment)? Y / N

Arrangement(s) concerning future career (to be completed from 2nd year of appointment):

35. What training/learning objectives does the employer feel will help his/her continued performance?
36. What training/learning objectives does the employer feel might be useful for the PhD-student?
37. What new challenges can be undertaken in the current position in the coming period?
38. What are the wishes and opportunities with regard to internal and external mobility?
39. What could be the result of training and development for the PhD-student?
40. What does the employee want to achieve at the end of his/her training as PhD-student?
41. What should the employee have achieved in terms of personal development?

7 Agreements for upcoming year

42. Describe the planning for upcoming year:
-- number of days of leave included
-- number of days of experiments
-- number of days for writing
-- number of days for teaching
-- number of days for education (doing courses/congresses)
other:
Do you find this realistic? Y / N

8 Summary of assessment (to be completed both by PhD Student and by supervisor(s) and new agreements

43. Describe the good qualities/skills of PhD Student
44. What qualities/skills should be developed and/or improved?
45. General evaluation (in words) of PhD Student's performance over last year
46. General evaluation of PhD Student's performance over last year (scale 1-5, to be completed by PhD Student and supervisor(s)
47. Comments regarding supervision

Research Lines

Name of the Research Line: NUTRIM Research Line 1: The Metabolic Syndrome

Research line leaders: **Prof. Ronald P. Mensink**
Prof. Patrick Schrauwen
For a full staff survey see appendix 1

1. Objectives and Research Area

1.1 Vision, Mission and Objectives

Mission Statement
The mission of the Research Line *The Metabolic Syndrome* is to identify, understand, and characterize physiological and functional changes in selected tissues related to the metabolic syndrome, and to develop and implement life-style based (diet, physical activity) interventions that will prevent the development of the metabolic syndrome.

Vision
Translating our findings into new evidence-based life-style interventions to improve health.

Objectives
- To examine how nutrition, physical activity, energy balance and clinical interventions can have beneficial metabolic and functional effects
- To understand the interplay between diet, physical activity, and clinical interventions on metabolic aberrations related to the metabolic syndrome
- To understand and influence health/energy balance-related behaviours
- To discover new evidence-based targets for the prevention and treatment of the metabolic syndrome

1.2 Research Area and Programmes

Research within Research Line 1 (RL-1) is concentrated around two complementary and interacting research programmes. Interactions with other research lines also exist.

Programme 1.1: Energy balance and obesity
One main focus of programme 1.1 is on intervention strategies for long-term maintenance of energy balance and food intake. Studies are centred on relations between diet(ary components), energy expenditure, physical activity and body composition. The number of studies on (neuro)endocrine mechanisms, brain signalling, and genetic predisposition is increasing. The purpose of another line of research within programme 1.1 is to understand and influence health/energy balance-related behaviours, also in interaction with biological factors, and to develop interventions suitable for large-scale dissemination.

Programme 1.2: Diabetes and cardiovascular disease risk
The research of programme 1.2 aims to identify / characterize how nutrition, physical activity, environmental factors, and clinical interventions can have beneficial molecular, metabolic and functional effects. Focus is on skeletal muscle, (brown) adipose tissue, blood vessels, the liver, and the intestine. Studies are in particular designed to obtain insight into the relationships between life-style, lipid and glucose metabolism and low-grade systemic inflammation. Knowledge obtained from studies under ‘normal’ conditions is applied to study and understand metabolic disturbances involved in aetiology of e.g. type 2 diabetes mellitus and cardiovascular disease.

1.3 Strategy

The Research Line has a balanced and multidisciplinary research portfolio, and is highly recognized and acknowledged worldwide. In the Report of the Mid-Term Review of 2012, it was concluded that “it is a large well-established group working at an excellent level” and the quality was rated as “excellent”. This encouraged us to proceed along the same lines. We believe that continuing existing and establishing new collaborations within and outside the Research Line are instrumental to maintain a high level of research output and to initiate new initiatives.

To maintain and further strengthen our leading (inter)national position and to anticipate future developments, we carefully monitor research initiatives and make sure that successful ongoing research initiatives and collaborations are continued. Young researchers are stimulated to apply for personal grants to build a successful research career. Within NUTRIM, discussions should continue to further integrate research initiatives between research lines and explore new possibilities. As far as our research is concerned, emphasis is on a further integration along the axis molecular biology - physiology - function and health. At the same time, our current strength and expertise within our core expertise and identity in the field of nutrition and metabolism (see §1.2) will not be neglected. We expect new opportunities due to the unique position of NUTRIM in the new organizational structure of Maastricht UMC$^+$ as innovation platform. This opens new venues to research related to “healthy” living (the core of Maastricht UMC$^+$) as well as to more life-style related studies, which are exactly the core of our research line.

We also invest in young researchers, and carefully monitor our PhD-students and discuss career opportunities. Most of our PhD-students do find new jobs very soon and our networks are used when they are looking for post-docs positions abroad. Support is also given for grant applications, including the VENI-programme. For talented staff members, tenure tracks were initiated. Finally, we also invest in BSc- and MSc-students, who are stimulated to participate in internal scientific meetings and discussions, and social activities within a Department during their internships.

For the next years no major changes in the focus of the research programme are anticipated.

1.4 Research environment and embedding

Besides in VLAG, we also participated in four Technological Top Institutes: Top Institute Food & Nutrition (TIFN), Center for Translational Medicine (CTCM), the Top Institute Pharma (TI Pharma), and the Institute for Nanotechnology (NanoNEXTNL). The extensive collaborative networks that have been developed during the last years have also resulted in several successful initiatives within EU-funded projects, in particular in the fields of (bioactive) food components. Further, we are partner in NoE NuGo (Nutrigenomics) with the primary aim to integrate nutrigenomics within Europe. EU-support of NuGo has ended in 2009, but NuGo continued as a European association with NUTRIM as one of the partners. At the national level, researchers have been successful in obtaining large competitive grants such as NWO-Top grants, a CVON (“Cardiovascular Research Netherlands”) grant, one VICI-grant, one VIDI-grant, five VENI-grants, and one senior fellowship of the Dutch Diabetes Foundation. We have collaborations with several prominent research groups (German Diabetes Center, Dusseldorf; University of Copenhagen; University of Bonn; McGill University Health Center, Quebec; University of Manitoba; Pasteur Institute Lille; EPFL Lausanne). Members of the research line have also frequently been invited to participate as reviewers and experts for national and international funding and health agencies, are editors or members of editorial boards of a wide range of well established scientific journals, and are regularly invited speakers at international meetings and chairing scientific sessions. Moreover, we receive significant funding from national and international agencies, and have received excellent scores in the last external NUTRIM review of 2009.

With the aid of internal and external support, we were able to acquire a modern unique infrastructure for our metabolic research. Research related to the metabolic syndrome in Maastricht is quantitatively and qualitatively at the top, not only in the Netherlands but also abroad. This is, at least partly, due to the close

collaboration with the academic hospital. In this respect, the development of Mosae Vita (an innovative concept that is currently developed by Maastricht UMC$^+$ in close collaboration with NUTRIM, focusing on the integration of science, care, society and business) and Brains Unlimited (a platform for neuro-imaging with three fMRI scanners of 3.0, 7.0 and 9.4 Tesla)) offers new and unique possibilities.

2. Resources and Facilities

Personnel

The scientific staff has remained relatively constant during the last three years. Some fluctuations in the number of PhD-students are evident, partly because of the recent transition of the Top Institute Food and Nutrition (TIFN). Several PhD-students are funded by TIFN-projects. Five researchers (Dr P. Schrauwen, Dr M. Hesselink, Dr S. Kremers, Dr N. Bouvy, and Dr J. Plat) – who participated in a tenure track programme – were appointed as professors. Four professors retired during the last years.

Funding

So far, we have been very successful in obtaining funding, which has remained at the same high level during the last three years, also due to our strong network, track record, and expertise. In recent years, the number of publications in high-impact journals is increasing, which we expect to result in an increasing success when applying for personal grants (e.g VENI, VIDI, VICI; fellowships; ERC). The strong internal and external collaborations will further foster applications for national and international project and programme funds (e.g. ZonMW, STW, EU). Recently, we were successfully involved in the application of two initiatives within the Joint Programme Initiative (JPI-HDHL). We are in the lead for the development of new programmes with TIFN. For the very near future, it is evident that public-private partnerships become increasingly important such as funding within the so-called Top Sectors.

Major externally funded research grants obtained in 2009-2014 within Programme 1.1 “Energy balance and obesity” are:

- Understanding food-gut-brain mechanisms across the lifespan in the regulation of hunger and satiety for health, European Commission (2013, Prof. M. Westerterp-Plantenga, 988 kEuro)
- An update and evaluation study of the course "Good food does not need to be expensive", ZonMw (2011, Dr P. van Assema, 346 kEuro)
- The significance of brown adipose tissue and muscle thermogenesis for development of obesity, ZonMw (2010, Prof. W. van Marken-Lichtenbelt, 675 kEuro)

Major externally funded research grants obtained in 2009-2014 within Programme 1.2 “Diabetes and cardiovascular disease risk” are:

- Identification of natural components to elevate HDL cholesterol concentrations through increasing apoA-I production (2012, Prof. J. Plat, Stichting voor de Technische Wetenschappen, 830 kEuro)
- Microbiota, energy balance and metabolism, TIFN (2011, Prof. E.E. Blaak, 1010 kEuro)
- Cardiovascular Health: The relevance of vascular function markers, TIFN (2011, Prof. R.P. Mensink, 970 kEuro)
- Mitochondrial lipotoxicity in type 2 diabetes mellitus, ZonMw (2009, Prof. P. Schrauwen, 1250 KEuro)

Research Facilities

Research facilities are not exclusively allocated to a RL, but shared between NUTRIM researchers. However daily management is assigned to one or more Departments. During the last years, Departments within RL-1 have financially contributed to build a state-of-the-art research infrastructure to carry out metabolic studies in humans. The Metabolic Research Unit Maastricht (MRUM) is a facility built to bring human metabolic studies to the next level. Twenty metabolic rooms were realized conforming to the latest quality standards regarding safety, climate and research infrastructure. A combination of the latest highly sophisticated technologies allows for control of environmental parameters as well as of research equipment-related parameters. To

optimize flexibility and efficiency, 11 of the 20 metabolic rooms are multi-purpose, which means that each of these 11 rooms can be set up for a wide variety of research questions in the field of nutrition (postprandial tests), physical activity (single/dual bedding, sports equipment) as well as environmental factors (temperature, sleep, circadian rhythm intervention). The remaining nine rooms are specifically tailored to research questions (e.g. high level exercise, body composition assessment, vascular function measurements (FMD, PWV, PWA), and include five closed rooms to measure for 1 – 7 days energy metabolism. In addition, facilities are available to carry out controlled human dietary intervention studies.

2.1 Researchers

The scientific staff and the number of lab technicians have been quite stable over the years 2009-2014 (Table 2.1). The apparent decrease in scientific staff in 2013-2014 is due to retirements and we expect to appoint new scientific staff in 2015. The number of PhD-candidates always fluctuates to some extent and is expected to increase again in 2015 due to the acquisition of new projects (e.g. VIDI-grant, CVON-grant).

Table 2.1 - Research staff at research unit level

NUTRIM-RL1	2009		2010		2011		2012		2013		2014	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific staff [1]	29	10,9	31	11,7	30	10,8	25	10,2	24	8,9	23	7,9
Post-docs [2]	8	7,1	7	6,3	12	11,3	13	10,6	13	10,4	14	11,0
PhD candidates[3]	41	40,6	50	49,8	52	50,6	50	47,7	55	52,2	46	42,9
Total res. staff	**78**	**58,6**	**88**	**67,8**	**94**	**72,7**	**88**	**68,5**	**92**	**71,5**	**83**	**61,8**
Lab Technicians	21	18,0	18	14,6	24	19,5	25	18,9	23	16,5	24	17,5
Visiting fellows	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Total staff for research	**99**	**76,63**	**106**	**82,43**	**118**	**92,26**	**113**	**87,45**	**115**	**88,03**	**107**	**79,33**
Other (admin.) staff	5	2,1	4	1,7	3	1,2	3	1,5	3	1,6	3	1,6
Total staff	**104**	**78,7**	**110**	**84,1**	**121**	**93,5**	**116**	**89,0**	**118**	**89,6**	**110**	**80,9**

- *FTE: sum of actual FTE-factors (in fulltime equivalents) labelled on NUTRIM research activities on 31-dec on any year*
- *#: number of persons active on NUTRIM Research activities on 31-dec of any year*
- *Scientific Staff: Professor, Assistant Professor and Associated Professor (direct funding)*
- *Post docs: researchers with completed PhD not belonging to Scientific staff*
- *PhD candidate: Standard PhD candidate with a contract.*
- *Lab technicians: technician, dieticians, data managers, research assistants etc.*
- *Other (admin.) staff: NUTRIM Office, personal assistants to PI's and project leaders etc.*

2.2 Research Funds

As already discussed, we have been very successful in obtaining funding (Table 2.2). The contribution of contract research is relatively large, but has not changed substantially over the years, despite the economic recession. Total expenditure has also not decreased and after a large increase in 2011, it is very stable over the last four years.

Table 2.2 - Funding at research unit level

	2009		2010		2011		2012		2013		2014		Average 2009-2014	
NUTRIM RL1														
Funding:	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding (1)	24,9 fte	32%	28,5 fte	34%	23,4 fte	25%	25,0 fte	28%	19,3 fte	22%	18,1 fte	22%	23,6 fte	28%
Research grants (2)	16,2 fte	21%	15,1 fte	18%	17,9 fte	19%	17,1 fte	19%	17,0 fte	19%	15,5 fte	19%	15,5 fte	18%
Contract research (3)	35,6 fte	45%	38,0 fte	45%	47,0 fte	50%	41,8 fte	47%	46,0 fte	51%	41,5 fte	51%	40,6 fte	48%
Other (4)	2,0 fte	3%	2,5 fte	3%	5,2 fte	6%	5,2 fte	6%	7,4 fte	8%	5,9 fte	7%	4,5 fte	5%
Total funding	**78,7 fte**	**100%**	**84,1 fte**	**100%**	**93,5 fte**	**100%**	**89,0 fte**	**100%**	**89,6 fte**	**100%**	**80,9 fte**	**100%**	**84,2 fte**	**100%**
Expenditure:	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%
Personnel costs	3794 k€	64%	3806 k€	63%	4260 k€	65%	4314 k€	67%	4269 k€	65%	4498 k€	68%	4157 k€	65%
Other costs	2131 k€	36%	2210 k€	37%	2304 k€	35%	2151 k€	33%	2335 k€	35%	2094 k€	32%	2204 k€	35%
Total expenditure	**5924 k€**	**100%**	**6016 k€**	**100%**	**6564 k€**	**100%**	**6465 k€**	**100%**	**6604 k€**	**100%**	**6592 k€**	**100%**	**6361 k€**	**100%**

Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)
Research grants obtained in national and international scientific competition (e.g. grants from NWO, KNAW and European Research Council)
Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations
Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within NUTRIM)

3. Research Quality

One of the pillars of our research strategy is to continue along the successful line of research, but be open to new initiatives and new collaborations. We further strive to maintain our facilities and equipment at a high level. Research topics are usually the result of a collaboration of two (or sometimes more) senior staff members. Depending on the focus of a topic, composition of the teams may change, which opens venues for new innovative approaches and collaboration between the various research groups. Assistant and associate professors closely work together with one or more professors. All staff members are encouraged to obtain their own funding and are involved in the supervision of the post-docs and PhD-students. Research meetings are organized within individual PI-groups, but also within the research line to optimally inform each other on new and on-going projects and results. Altogether this approach is an excellent basis for performing research at the highest level.

The most important performance indicator is the citation score of the various papers. This score is a reflection of the scientific impact. Furthermore, the publicationsreflect a fruitful collaboration with both internal and external partners.

Some key publications are*:*
Programme 1.1: Energy balance and obesity

1. Larsen, T.M., Dalskov, S.M., Baak, M. van, Jebb, S.A., Papadaki, A., Pfeiffer, A.F., Martinez, J.A., Darlenska, T. Handjieva, Kunesova, M., Pihlsgard, M., Stender, S., Holst, C., Saris, W.H. & Astrup, A. (2010). Diets with high or low protein content and glycemic index for weight-loss maintenance. *New England Journal of Medicine*, 363(22), 2102-13.
2. Marken Lichtenbelt, W.D. van, Vanhommerig, J.W., Smulders, N.M., Drossaerts, J.M., Kemerink, G.J., Bouvy, N.D., Schrauwen, P. & Teule, G.J. (2009). Cold-activated brown adipose tissue in healthy men. *New England Journal of Medicine*, 360(15), 1500-8.
3. Born, J.M., Lemmens, S.G., Martens, M., Formisano, E., Goebel, R. & Westerterp-Plantenga, M.S. (2011). Differences between liking and wanting signals in the human brain and relations with cognitive dietary restraint and body mass index. *American Journal of Clinical Nutrition*, 94(2), 392-403.
4. Sleddens, E.F.C., Kremers, S.P.J., Hughes, S.O., Cross, M.B., Thijs, C., Vries, N.K. de & O'Connor, T.M. (2012). Physical activity parenting: a systematic review of questionnaires and their associations with child activity levels. *Obesity Reviews*. 13 (11), 1015-33.

Programme 1.2: Diabetes and cardiovascular disease risk

1. Wu, J., Boström, P., Sparks, L.M., Ye, L., Choi, J.H., Giang, A.H., Khandekar, M., Virtanen, K.A., Nuutila, P., Schaart, G., Huang, K., Tu, H., van Marken Lichtenbelt, W.D., Hoeks, J., Enerbäck, S., Schrauwen, P., & Spiegelman, B.M. (2012). Beige adipocytes are a distinct type of thermogenic fat cell in mouse and human. *Cell*, 150(2), 366-76.

2. Timmers, S., Konings, E., Bilet, L., Houtkooper, R.H., Weijer, T. van de, Goossens, G.H., Hoeks, J., Krieken, S. van der, Ryu, D., Kersten, S., Kornips, C.F.P., Hesselink, M.K.C., Kunz, I., Schrauwen-Hinderling, V., Blaak, E.E., Auwerx, J. & Schrauwen, P.A.J. (2011). Calorie restriction-like effects of 30 days of resveratrol supplementation on energy metabolism and metabolic profile in obese humans. *Cell Metabolism*, 14(5), 612-22.
3. Goossens, G.H., Bizzarri, A., Venteclef, N., Essers, Y., Cleutjens, J.P.M., Konings, E., Jocken, J.W., Cajlakovic, M., Ribitsch, V., Clement, K. & Blaak, E.E. (2011). Increased adipose tissue oxygen tension in obese compared with lean men is accompanied by insulin resistance, impaired adipose tissue capillarization, and inflammation. *Circulation*, 124(1), 67-76.
4. Mensink, R.P., Jong, A., Lutjohann, D., Haenen, G.R.M. & Plat, J. (2010). Plant stanols dose-dependently decrease LDL-cholesterol concentrations, but not cholesterol-standardized fat-soluble antioxidant concentrations, at intakes up to 9 g/d. *American Journal of Clinical Nutrition*, 92(1), 24-33

3.1 Demonstrable products - Research products for peers in science

Table 3.1 - Main categories of research output

	2009	2010	2011	2012	2013	2014	Total
Academic publications							
a. Refereed articles	**197**	**216**	**256**	**212**	**206**	**173**	**1260**
a.1 Refereed articles WoS (Web of Science)	**186**	**207**	**245**	**193**	**188**	**168**	**1189**
a.2 Refereed articles non-WoS	**11**	**9**	**11**	**19**	**18**	**5**	**71**
b. Non-refereed articles	**2**	**6**	**3**	**4**	**7**	**2**	**24**
c. Books				**1**	**1**		
d.1. Refereed book chapters	**5**			**4**	**4**	**1**	**14**
d.2. Non-refereed book chapters							
e. PhD Theses	**13**	**11**	**13**	**8**	**10**	**14**	**69**
f. Conference papers				**1**			**1**
g. other products (see 3.2 / please specify)							
Total academic publications: 1368							

NOTE: The total numbers of refereed articles WoS include full paper, letters, editorial material etc.

3.2 Demonstrable use of products - Use of research products by peers

Table 3.2 – Bibliometric analysis of research output

Year	N	C	Wavg	CPP	RI	%T10	%T1	%NC
2008	171	4843	2995	28,3	1,71	22%	1%	2%
2009	172	5127	2436	29,8	2,19	29%	3%	0%
2010	197	4168	2219	21,2	1,98	25%	2%	4%
2011	227	3454	1849	15,2	1,93	22%	4%	4%
2012	180	1898	928	10,5	1,95	23%	3%	4%
2013	173	777	373	4,5	2,07	28%	2%	18%
Total	**1120**	**20267**	**10801**	**18,1**	**1,97**	**25%**	**3%**	**5%**

NOTE: The differences between the number of records exported from NUTRIM research information system (Metis, as in table 3.1) differs from the number of records presented in the bibliometric analysis. This is mainly caused by records that were classified in WoS, as editorial material, news item, correction etc. Some records could not be retrieved (by the WUR librarian) from WoS.
N: Number of publications; C: Number of citations of these publications; Wavg ; World average number of citations for publication in same research field; CPP: Average number of citations per publication; RI: Relative Impact; %T10: Percentage of publications within the top 10% most cited publications; %T1: Percentage of publications within the top 1% most cited publications; %NC: Percentage of non-cited articles

The research output has been at a continuous high level and no obvious up- or downward trend can be observed. On average 186 refereed articles were published annually. Of these articles, 25% and 3% were in the top-10% and top-1% best cited respectively. The RI is close to two, which means that our publications are cited two times more than the worldwide average. In addition, we regularly published reviews and write book chapters.

3.3 Demonstrable marks of recognition - Marks of recognition from peers

Science awards, Scholarly prizes, Research grants awarded to individuals

Year	*Prize description…*	*Person*
2009	VICI grant from the Netherlands Organisation for Scientific Research (NWO)	Patrick Schrauwen
2010	Two VENI grants from the Netherlands Organisation for Scientific Research (NWO)	Johan Jocken / Vera Schrauwen-Hinderling
2011	EASO Young Investigator Award for Clinical Research	Gijs Goossens
2011	Young Investigator Award from the Japanese Society for Microcirculation	Gijs Goossens
2012	EASO Young Investigator Award for Basic Science	Joris Hoeks
2012	VENI grant from the Netherlands Organisation for Scientific Research (NWO)	Esther Phielix
2013	Two VENI grants from the Netherlands Organisation for Scientific Research (NWO)	Jessica Gubbels / Silvie Timmers
2013	Corona-Gallina Research Price from the Dutch Diabetes Foundation	Patrick Schrauwen
2013	Senior Fellowship from the Dutch Diabetes Research Foundation	Joris Hoeks
2014	Rising Star Fellowship from the European Foundation for the Study of Diabetes (EFSD)	Gijs Goossens
2014	VIDI grant from the Netherlands Organisation for Scientific Research (NWO)	Joris Hoeks

Plenary/Keynote Lectures at major conferences

Year	*Person*	*Conference*
2008	Kremers, S.	16th European Congress on Obesity (ECO). Geneva, Switzerland
2009	Mensink, R.P.	PIPOC. Kuala Lumpur, Malaysia
2011	Blaak, E.E.	European Congress on Obesity. Istanbul, Turkey
2011	Blaak, E.E.	ESPEN. Barcelona, Spain
2011	Mensink, R.P.	EuroFed. Rotterdam, the Netherlands
2012	Schrauwen, P.	Integrated Biology of Exercise conference. Colorado, USA.
2012	Schrauwen, P.	4th International Graz Symposium on Lipid and Membrane Biology. Graz, Austria.
2013	Schrauwen, P.	Keystone Symposium on Mitochondria, Metabolism and Myocardial Function. Colorado, USA.
2013	Goossens, G.	European Congress on Obesity, Bulgaria
2013	Blaak, E.E.	20th International Congress on Nutrition. Granada, Spain
2013	Schrauwen, P.	Nature Medicine Herrenhausen Symposium on Metabolic, Diseases. Hannover, Germany
2013	Schrauwen, P.	73th Scientific Sessions of the American Diabetes Association. Chicago, USA

Organisation of International Scientific Conferences

Year	*Person*	*Conference*
2009	Kremers, S.	European Congress on Obesity - Prevention Satellite. Amsterdam
2009	Marken Lichtenbelt van, W.	Workshop “Adaptive thermogenesis. Significant in small mammal; of significance in humans?”, PPTR, Matsue, Japan
2009	Schrauwen, P.	Satellite symposium "Lipids and insulin resistance' of the European Congress on Obesity (ECO), Amsterdam, the Netherlands
2011	Hesselink, M.	ISSFAL, Maastricht, the Netherlands
2011	Marken Lichtenbelt van, W.	Brown Adipose Tissue and Human Obesity. ICO precongress symposium. Stockholm, Sweden
2011	Schrauwen, P.	ISSFAL, Maastricht, the Netherlands
2011	Marken Lichtenbelt van, W.	Scientific committee IBPSA
2011	Mensink, R.P.	Chairman of the Scientific Committee of the 9th EuroFed Lipid Congress, Rotterdam, the NEtherlands
2011	Plasqui, G.	Recent Advances and Controversies in Measuring Energy Metabolism **(**RACMEM), Maastricht, the Netherlands
2011	Plat, J.	Progress and prospective of plant sterol and plant stanol research, Maastricht, the Netherlands
2012	Blaak, E.E.	European Congress on Obesity, Lyon, France
2013	Blaak, E.E.	European Congress on Obesity, Liverpool, United Kingdom

Editorial boards

Person	
Baak, M.	Obesity Reviews
Baak, M.	British Journal of Nutrition
Blaak, E.E.	International Journal of Obesity
Blaak, E.E.	Obesity Facts
Bouvy N.D.	Nederlands Tijdschrift voor Heelkunde
Bouvy N.D.	Annals of Gastroenterology and Hepatology
Kooi, M.E.	Journal of Biomedical Graphics and Computing
Kremers, S	International Journal of Behavioral Nutrition and Physical Activity
Mensink, R.P.	Current Opinion of Lipidology
Mensink, R.P.	Nutrition Metabolism and Cardiovascular Diseases
Mensink, R.P.	European Journal of Lipid Science Technology
Mensink, R.P	Nutrients
Schrauwen, P.	Diabetologia
Schrauwen, P.	Scientific Reports
Schrauwen, P.	Nutrition and Diabetes
Westerterp, K.	Proceedings of the Nutrition Society (Editor in Chief)
Westerterp, K.	European Journal of Applied Physiology
Westerterp, K.	Journal Nutrition and Metabolism
Westerterp, K.	European Journal of Clinical Nutrition
Westerterp-Plantenga, M.	Physiology and Behavior
Westerterp-Plantenga, M.	International Journal of Obesity

Memberships of academies

Person	
Blaak, E.E.; Schrauwen, P.	Advisory Board Dutch Diabetes Foundation
Blaak, E.E.; Goossens, G.	European Association for the Study of Obesity
Blaak, E.E.; Mensink, R.P.; Plat, J.; Schrauwen P.	European Nutrigenomics Consortium (NUGO)

Hesselink, M.	American Diabetes Association
Hesselink, M.	American Physiological Society
Hesselink, M.	Dutch Association for Diabetes Research
Kremers, S.	Dutch Working Group on Nutritional Habits
Mensink, R.P; Plat, J.	European Atherosclerosis Society
Mensink, R.P; Plat, J.	Dutch Academy of Nutritional Sciences
Mensink, R.P.	International Society for the Study of Fatty Acids and Lipids
Plat, J.	Member of the European Network for Oxysterol research (ENOR)
Plat, J.	American Society for Nutrition (ASN)
Plat, J.	American Oil Chemist Society (AOCS)
Schrauwen, P.	European Association for the Study of Diabetes

Apart from staff members (Table above) also several PhD students have been very successful:

- 2011 Foppe ten Hoor Young Investigator Award
  Florence Brüll
- 2012 Young Researchers on Physiology and Pharmacology of Temperature Regulation
  Boris Kingma
- 2014 Foppe ten Hoor Young Investigator Award
  Sabine Baumgartner

4. Relevance to Society

The ultimate aim of our studies is to translate our findings into new evidence-based life-style interventions. Also, the metabolic syndrome is emerging as a major public health problem contributing to type 2 diabetes and cardiovascular disease. Likewise, nutrition and physical activity / exercise are topics close to the general population and with a huge pubic health impacts. Therefore, we have an active policy not only to discuss our research findings with fellow scientists at national and international meetings, but also to disseminate our findings to the general public through newspapers, television, radio, etc.

Members of the Research Line are actively reaching out to society and are in close contact with many different stakeholders. They are involved in committees and organisations that give advice on the role of nutrition and / or exercise in the prevention and treatment of obesity, type 2 diabetes and cardiovascular disease, such as the Dutch Health Council, Dutch Nutrition Centre, Diabetes Foundation, European Food Safety Authority (EFSA), European Association for the Study of Obesity (EASO), Netherlands Association of Obesity (NASO), Dutch Academy of Nutritional Sciences (NAV). In addition, they are also present and discuss the latest insight at meetings of professional associations (e.g. dieticians, physiotherapists). When applicable, press releases for the popular press are made when results are appealing.

Students that graduate from our MSc and PhD programmes are not only employed within research institutes and universities, but also at (inter)national (food) companies (Unilever, Nestle, Danone, FrieslandCampina, DSM, Medtronics) or health organisations (e.g. municipal health authorities).

The treatment and prevention of obesity is one of the larger topics of our Research Line. Life style is seen as a major target to reach this goal, and classically lifestyle has been mainly seen as food intake and activity behaviour. The rediscovery of brown adipose tissue in 2009 has resulted in re-interest on the role of thermoregulation in obesity. Our academic staff has not only been active in unravelling the biology behind brown fat, but also plays an important role in disseminating these results to society. Thus, attention is given on how environmental conditions related to thermal comfort, long-term health and prevention of obesity. The link between environmental temperature and health and comfort is promising, as illustrated by the funding by SenterNovem.

Our Research Line has also been very active in promoting physical activity in the prevention of obesity-

related metabolic diseases, such as type 2 diabetes. In fact, the slogan of the Dutch Diabetes Foundation has for years been "Bewegen is de beste bescherming tegen type 2 diabetes" (exercise is the best strategy to prevent type 2 diabetes), and our research line has been active in laying the foundations for this statement, as well as propagating the message to the society.

4.1 Demonstrable products - Research products for societal target groups

- Gave numerous presentations to general audiences about nutrition/physical activity (patient organizations, professional associations, etc)
- Coordinated and substantially contributed to numerous PhD-level training courses in nutrition and metabolism
- Some staff members are involved in the so-called open days to introduce high school students to the university

4.2 Demonstrable use of products - Use of research products by societal groups

- Filed several patents (see CVs)
- Technical knowledge has been transferred and respiration chambers / ventilated hoods (including technical know-how) have been sold to external national and international parties

4.3 Demonstrable marks of recognition – Marks of recognition by societal groups

- Contributed frequently to popular national and international magazines and newspapers
- Regularly invited for radio interviews, including local but also Dutch national Radio stations.
- Appearance in several television programs for expert opinion (local and Dutch television)
- Appearance in several documentary television programs, with an in depth focus on the research performed in the research line; this includes local, national but also international broadcasters
- Member of various advisory bodies (see CVs)
- Winner of several poster presentations at international conferences

5. Viability

5.1 Benchmark

Our niche in the field of the metabolic syndrome and unique setting due to a close collaboration with the academic hospital and structural participation of clinical groups is well-recognized by the national and international scientific community. Several members of the Research Line are internationally recognized as leading experts in the field of nutrition and physical exercise, and the aetiology and prevention of the metabolic syndrome. The fact that this is not only true for the established staff, but also applies to the junior staff members and/or recently appointed young professors is very important, as it is an indication of the research line to renew itself. The staff is mainly based at the Departments of Human Biology, Health Promotion, Human Movement Sciences, Surgery, Radiology, and Internal Medicine. As described in the previous paragraphs, a large part of our research is embedded in various Top Institutes and researchers have been very successful in obtaining grants in TIFN. We have also obtained significant funding from different sources and received excellent scores during the external assessment of 2009 and the mid-term review of 2012. We have a strong publication record with increasing number of papers in prestigious high

impact journals (New England Journal of Medicine, Cell Metabolism, Circulation, American Journal of Clinical Nutrition, Diabetes). In general, mean field citations scores of our publications in the field of Nutrition and Metabolism are well above the worldwide average. Finally, the realisation of the Metabolic Research Unit Maastricht (MRUM) has increased the reputation of RL-1 in the field of translational metabolic research.

In our areas of research, there are of course institutes within and outside Europe with a comparable interest (e.g. Department of Nutrition, Exercise and Sports, University of Copenhagen; King's College London, Division of Diabetes & Nutritional Sciences; Pennington Biomedical Research Center, Louisiana (US); Division of Nutritional Sciences at Cornell University (US); Department of Nutrition at University of California at Davis (US); INSERM Paris and Toulouse (France)). Although some of these institutes may be stronger on specific topics and related infrastructures, the translational aspect of the research at RL-1 and the unique combination of expertise, techniques and our own total infrastructure makes our research extremely competitive when compared to these peer-institutes. In addition, with many of these institutes, we have a close collaboration, as evidenced from common grant applications and projects.

5.2 SWOT-analysis

Strengths
- Top-research in the field of (large scale) well-controlled (dietary) intervention studies and of (observational) research on physical activity in relation to metabolic disorders, resulting in an active international collaborations and exchange.
- An excellent up-to-date infrastructure for basic and clinical research to carry out translational research and in vivo metabolic studies at the whole body level (whole-body indirect calorimetry, body composition, clamping, ergometry, controlled dietary studies) and organ level (stable isotope technology, magnetic resonance spectroscopy and imaging, magnetic stimulation, tissue biopsies).
- A close collaboration with the academic hospital and structural participation of clinical groups within NUTRIM, which has been translated into unique synergistic research lines from 'cell-to-bed'.
- Very strong output by many of the PI groups over the last years, both when considering the number of papers in high-impact journals, the dissertations and the external funding.
- A strong portfolio in research funds and contracts with an excellent mixture of more fundamental, clinical and applied science.

Weaknesses
- Difficulty in recruiting excellent researchers from outside the Maastricht area.
- Limited possibilities for permanent positions for excellent young scientists.

Opportunities
- The excellent new infrastructure and unique setting should further strengthen translational and interdisciplinary research, and attract researchers from outside the region.
- The senior scientists are well-involved in national and EU academic and industrial networks, which gives the opportunity to initiate large scale projects on intermediary metabolism related to chronic diseases.
- NUTRIM could and should play a role at the forefront, when considering basic, clinical and translational research, and should aim for authority in the field of life-style based interventions.
- Further exploring intra- and inter-institute multidisciplinary collaborations in the field of nutrition and personalized health.

Threats
- Financial support from the government (and thus the university) is decreasing.
- Temporarily decreased financial support of the industry due to the global economic recession.
- Increasing regulations for human studies do not necessarily lead to higher-quality studies.

6. Reflection and future strategy

6.1 Reference to previous assessments

In the previous assessment (VLAG-Nutrim external review 2009) RL1 was judged for scientific quality, productivity, relevance, and vitality and feasibility with the highest grades (5). The external assessment of 2009 and the mid-term review were very rewarding and one clear opportunity was explicitly mentioned: “build on the strength of RL1 in lipid metabolism and the links of non-alcoholic fatty liver disease to the metabolic syndrome”. This opportunity has been explored successfully and in the mean time we have carried out several human and animal studies focussing on the relationship between dietary (macro)nutrients and exercise with intrahepatic lipid accumulation and inflammation. These studies have been carried out in collaboration with the groups of prof. Masclee, prof. Wildberger, dr Sverdlov, and dr Olde Damink, and have among other resulted in a prestigious 1 M€ consortium grant from the Dutch Diabetes Foundation. In addition, projects have recently been submitted for funding to study the preventive effects of mainly plant-based compound on NAFLD in humans, for which we have strong evidence from animal studies.
During the midterm review (2012), one specific comment related to RL1 concerned the visibility of clinical labelling in RL1. Although at the Departments of Human Biology, Human Movement Sciences and Health Promotion (the core of RL1) not many clinicians are appointed, we have in the last years established strong and very direct collaborations with the clinical departments. This has resulted not only in strong scientific collaborations but also in the physical presence and involvement of more clinicians in our research projects. As evidenced from the scientific output, a fruitful collaboration with clinicians of in particular RL2 exists. Increasing the research labelling of clinicians within RL1 can only be achieved by reshuffling - based on research focus - labelling between Research Lines. This has been initiated and the labelling of clinicians is expected to increase within RL1 by 0.7 fte.

6.2 Viability and future strategy

The prevalence of metabolic disorders is reaching epidemic shapes and may be the most serious society-wide health threat for the years to come. Lifestyle is and will remain an essential part in the prevention and treatment of metabolic disturbances. In fact in recent years, lifestyle interventions have also resulted in new physiological insights that will lead to new opportunities for the years to come (for example cold and BAT activation). Furthermore, insight is increasing that for the solution of the metabolic syndrome, pre-clinical research alone will not be enough, and more and more attention is given to the necessity of human translational research. This puts us in a very advanced position and we do therefore not anticipate a huge change in funding, although it needs to be emphasized once more that funding possibilities are decreasing and competitiveness is increasing.

We have appointed new (young) scientists as assistant professors. These scientists were first appointed as part of the NUTRIM investment plan and were successful during that period. This guarantees and initiates news lines of research. However, we have achieved and maintained a good balance between established and potentially promising areas of research. Due to retirements, we have 2.2 fte research vacancy. Further, we actively participate in (inter)national networks to exchange ideas, expertise and techniques (e.g. “omics”) with colleagues. Our strong background in metabolism, combined with “omics’ approaches will open new venues to answer new research questions in the field of nutrigenomics.

Appendix 1 - Research staff at research unit level

Funding:

1= Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)

2 = Research grants obtained in national and

3 = Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations

4= Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within NUTRIM)

FTE: fte's employed at 31-dec of any year

		2009	2010	2011	2012	2013	2014
Staff		FTE	FTE	FTE	FTE	FTE	FTE
Full professors	**Funding**	**3,40**	**4,80**	**4,50**	**3,50**	**4,50**	**4,20**
Baak van MA	nvt	0,50	0,50	0,50	0,50	0,50	0,00
Blaak EE	1	0,50	0,50	0,50	0,50	0,50	0,50
Bouvy N.	1	0,00	0,00	0,00	0,00	0,00	0,20
Brouns F.	1	0,00	0,40	0,40	0,00	0,20	0,20
Hesselink M.	1	0,00	0,50	0,50	0,50	0,50	0,50
Heurn van E.	1	0,20	0,20	0,20	0,20	0,20	0,20
Kremers S	1	0,00	0,00	0,00	0,00	0,50	0,50
Kuipers H.	1	0,30	0,30	0,30	0,00	0,00	0,00
Marken Lichtenbelt van W.	1	0,00	0,00	0,00	0,00	0,00	0,50
Mensink RP	1	0,50	0,50	0,50	0,50	0,50	0,50
Mottaghy F.	1	0,00	0,00	0,00	0,00	0,00	0,00
Plat, J	1	0,00	0,00	0,00	0,00	0,50	0,50
Saris WHM	1	0,50	0,50	0,50	0,50	0,50	0,00
Sauerwein H.	1	0,20	0,20	0,20	0,20	0,00	0,00
Schrauwen, PAJ	1	0,00	0,50	0,50	0,50	0,50	0,50
Stehouwer C	1	0,10	0,10	0,10	0,00	0,00	0,00
Vries N	1	0,10	0,10	0,10	0,10	0,10	0,10
Westerterp K	1	0,50	0,50	0,20	0,00	0,00	0,00
Associate professors		**4,40**	**3,60**	**3,40**	**3,40**	**2,00**	**1,30**
Schrauwen-Hinderling VB	1	0,00	0,80	0,60	0,80	0,40	0,40
Assema van P	1	0,20	0,20	0,20	0,20	0,20	0,20
Berendschot T.	1	0,20	0,20	0,20	0,20	0,20	0,20
Bouvy N.	1	0,20	0,20	0,20	0,20	0,20	0,00
Brouns F.	1	0,40	0,00	0,00	0,00	0,00	0,00
Gerver WJ	1	0,30	0,30	0,30	0,00	0,00	0,00
Hesselink M.	1	0,50	0,00	0,00	0,00	0,00	0,00
Kooi ME	1	0,00	0,00	0,00	0,30	0,30	0,30
Kooman JP	1	0,40	0,20	0,20	0,00	0,00	0,00
Kremers S	1	0,50	0,50	0,50	0,50	0,00	0,00
Marken Lichtenbelt van W.	1	0,50	0,50	0,50	0,50	0,50	0,00
Meertens R	1	0,20	0,20	0,20	0,20	0,20	0,20
Plat, J	1	0,50	0,50	0,50	0,50	0,00	0,00
Schrauwen, PAJ	1	0,50	0,00	0,00	0,00	0,00	0,00
Assistant professors		**2,50**	**2,70**	**2,30**	**2,80**	**1,90**	**1,70**
Westerterp-Plantenga M.	1	0,70	0,50	0,50	0,50	0,00	0,00
Berendschot T.	1	0,00	0,00	0,00	0,00	0,00	0,00
Gielen M	1	0,00	0,00	0,00	0,00	0,00	0,00
Goossens GH	1	0,50	0,50	0,00	0,50	0,50	0,50
Havekes B.	1	0,00	0,40	0,50	0,50	0,10	0,10
Hoeks J	1	0,50	0,50	0,50	0,50	0,50	0,50
Nieuwenhuizen A	1	0,00	0,00	0,00	0,00	0,00	0,00
Nooijer de J	1	0,30	0,30	0,30	0,30	0,30	0,10
Plasqui G.	1	0,50	0,50	0,50	0,50	0,50	0,50
Schrauwen-Hinderling VB	1	0,00	0,80	0,60	0,80	0,40	0,40

Funding:

1= Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)

2 = Research grants obtained in national and

3 = Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations

4= Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within NUTRIM)

FTE: fte's employed at 31-dec of any year

Post-docs		***7,90***	***7,10***	***11,30***	***11,20***	***11,00***	***13,40***
Gubbels J.	*1*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*
Nabuurs C.	*1*	*0,00*	*0,00*	*0,70*	*0,70*	*0,00*	*0,00*
Rutters F	*1*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Soenen S	*1*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Timmers S.	*1*	*0,00*	*0,00*	*0,00*	*0,70*	*0,00*	*0,00*
Weijer T.	*1*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,20*
Bessems K	*1*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*0,00*
Boon M.	*2*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Gubbels J.	*2*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,80*
Jocken J	*2*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*0,00*
Manders R	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Nascimento E.	*2*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Paglialunga S.	*2*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*
Phielix E	*2*	*0,00*	*0,00*	*0,00*	*0,80*	*0,80*	*0,80*
Rutten G.	*2*	*0,00*	*0,60*	*0,60*	*0,60*	*0,50*	*0,40*
Schrauwen-Hinderling VB	*2*	*0,40*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Sparks L.	*2*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Timmers S.	*2*	*0,00*	*0,00*	*1,00*	*0,00*	*1,00*	*0,00*
Bauwens M.	*2*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*
Bessems K	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,40*
Boer den A.	*3*	*0,70*	*0,70*	*0,70*	*0,00*	*0,00*	*0,00*
Gerards S.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,70*	*0,70*
Gubbels J.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,80*	*0,00*
Hursel R.	*3*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*
Jocken J	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Kingma B.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Lemmens S.	*3*	*0,00*	*0,00*	*1,00*	*1,00*	*0,00*	*0,00*
Martens M.	*3*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*0,00*
Mil van A.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Nabuurs C.	*3*	*0,00*	*0,00*	*0,30*	*0,30*	*0,00*	*0,00*
Nascimento E.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Paglialunga S.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Rutten G.	*3*	*0,00*	*0,00*	*0,00*	*0,10*	*0,00*	*0,10*
Westerterp-Plantenga M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,40*	*0,40*
Gerver WJ	*3*	*0,00*	*0,00*	*0,00*	*0,20*	*0,20*	*0,00*
Jocken J	*4*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Ewijk van E.	*9*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Gubbels J.	*9*	*0,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Westerterp K	*9*	*0,00*	*0,00*	*0,00*	*0,20*	*0,00*	*0,00*
Helmink J.	*9*	*0,80*	*0,80*	*0,00*	*0,00*	*0,00*	*0,00*
Schellen L.	*3*	*0,00*	*0,00*	*0,00*	*0,60*	*0,60*	*0,60*
Sleddens E.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
PhD Students		***39,80***	***49,00***	***50,63***	***47,12***	***51,62***	***40,49***
Bessems K	*0*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Bosma M.	*1*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Brüll F.	*1*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Camps S.	*1*	*0,00*	*0,50*	*0,50*	*0,50*	*0,50*	*0,00*
Can van J.	*1*	*0,00*	*0,25*	*0,00*	*0,00*	*0,00*	*0,00*
Daemen S.	*1*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Dahlmans D.	*1*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*
Gevers D.	*1*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*

Gonnissen H.	1	1,00	1,00	1,00	1,00	0,00	0,00
Gubbels J.	1	1,00	0,00	0,00	0,00	0,00	0,00
Konings E.	1	0,00	0,50	0,50	0,00	0,00	0,00
Moors C	1	1,00	1,00	0,00	0,00	0,00	0,00
Nabben M	1	0,00	1,00	0,00	0,00	0,00	0,00
Paulus G.	1	0,00	1,00	1,00	1,00	1,00	0,00
Sleddens E.	1	0,00	0,00	0,00	0,00	1,00	0,00
Sloten van T.	1	0,00	1,00	0,33	0,33	0,33	0,00
Teunissen K.	1	0,00	0,57	0,57	0,57	0,57	0,00
Vijgen G.	1	0,00	1,00	0,00	0,00	0,00	0,00
Vosselman M.	1	1,00	0,00	0,00	0,00	0,00	0,00
Wert de L.	1	0,00	0,00	0,00	0,00	0,00	1,00
Baumgartner S.	1	1,00	1,00	1,00	1,00	1,00	0,00
Bessems K	2	1,00	1,00	0,00	0,00	0,00	0,00
Bilet L.	2	1,00	1,00	1,00	1,00	0,00	0,00
Bree van B.	2	1,00	1,00	1,00	1,00	0,00	0,00
Broeders E.	2	0,00	0,00	0,00	0,66	0,66	0,66
Gerards S.	2	1,00	1,00	1,00	1,00	0,00	0,00
Grêaux, K.	2	0,00	1,00	1,00	1,00	1,00	1,00
Hansen J.	2	0,00	0,00	0,00	0,00	1,00	1,00
Hoor ten G.	2	0,00	0,00	0,00	0,00	1,00	1,00
Houzelle A.	2	0,00	0,00	0,00	0,00	0,00	1,00
Konings E.	2	1,00	0,00	0,00	0,00	0,00	0,00
Krieken van der S.	2	0,00	0,00	0,00	1,00	1,00	1,00
Kulve te M.	2	0,00	0,00	0,00	0,00	1,00	1,00
Lans van der A.	2	0,00	1,00	1,00	1,00	1,00	0,00
Meex R	2	1,00	0,00	0,00	0,00	0,00	0,00
Nabben M	2	1,00	0,00	0,00	0,00	0,00	0,00
Smet de E.	2	1,00	1,00	1,00	1,00	0,00	0,00
Smolders L.	2	0,00	0,00	0,00	0,00	1,00	1,00
Tonnard J.	2	1,00	1,00	1,00	1,00	0,00	0,00
Vijgen G.	2	0,00	0,00	0,25	0,00	0,00	0,00
Vosselman M.	2	0,00	1,00	1,00	1,00	1,00	0,00
Aller E.	3	1,00	1,00	1,00	1,00	0,00	0,00
Bakia J.	3	0,00	0,00	0,00	1,00	1,00	0,00
Barneveld van K.	3	0,00	0,00	0,00	1,00	1,00	0,00
Baumgartner S.	3	0,00	0,00	0,00	0,00	0,00	0,00
Born J.	3	1,00	1,00	0,00	0,00	0,00	0,00
Bosmans A.C.	3	0,00	0,00	0,00	0,00	1,00	1,00
Broeders E.	3	0,00	0,00	0,00	0,33	0,33	0,33
Broers N.	3	0,00	0,00	1,00	1,00	1,00	1,00
Brouwers B.	3	0,00	1,00	1,00	1,00	1,00	1,00
Bruls Y.	3	0,00	0,00	0,00	0,00	1,00	1,00
Bussel van B.	3	1,00	1,00	1,00	0,00	0,00	0,00
Camps S.	3	0,00	0,50	0,50	0,50	0,50	0,00
Canfora E.	3	0,00	0,00	1,00	1,00	1,00	1,00
Dahlmans D.	3	0,00	0,00	0,00	0,00	1,00	1,00
Dopheide J.	3	1,00	1,00	0,00	0,00	0,00	0,00
Dorenbos E.	3	0,00	0,00	0,00	0,00	0,00	0,80
Drummen M.	3	0,00	0,00	0,00	0,00	1,00	1,00
Du H	3	0,00	0,00	0,00	0,00	0,00	0,00
Ernst M.	3	0,00	0,00	0,00	0,00	0,00	0,00
Ewijk van E.	3	1,00	1,00	1,00	1,00	0,00	0,00
Gemmink A.	3	0,00	0,00	1,00	1,00	1,00	1,00
Gerards S.	3	0,00	0,00	0,00	0,00	0,00	0,00
Hanssen M.	3	0,00	0,00	1,00	1,00	1,00	1,00
Heemskerk J.	3	0,00	0,00	0,00	0,00	0,00	0,00
Hees van AMJ	3	0,00	0,00	0,00	0,00	0,00	0,00
Helmink J.	3	0,00	0,00	0,80	0,00	0,00	0,00
Herpen N.	3	1,00	0,00	0,00	0,00	0,00	0,00
Hil van den L.	3	0,00	0,00	0,00	0,00	0,00	0,50

Hoed M	3	0,00	0,00	0,00	0,00	0,00	0,00
Hommelberg PPH	3	0,00	0,00	0,00	0,00	0,00	0,00
Hoogland P.	3	0,80	0,00	0,00	0,00	0,00	0,00
Hursel R.	3	1,00	1,00	0,00	0,00	0,00	0,00
Jacquot C.	3	0,00	0,00	1,00	1,00	0,00	0,00
Jans A.	3	1,00	1,00	0,00	0,00	0,00	0,00
Joris P.	3	0,00	0,00	1,00	1,00	1,00	1,00
Kingma B.	3	1,00	1,00	1,00	0,00	0,00	0,00
Leenaars C.	3	0,00	0,00	0,00	0,00	1,00	0,00
Lemmens S.	3	1,00	1,00	0,00	0,00	0,00	0,00
Lenaers E	3	1,00	0,00	0,00	0,00	0,00	0,00
Lieshout van R.	3	0,00	0,00	0,00	0,00	0,50	0,50
Ligt de M.	3	0,00	0,00	0,00	0,00	1,00	1,00
Lindeboom L.	3	0,00	0,00	1,00	1,00	1,00	1,00
Made van der S.	3	0,00	0,00	1,00	1,00	0,00	0,00
Marsaux C.	3	0,00	0,00	1,00	1,00	1,00	1,00
Martens E.	3	0,00	0,00	1,00	1,00	1,00	0,00
Martens M.	3	1,00	1,00	1,00	0,00	0,00	0,00
Meijl van L	3	1,00	0,00	0,00	0,00	0,00	0,00
Meis J.	3	0,00	1,00	1,00	1,00	1,00	0,00
Moors C	3	0,00	0,00	0,00	0,00	0,00	0,00
Munsters M.	3	1,00	1,00	1,00	0,00	0,00	0,00
Pallubinsky H.	3	0,00	0,00	0,00	0,00	1,00	1,00
Phielix E	3	0,00	0,00	0,00	0,00	0,00	0,00
Pommé D.	3	0,00	0,00	0,00	0,00	1,00	0,00
Raaijmakers L.	3	0,00	1,00	1,00	1,00	1,00	0,00
Reijnders D.	3	0,00	0,00	1,00	1,00	1,00	1,00
Rijn van S.	3	0,00	0,00	0,00	0,00	0,00	0,00
Rinsum van C.	3	0,00	0,00	0,00	0,00	0,00	1,00
Roebroek Y.	3	0,00	0,00	0,00	0,00	0,00	1,00
Roque Martins A.	3	0,00	0,00	0,00	0,00	0,00	0,00
Schols R.	3	0,00	0,00	0,00	1,00	1,00	0,00
Schreinemacher M.	3	1,00	1,00	0,00	0,00	0,00	0,00
Severins N.	3	0,00	0,00	0,00	0,80	0,80	0,00
Sleddens E.	3	1,00	1,00	1,00	1,00	0,00	0,00
Soenen S	3	0,00	0,00	0,00	0,00	0,00	0,00
Talbot C.	3	0,00	0,00	0,00	0,00	1,00	1,00
Teunissen K.	3	0,00	0,43	0,43	0,43	0,43	0,00
Teuscher D.	3	0,00	0,00	1,00	1,00	1,00	1,00
Timmers S.	3	1,00	1,00	0,00	0,00	0,00	0,00
Veldhorst M	3	0,00	0,00	0,00	0,00	0,00	0,00
Verboven K.	3	0,00	0,00	0,00	0,00	0,00	0,00
Vijgen G.	3	0,00	0,00	0,75	0,00	0,00	0,00
Vogel M.	3	0,00	0,00	0,00	0,00	1,00	1,00
Vogels R.	3	0,00	0,00	1,00	0,50	0,50	0,00
Vries de E.	3	0,00	1,00	0,00	0,00	0,00	0,00
Vrolix R	3	0,00	0,00	0,00	0,00	0,00	0,00
Vught van A	3	0,00	0,00	0,00	0,00	0,00	0,00
Waelen A	3	0,00	0,00	0,00	0,00	0,00	0,00
Weijer T.	3	1,00	1,00	1,00	1,00	0,00	0,00
Wert de L.	3	0,00	0,00	0,00	0,00	0,00	0,00
Wulan S.	3	1,00	1,00	1,00	1,00	0,00	0,00
Aguirre Morales M.	3	0,00	0,00	0,00	1,00	1,00	1,00
Baumgartner S.	4	0,00	0,00	0,00	0,00	0,00	0,00
Bilet L.	4	0,00	0,00	0,00	0,00	1,00	0,40
Brüll F.	4	0,00	0,00	1,00	0,00	0,00	0,00
Can van J.	4	1,00	0,75	0,00	0,00	0,00	0,00
Dijk van J.W.	4	0,00	0,00	0,00	0,00	0,00	0,00
Janssens P.	4	0,00	0,00	1,00	1,00	1,00	1,00
Kelly E.	4	0,00	1,00	0,00	0,00	0,00	0,00
Konings E.	4	0,00	0,50	0,50	0,00	0,00	0,00

Made van der S.	4	0,00	1,00	0,00	0,00	1,00	0,00
Martens E.	4	0,00	1,00	0,00	0,00	0,00	0,00
Masson C.	4	1,00	1,00	1,00	0,00	0,00	0,00
Most J.	4	0,00	1,00	1,00	1,00	1,00	1,00
Pieters D.	4	0,00	0,00	0,50	0,50	0,50	0,50
Severins N.	4	0,00	1,00	1,00	0,00	0,00	0,80
Smet de E.	4	0,00	0,00	0,00	0,00	0,00	0,00
Stinkens R.	4	0,00	0,00	0,00	1,00	1,00	1,00
Verhoef S.	4	1,00	1,00	1,00	0,00	0,00	0,00
Bonomi A.	4	0,00	0,00	0,00	0,00	0,00	0,00
Kolk van der B.	9	0,00	0,00	0,00	0,00	1,00	1,00
Konings E.	9	0,00	0,00	0,00	0,00	0,00	0,00
Paulus G.	9	0,00	0,00	0,00	0,00	0,00	0,00
Rutters F	9	0,00	0,00	0,00	0,00	0,00	0,00
Teunissen K.	9	0,00	0,00	0,00	0,00	0,00	0,00
Valenti G.	9	0,00	0,00	1,00	1,00	1,00	1,00
Vijgen G.	9	1,00	0,00	0,00	0,00	0,00	0,00
Total scientific staff		***48,90***	***57,90***	***63,53***	***60,12***	***63,52***	***54,29***
Support staff		***18,03***	***14,63***	***19,53***	***18,93***	***16,51***	***17,54***
Aydeniz H	0	0,50	0,50	0,50	0,50	0,50	0,50
Gijsen A*	1	1,00	1,00	1,00	1,00	1,00	1,00
Hoor ten G.	1	0,00	0,00	0,00	1,00	0,00	0,00
Kolenburg L.	1	0,23	0,23	0,23	0,23	0,23	0,23
Rosique Esteban N.	1	0,00	0,00	0,00	0,00	0,00	1,00
Schaart G	1	0,80	0,80	0,80	0,80	0,80	0,80
Schoffelen P	1	1,00	1,00	1,00	1,00	1,00	1,00
Sluijsmans WEM*	1	0,60	0,60	0,60	0,60	0,60	0,60
Stegen JHCH	1	1,00	1,00	1,00	1,00	1,00	1,00
Wouters L	1	0,85	0,85	0,85	0,85	0,85	0,85
Arkenbosch L.	1	0,00	0,00	0,00	0,60	0,40	0,00
Beckers M.	2	0,00	0,50	0,00	0,00	0,00	0,00
Beurden van D.	2	1,00	1,00	0,00	0,00	0,00	0,00
Boekel van L.	2	1,00	0,00	0,00	0,00	0,00	0,00
Boonen A.	2	1,00	0,00	0,00	0,00	0,00	0,00
Coonen M.	2	0,00	1,00	0,00	0,00	0,00	0,00
Hall V.	2	0,00	0,00	0,00	0,00	0,00	0,39
Hamers F.	2	0,00	0,00	1,00	0,00	0,00	0,00
Hoebers N	2	0,00	0,00	0,00	0,40	0,00	1,00
Jörgensen J.A.	2	0,80	0,00	0,00	0,00	0,80	0,60
Klaassen R.	2	0,00	0,00	0,00	1,00	0,80	0,00
kohl L.	2	0,00	0,00	0,00	0,00	0,00	0,80
Konings M	2	0,00	1,00	1,00	1,00	1,00	1,00
Schonewille M.	2	0,00	0,00	1,00	0,00	0,00	0,00
Stessen K.	2	0,00	0,00	0,00	0,00	0,00	1,00
Arkenbosch L.	2	0,00	0,00	0,00	0,00	0,00	0,60
Beckers M.	3	0,00	0,50	0,00	0,00	0,00	0,00
Boekel van L.	3	0,00	1,00	0,00	0,00	0,00	0,00
Dopheide J.	3	0,00	0,00	0,80	0,00	0,00	0,00
Dunlop M.	3	0,00	0,00	0,00	1,00	1,00	0,00
Hall V.	3	0,00	0,00	0,00	0,60	0,00	0,00
Hamers F.	3	0,00	0,00	0,00	1,00	0,00	0,00
Hoebers N	3	0,00	0,00	0,00	0,40	0,80	0,00
Hul G	3	1,00	0,00	0,30	0,30	0,30	0,30
Hulsbosch M	3	0,85	0,45	0,45	0,45	0,45	0,45
Janssen - Essers Y	3	0,60	0,60	0,60	0,60	0,60	0,60
Jongen A.	3	0,00	0,00	0,00	0,00	0,00	1,00
Joosten M-H	3	0,00	0,00	0,00	0,00	0,80	0,00
Jörgensen J.A.	3	0,00	0,00	0,80	0,80	0,00	0,00

kohl L.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,28*	*0,00*
Langejan C.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Made van der S.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Martens E.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Meis J.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Monsheimer S	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Penders B.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,72*
Pieters D.	*3*	*0,00*	*0,00*	*0,50*	*0,00*	*0,00*	*0,00*
Robins H.	*3*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*
Ronden L.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Schols R.	*3*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*
Smets J.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Souren M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Verhulst Y.	*3*	*0,80*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Wystyrk N.	*3*	*0,00*	*0,60*	*0,80*	*0,40*	*0,00*	*0,00*
Arkenbosch L.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Beckers M.	*4*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*0,00*
Essers H.	*4*	*0,00*	*0,00*	*0,50*	*0,50*	*0,00*	*0,00*
Gerver Jansen AJGM	*4*	*1,00*	*1,00*	*1,00*	*0,50*	*0,50*	*0,50*
Käfer T.	*4*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*
Kolk van der B.	*4*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*
Langejan C.	*4*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Luiten D.	*4*	*0,00*	*0,00*	*0,00*	*0,00*	*0,80*	*0,80*
Pieters D.	*4*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Tarasidou I.	*4*	*0,00*	*0,80*	*0,00*	*0,00*	*0,00*	*0,00*
Velde ten G.	*4*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,80*
Wings K.	*4*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Wystyrk N.	*4*	*0,00*	*0,20*	*0,80*	*0,40*	*0,00*	*0,00*

Other Staff		***1,26***	***1,70***	***1,20***	***1,50***	***1,60***	***1,60***
Mensinga S.	*1*	*0,06*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Broekhuizen R.	*1*	*0,30*	*0,30*	*0,00*	*0,00*	*0,00*	*0,00*
Maessen - Mohren H.	*3*	*0,00*	*0,50*	*0,00*	*0,00*	*0,00*	*0,00*
Morales Belmar - Slippens D.	*3*	*0,70*	*0,70*	*0,00*	*0,00*	*0,00*	*0,40*
Pieters D.	*3*	*0,00*	*0,00*	*0,00*	*0,50*	*0,50*	*0,50*
Verhaegen Y.	*3*	*0,00*	*0,00*	*0,40*	*0,60*	*0,60*	*0,60*
Welbergen I	*3*	*0,20*	*0,20*	*0,00*	*0,00*	*0,00*	*0,00*
Morales Belmar - Slippens D.	*3*	*0,00*	*0,00*	*0,40*	*0,40*	*0,50*	*0,10*
Pachen C	*4*	*0,00*	*0,00*	*0,20*	*0,00*	*0,00*	*0,00*
Verhaegen Y.	*4*	*0,00*	*0,00*	*0,20*	*0,00*	*0,00*	*0,00*

Total staff	***68,19***	***74,23***	***84,26***	***80,55***	***81,63***	***73,43***

Appendix 2: Curricula

Name: Ellen E Blaak
E-mail: E.Blaak@maastrichtuniversity.nl
URL:

GENERAL INFORMATION
Date of birth: December 17, 1964
Current position: Professor
Fields of Expertise: Energy and substrate metabolism in Obesity and Diabetes, Interorgan crosstalk, Nutrition, Lifestyle,

QUALIFICATIONS and SCIENTIFIC CAREER

1989 Degree in Human Nutrition, Agricultural University Wageningen
1989-1993 PhD-student, Dept of Human Biology, Maastricht University; "The sympathetic nervous system and human energy metabolism in relation to obesity", Cum Laude graduation.
1994 'Talentstipendium' from the Netherlands Organisation of Scientific Research to acquire the microdialysis skills at the Huddinge. University Hospital, Karoliska Institute in Stockholm, Sweden (Dr P Arner).
1995-1999 Grant for a 3-y postdoc position at the Maastricht University from the Netherlands Organisation of Scientific Research for the research proposal: 'Defects in the sympathetically mediated fat utilization in the etiology of abdominal obesityassociated Diabetes Mellitus'
1999-2002 Assistant Professor, Dept. of Human Biology, UM
2002-2007 Associate Professor (NWO Aspasia grant), Dept. of Human Biology, UM
2007-now Professor of Physiology of Fat Metabolism, Dept of Human Biology, UM
2011-now Project leader within Top Institute Food and Nutrition, Wageningen

OUTPUT:

Publications:
- Number of publications in international refereed scientific journals according to WoS: 170
- Contributions to books: 7
- Number of citations according to WoS: 4640; H-index: 37

Supervision of PhD theses:
- Number of PhD students supervised till thesis defense: 16

Scientific teaching:
- Program coördinator study direction Molecular life sciences/Biomedical sciences (2006-2013)
- Coordinator and Member of various block groups
- Coach of BSc- and MSc- students during their practical training period

Three key publications 2009 – 2014:

- Jocken JW, Goossens GH, Boon H, Mason RR, Essers Y, Havekes B, Watt MJ, van Loon LJ, Blaak EE. Insulin-mediated suppression of lipolysis in adipose tissue and skeletal muscle of obese type 2 diabetic men and men with normal glucose tolerance. Diabetologia. 2013 Oct;56(10):2255-65. doi: 10.1007/s00125-013-2995-9. Epub 2013 Aug 2.
- Jans A, Konings E, Goossens GH, Bouwman FG, Moors CC, Boekschoten MV, Afman LA, Müller M, Mariman EC, Blaak EE.PUFAs acutely affect triacylglycerol-derived skeletal muscle fatty acid uptake and increase postprandial insulin sensitivity.Am J Clin Nutr. 2012 Apr;95(4):825-36. doi: 10.3945/ajcn.111.028787. Epub 2012 Feb 15.
- Goossens GH, Bizzarri A, Venteclef N, Essers Y, Cleutjens JP, Konings E, Jocken JW, Cajlakovic M, Ribitsch V, Clément K, Blaak EE.Increased adipose tissue oxygen tension in obese compared with lean men is accompanied by insulin resistance, impaired adipose tissue capillarization, and inflammation. Circulation. 2011 Jul 5;124(1):67-76.

NATIONAL/INTERNATIONAL SCIENTIFIC FUNCTIONS

1999-2002 Principal investigator EU concerted action, FAIR CT98-4141 'Dietary fat, body weight control and cardiovascular disease (FATLINK)'

>2001 Secretary, and **>2003** Chair, Netherlands Association for the Study of Obesity

2004-2009 Principal Investigator EU project 6th framework programme food quality and safety with 25 partners 'Diet, genomics and the metabolic syndrome: an integrated nutrition, agro-food, social and economic analysis " (LIPGENE).

2005-now Member, Editorial Board International Journal of obesity

2005-2011 Member, Scientific Committee Dutch Diabetes Research Foundation

2007-now Member, Editorial Board 'Obesity Facts'

2007-now Member, Scientific Committee, European Obesity Congress, Budapest,

>2007 Member, Scientific Committee Netherlands Organisation for Scientific research ' 'Top grants' and veni grants

2009 Chair 17th European Obesity Congress, Amsterdam

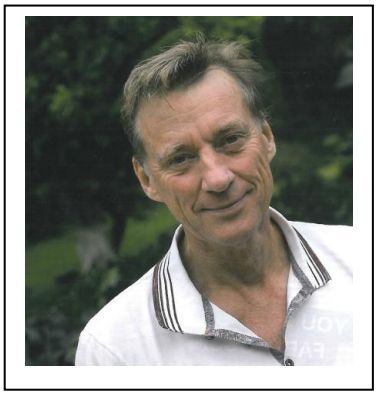
2011-now Secretary European Association for the Study of Obesity (EASO)

2012-2014 Participant Joint research Centre foresight study "Tomorrow's healthy society research for food and health" EU commission towards horizon 2020

RESEARCH GRANTS, AWARDS:

E. Blaak acquired funding from Netherlands Organisation for Scientific research/Dutch Diabetes Research Foundation/European Union as a PI for 18 research projects.She is actively involved in 6th and 7th framework EU projects. She the secretary of the European Association for the Study of Obesity and is in this function involved in the promotion of obesity research, the dissemination of results and exchange of scientific information in the field of obesity within Europe.

Name: Fred Brouns
E-mail: fred.brouns@maastrichtuniversity.nl
URL



GENERAL INFORMATION
Date of birth: Sept 8, 1950
Current position: Professor
Fields of Expertise: Human nutrition, sports nutrition, sugars, fructose, grains/cereals. Gluten. Dietary fibers, prebiotics, functional foods

QUALIFICATIONS
- 2015 – appointed FELLOW of the ICC Academy, year 2014,ICC, Vienna.
- 2009-heden: Professor human nutrition –chair 'Health Food Innovation"
- 2006 Registered Nutritionist, Dutch Academy Nutritional Sciences
- 1993 Fellow European College of sports Sciences(ACSS)
- 1990 Fellow American College of Sports Medicine (ACSM)
- 1987 PhD, Maastricht University
- 1986 Invited member Nutrition Society, UK
- 1977 MOPE, Univ. Applied Sci., Amsterdam
- 1980 LIC-PE, VUB, Brussel

SCIENTIFIC CAREER:
- 2008, Professor
- 1987, PhD
- 1980 Lic Physical education

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 178
- Contributions to books: 33
- Number of citations according to WoS: sum 5372, average 30.18 /item ; H-index:43

Patents: NA

Supervision of PhD theses: 3

Scientific teaching:
- course director Health Food Innovation management 2009-2014
- Supervisor coach of Bsc and MSc thesis student
- Lecturer in courses European public health, Biomedical Sciences,
- External guest lecturer at various universities and institutes

Three key publications 2009 – 2014:
- Brouns, F. J. P. H., van Buul, V. J., & Shewry, P. R. (**2013**). Does wheat make us fat and sick? Journal of Cereal Science, 58(2), 209-215. **Downloaded 17.885 times in the first 5 months after open access**
- van Buul, V. J., Tappy, L., & **Brouns,** F. J. P. H. (**2014**). Misconceptions about fructose-containing sugars and their role in the obesity epidemic. Nutrition Research Reviews, page 1 of 12; doi:10.1017/S0954422414000067 **SELECTED by the British Nutrition Society as "science paper of the month June 2014, downloaded 5300 times**
- Fred Brouns , Youna Hemery, Ruth Price & Nuria Mateo Anson. Wheat Aleurone: Separation, Composition, Health Aspects, and Potential Food Use. Critical Reviews in Food Science and Nutrition, **2012,** 52:6, 553-568 http://dx.doi.org/10.1080/10408398.2011.589540

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:

- NA

Membership of national and international scientific organizations:

- NAV
- ICC
- ISHS

RELEVANT JOB-RELATED SOCIAL POSITIONS: (max 3)

- Chair Carbohydrates CIE, Intl. Life Sciences Institute, Brussles
- Board member-secretary- Dutch Academy of Nutritional Sciences
- Scientific Advisory board member, Laval University, Quebec, Canada

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- 1994 FIMS (Féderation Internationale de Médecine Sportive) Award received for “Noteworthy Contribution to the Global Sports Medicine Science and Concept”.
- 1990 Netherlands Sports Medicine Award
- 2006 Health Ingredients Europe – Golden innovation award for studies on Isomaltulose

Name: HESSELINK, Matthijs K. C.
E-mail: Matthijs.hesselink@maastrichtuniversity.nl
URL: www.dmrg.nl

GENERAL INFORMATION
Date of birth: August 8, 1968
Current position: Professor
Fields of Expertise: Human movement sciences, muscle metabolism, exercise, lipid droplets, mitochondria, microscopy

QUALIFICATIONS:
1998: PhD Structural, functional and metabolic aspects of shortening and lengthening muscle contractions, Maastricht University
1993: License to work with radioactive material 5b
"Artikel 9 functionaris" for studies with laboratory animals. This certificate is comparable to the category C recommendations of the Federation of European Laboratory Animal Science Associations (FELASA)
1992: MSc in Health Sciences, specialization Human Movement Sciences, Maastricht University

SCIENTIFIC CAREER:
2010-present: Full Professor of Human Movement Sciences, NUTRIM School for Nutrition, Toxicology and Metabolism, Maastricht University Medical Centre + (MUMC+)
2007-2013: Head of the Department of Human Movement Sciences Maastricht University Medical Centre + (MUMC+).
2006-2010: Associate Professor Department of Human Movement Sciences, NUTRIM, Maastricht University Medical Centre + (MUMC+)
2000-2006: Assistant Professor Department of Human Movement Sciences, Maastricht University
1997-2000: Post-Doctoral appointment at NUTRIM, Maastricht University
1992-1997: PhD-student, Cardiovascular Research Institute Maastricht (CARIM) Maastricht University

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 158
- Contributions to books: 4
- Number of citations according to WoS: 4118; H-index: 38

Patents:
- None

Supervision of PhD theses:
Number of PhD students supervised till thesis defence: 9

Scientific teaching:
- Member of various block groups
- Coach of BSc- and MSc- students during their practical training period

Three key publications 2009 – 2014:
- Bosma, M., M.K. Hesselink, L.M. Sparks, S. Timmers, M.J. Ferraz, F. Mattijssen, D. van Beurden, G. Schaart, M.H. de Baets, F.K. Verheyen, S. Kersten, and P. Schrauwen, Perilipin 2 improves insulin sensitivity in skeletal muscle despite elevated intramuscular lipid levels. Diabetes, 2012. 61(11): p. 2679-90.
- Haemmerle, G., T. Moustafa, G. Woelkart, S. Buttner, A. Schmidt, T. van de Weijer, M. Hesselink, D. Jaeger, P.C. Kienesberger, K. Zierler, R. Schreiber, T. Eichmann, D. Kolb, P. Kotzbeck, M. Schweiger,

M. Kumari, S. Eder, G. Schoiswohl, N. Wongsiriroj, N.M. Pollak, F.P. Radner, K. Preiss-Landl, T. Kolbe, T. Rulicke, B. Pieske, M. Trauner, A. Lass, R. Zimmermann, G. Hoefler, S. Cinti, E.E. Kershaw, P. Schrauwen, F. Madeo, B. Mayer, and R. Zechner, ATGL-mediated fat catabolism regulates cardiac mitochondrial function via PPAR-alpha and PGC-1. Nature medicine, 2011. 17(9): p. 1076-85.

- Meex, R.C., V.B. Schrauwen-Hinderling, E. Moonen-Kornips, G. Schaart, M. Mensink, E. Phielix, T. van de Weijer, J.P. Sels, P. Schrauwen, and M.K. Hesselink, Restoration of muscle mitochondrial function and metabolic flexibility in type 2 diabetes by exercise training is paralleled by increased myocellular fat storage and improved insulin sensitivity. Diabetes, 2010. 59(3): p. 572-9.

RELEVANT SCIENTIFIC SERVICES :
Membership of editorial boards of international scientific journals:

Membership of national and international scientific organizations:
- Member of the American Diabetes Association (ADA)
- Member of the American Physiologial Society (APS)
- Member of the Dutch Association for Diabetes Research (NVDO)

RELEVANT JOB-RELATED SOCIAL POSITIONS: (
- Board Member of the Dutch Association for Diabetes Research (NVDO)
- Member of the Steering committee for the international registry of Neutral Lipid Storage Disease (NLSD)/Triglyceride Deposit Cardiomyovasculopathy (TGCV)
- Member of the Scientific Sessions Meeting Planning Committee for Sessions on Exercise and Diabetes, American Diabetes Association's, developing the program for the Association's 2013 Scientific

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:
- 2006 Awarded ZON-MW/NWO VIDI Grant for innovative research: 'Setting fat on fire; towards a molecular understanding of the link between defective mitochondrial respiration and insulin resistance'
- 2014 Research grant Dutch Diabetes Research Foundation, Myocellulair fat: good or bad (or not as simple as that)?
- 2010 Research Grant TI HTSM/ NANO Next: Molecular structure of food; Characterization and molecular control of cellular lipid droplets.

Name: KREMERS, Stef P.J.
E-mail: s.kremers@maastrichtuniversity.nl
URL: http://www.maastricht-university.eu/s.kremers/

GENERAL INFORMATION
Date of birth: July 25, 1973
Current position: Professor
Fields of Expertise: Obesity prevention, health promotion, behavioural determinants, social psychology

QUALIFICATIONS:
2002: PhD in Health Sciences, Maastricht University
1998: MSc in Health Education and Promotion, Maastricht University

SCIENTIFIC CAREER:

July 2013 – current:	Professor, Maastricht University
April 2009 – June 2013:	Associate Professor, Maastricht University
March 2007 – March 2009:	Assistant Professor, Maastricht University
Sept. 2001 – Feb. 2007:	Postdoctoral researcher, Maastricht University
Nov. 2000 - August 2001:	Senior Researcher, Maastricht University
June 1998 – Oct. 2000:	Junior Researcher, Maastricht University
March 1998 - May 1998:	Research assistant, Maastricht University

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 159
- Contributions to books: 23
- Number of citations according to WoS: 2375; H-index: 31

Patents: -

Supervision of PhD theses:
Number of PhD students supervised till thesis defence: 9

Scientific teaching:
- Member of various block groups
- Coach of BSc- and MSc- students during their practical training period

Three key publications 2009 – 2014:
- Rutten GM, Meis JJM, Hendriks MRC, Hamers FJM, Veenhof C, *Kremers SPJ*. Does lifestyle coaching of overweight patients in primary care contribute to more autonomous motivation for physical activity and healthy dietary behaviour? Results of a longitudinal study. *International Journal of Behavioral Nutrition and Physical Activity* 2014, 11, 86.
- Gubbels JS, *Kremers SPJ*, Van Kann DHH, Stafleu A, Dagnelie PC, De Vries NK, Thijs C. Interaction between physical environment, social environment and child characteristics in determining physical activity at child-care. *Health Psychology* 2011, 30, 84-90.
- *Kremers S*, Reubsaet A, Martens M, Gerards S, Jonkers R, Candel M, De Weerdt I, De Vries N. Systematic prevention of overweight and obesity in adults: A qualitative and quantitative literature analysis. *Obesity Reviews* 2010, 11, 371-379.

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
Co-Editor International Journal of Behavioral Nutrition and Physical Activity (IJBNPA)

Membership of national and international scientific organizations:

- Member of the International Society for Behavioral Nutrition and Physical Activity (ISBNPA)
- Member of the International Physical Activity and the Environment Network (IPEN)
- Member of the National Health Council committee 'Living environment and physical activity', committee number 838 (2008-2010). Chair of the subcommittee 'Interventions in the living environment'.

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Member of the advisory board of the Dutch Nutrition Centre
- Chairman of the Dutch Working Group on Nutritional Habits (WeVo)
- Chair of the Dutch admission system for health promotion interventions, committee for adults and elderly.

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- The ONVZ Prevention Year Award 2005
- Research grants in the field of nutrition, physical activity, obesity prevention supported by Netherlands Organisation for Scientific Research (NOW), Netherlands Heart Foundation, Diabetes Fund, Netherlands Organisation for Health Research and Development (ZonMw), Dutch Ministry of Health Welfare and Sport

Name: van MarkenLichtenbelt, Wouter D.
E-mail: markenlichtenbelt@maastrichtuniversity.nl
URL: -

GENERAL INFORMATION
Date of birth: September 2, 1954
Current position: Professor
Fields of Expertise: Human energy metabolism, thermoregulation metabolic syndrome

QUALIFICATIONS:
1985-1991 Ph.D. Biology State University Groningen
1984-1985 Areal Survey International Institute for Aerial Survey and Earth Sciences (ITC), Enschede
1974-1983 M.Sc. Biology State University Groningen (cum Laude)
1967-1974 Atheneum B Christelijk lyceum Zeist

SCIENTIFIC CAREER:
2014 Professor Ecological Energetics and Health
2009 – 2014 Associate Professor, Human Biology, Maastricht University
1991 – 2009 Assistant Professor, Human Biology, Maastricht University
1989 – 1991 Researcher, Zoologisch Laboratorium, University of Groningen
1984 – 1989 Staff member, CARMABI foundation, Curaçao, Netherlands Antilles

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 120
- Contributions to books: 5
- Number of citations according to WoS: 5000; H-index: 30

Patents:
- -

Supervision of PhD theses:
Number of PhD students supervised till thesis defence: 10

Scientific teaching:
- Development and coordinator of Master Sports and Physical Activity Interventions
- Internship coordinator
- Member of various block groups
- Coach of BSc- and MSc- students during their practical training period

Three key publications 2009 – 2014:
- Marken Lichtenbelt WD van, Vanhommerig JW, Smulders NM, Drossaerts MAFL, Kemerink GJ, Bouvy ND, Schrauwen P, and Teule GJJ. (2009) Cold-activated Brown Adipose Tissue in Healthy Adult Men. *New Engl J Med*, 360, 1500-8.
- Wu J, Bostrom P, Sparks LM, Ye L, Choi JH, Giang AH, Khandekar M, Virtanen KA, Nuutila P, Schaart G, Huang K, Tu H, van Marken Lichtenbelt WD, Hoeks J, Enerback S, Schrauwen P & Spiegelman BM (2012) Beige adipocytes are a distinct type of thermogenic fat cell in mouse and human. *Cell* 150, 366-76.
- Van der Lans AA, Hoeks J, Brans B, Vijgen GH, Visser MG, Vosselman MJ, Hansen J, Jorgensen JA, Wu J, Mottaghy FM, Schrauwen P, van Marken Lichtenbelt WD (2013). Cold acclimation recruits human brown fat and increases nonshivering thermogenesis. *The Journal of Clinical Investigation* 123**:** 3395-403.

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:

- Editorial Board of Temperature°

Membership of national and international scientific organizations:

- Member of the American Physiological Society (APS)
- Member of the European Association for the Study of Diabetes (EASD)

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Scientific Committee Windsor Conferences Thermal Comfort
- Scientific Committee International Symposia Physiology and Pharmacology of Thermoregulation (PPTR)
- Scientific Committee International Building Performance Simulation Association
- Scientific sub-Committee Thermoregulation of the International Union of Physiological Sciences (IUPS)

Name: MENSINK, Ronald P.
E-mail: r.mensink@maastrichtuniversity.nl
URL: -

GENERAL INFORMATION
Date of birth: April 30, 1960
Current position: Professor
Fields of Expertise: Human nutrition, intervention studies, metabolism, metabolic syndrome

QUALIFICATIONS:
2005: Registered nutritionist
1993: "Artikel 9 functionaris" for studies with laboratory animals. This certificate is comparable to the category C recommendations of the Federation of European Laboratory Animal Science Associations (FELASA)
1992: Registered epidemiologist
1992: MSc in Epidemiology
1990: PhD in Agricultural and Environmental Sciences, Wageningen University
1985: MSc in Human Nutrition, Wageningen University

SCIENTIFIC CAREER:
1999-present: Professor in Molecular Nutrition (with special emphasis on lipid metabolism), Maastricht University
1998-1999: Associate professor in Molecular Nutrition, Maastricht University
1996-1998: Assistant professor, Maastricht University
1991-1996: Fellow of the Dutch Academy of Science (KNAW), Maastricht University
1990-1991: Postdoctoral fellow at the Department of Human Biology, Maastricht University
1985-1990: PhD-student, Wageningen University

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 268
- Contributions to books: 19
- Number of citations according to WoS: 9977; H-index: 49

Patents:
- Brull,F, Plat J, Mensink RP. Compositions for preventing and treating an immune system disorder. Patent: 20120135956, 20120135970

Supervision of PhD theses:
Number of PhD students supervised till thesis defence: 24

Scientific teaching:
- Member of various block groups
- Coach of BSc- and MSc- students during their practical training period

Three key publications 2009 – 2014:
- Sanders TAB, Filippou A, Berry SE, Baumgartner S, *Mensink RP*. Palmitic acid in the sn-2 position of triacylglycerols acutely influences postprandial lipid metabolism. *American Journal of Clinical Nutrition* 2011; 94:1433-1441
- *Mensink RP*, de Jong A, Lütjohann D, Haenen GR, Plat J. Plant stanols dose-dependently decrease LDL-cholesterol concentrations - but not cholesterol-standardized fat-soluble antioxidant levels - at intakes up to 9 g a day. *American Journal of Clinical Nutrition* 2010; 92:24-33.

- Vrolix R, *Mensink RP*. Effects of glycemic load on metabolic risk markers in subjects at increased risk of developing metabolic syndrome. *American Journal of Clinical Nutrition* 2010; 92:366-374.

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:

- Editorial Board of Nutrition Metabolism and Cardiovascular Diseases
- Editorial Board of European Journal of Lipid Science Technology
- Editorial Board of Nutrients

Membership of national and international scientific organizations:

- Member of the International Society for the Study of Fatty Acids (ISSFAL)
- Member of the European Atherosclerosis Society (EAS)
- Member of the Dutch Academy of Nutritional Sciences

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Member of the Dutch Health Council
- Chairman of the board of the graduate school VLAG
- Chairman of “Commissie van Toezicht en Beoordeling” for accreditation of nutritionists

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- Paul Nestel Lecture, Adelaide, 2010
- Project leader within the Top Institute Food and Nutrtition (“Relevance of Vascular Function Markers”)
- Research grants in the field of nutrition, lipid metabolism, endothelial function, and (cardio)vascular health supported by the EU, Unilever, Raisio, Dutch Dairy Foundation, Sime Darby, and MPOB

Name: Plat, Jogchum
E-mail: j.plat@maastrichtuniversity.nl
URL: -

GENERAL INFORMATION
Date of birth: May 8, 1970
Current position: Professor
Fields of Expertise: Human nutrition, intervention studies, sterol metabolism, functional foods

QUALIFICATIONS:
2005: Registered nutritionist
2006: "Artikel 9 functionaris" for studies with laboratory animals. This certificate is comparable to the category C recommendations of the Federation of European Laboratory Animal Science Associations (FELASA)
2002: Radiation hygiene Level 5b
2001: PhD, Maastricht University
1996: MSc in Biological health Sciences, Wageningen University
1994: MSc in Nutrition and Dietetics, Hanze hogeschool Groningen

SCIENTIFIC CAREER:
2013-present: Professor Physiology of Nutrition (with special emphasis on sterol metabolism), Maastricht University
2008-2013: Associate professor, Maastricht University
2004-2008: Assistant professor, Maastricht University
2001-2003: Postdoctoral fellow at the Department of Human Biology, Maastricht University
1997-2001: PhD-student, Maastricht University

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 104
- Contributions to books: 6
- Number of citations according to WoS: 2608; H-index: 31

Patents:
- Brull,F, Plat J, Mensink RP. Compositions for preventing and treating an immune system disorder. Patent: 20120135956, 20120135970
- Plat J, Shiri-Sverdlov R, Bieghs V, Mensink, R.P. Plant stanol/sterol (derivatives) for treatment and/or monitoring liver inflammation. Patent: 11191776.1
- Berendschot, T.T.J.M, Nelissen J.W.P.M, Plat J, Thielen W.J.G. Method of producing egg yolk based functional food products and products obtainable thereby. Patent: US 2011/0015,277
- Plat J, Mensink R.P. Detection of subjects at risk for chd by a genotype evaluation associated with serum plant sterols enabling individualized (drug) treatment on demand Patent: WO/2005/118846 US 2008/0131879

Supervision of PhD theses:
Number of PhD students supervised till thesis defence: 9

Scientific teaching:
- Coordinator of the Biological Health Sciences bachelor program with biomedical Sciences
- Member of various block groups
- Coach of BSc- and MSc- students during their practical training period

Three key publications 2009 – 2014:

- Plat J, Hendrikx T, Bieghs V, Jeurissen ML, Walenbergh SM, van Gorp PJ, De Smet E, Konings M, Vreugdenhil AC, Guichot YD, Rensen SS, Buurman WA, Greve JW, Lütjohann D, Mensink RP, Shiri-Sverdlov R. Protective role of plant sterol and stanol esters in liver inflammation: insights from mice and humans. *PLoS One.* 2014; 30:9.
- *Mensink RP*, de Jong A, Lütjohann D, Haenen GR, Plat J. Plant stanols dose-dependently decrease LDL-cholesterol concentrations - but not cholesterol-standardized fat-soluble antioxidant levels - at intakes up to 9 g a day. *American Journal of Clinical Nutrition* 2010; 92:24-33.
- Baumgartner S, Mensink RP, Husche C, Lütjohann D, Plat J. Effects of plant sterol- or stanol-enriched margarine on fasting plasma oxyphytosterol concentrations in healthy subjects. Atherosclerosis 2013; 227:414-419.

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:

-

Membership of national and international scientific organizations:

- Member of the European Network for Oxysterol research (ENOR)
- Member of the European Atherosclerosis Society (EAS)
- Member of the American Society for Nutrition (ASN)
- Member of the American Oil Chemist Society (AOCS)
- Member of the Dutch Academy of Nutritional Sciences (NAV)
- Member of the European Nutrigenomics Consortium (NUGO)

RELEVANT JOB-RELATED SOCIAL POSITIONS: (max 3)

- Chairman of the Department of Human Biology and Movement Sciences (section B)
- Chairman of the board of the Dutch Academy of Nutrition Sciences (NAV)
- Daily supervision of the Metabolic Research Unit Maastricht (MRUM)
- Member of the Medical Ethical Committee (METC) AZM-UM 2008-2013

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- Research grants in the field of nutrition, plant sterol metabolism, HDL cholesterol, and (cardio)vascular health supported by the NWO, ZonMW, Raisio, Newtricious, FND, OP-zuid, CERES/EFRO/Innerlife, McNeill, DSM, and Unilever

Name: SCHRAUWEN, Patrick.
E-mail: p.schrauwen@maastrichtuniversity.nl
URL: -

GENERAL INFORMATION
Date of birth: April 4, 1971
Current position: Professor
Fields of Expertise: Type 2 diabetes, mitochondria, human intervention studies, metabolic imaging

QUALIFICATIONS:
2008: Registered nutritionist
1998: PhD in determinants of energy and substrate metabolism, Maastricht University
1994: MSc in Health Sciences/Movement Sciences, Maastricht University

SCIENTIFIC CAREER:
2010-present: Professor in Metabolic aspects of type 2 diabetes, Maastricht University
2009-2014: NWO VICI fellowship and (associate) professor, Maastricht University
2002-2007: Academy fellow of the Royal Academy of Arts and Sciences (KNAW), Maastricht University
1998-2001: NWO postdoctoral Fellow, Maastricht University
1997-1998: Visiting Scientist, NIDDK, NIH, Phoenix, USA
1994-1998: PhD-student, Maastricht University

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals: 196
- Contributions to books: 5
- Number of citations according to WoS: 7054; H-index: 46

Supervision of PhD theses:
Number of PhD students supervised till thesis defense: 16

Scientific teaching:
- Member of various block groups, member of the exam committee FHML
- Coach of BSc- and MSc- students during their practical training period

Three key publications 2009 – 2014:
- Lindeboom L, Nabuurs CI, Hoeks J, Brouwers B, Phielix E, Kooi ME, Hesselink MKC, Wildberger JE, Stevens RD, Koves T, Muoio DM, *Schrauwen P*, Schrauwen-Hinderling VB. Long-echo time MR spectroscopy for skeletal muscle acetylcarnitine detection. *Journal of Clinical Investigation* 2014; 124:4915-4925
- Wu J, Boström P, Sparks LM, Ye L, Choi JH, Giang A-H, Khandekar M, Virtanen KA, Nuutila P, Schaart G, Huang K, Tu H, van Marken Lichtenbelt WD, Hoeks J, Enerbäck S*, Schrauwen P*, Spiegelman BM. Beige adipocytes are a distinct type of thermogenic fat cell in mouse and human. Cell2012; 150:366-376
- Timmers S, Konings E, Bilet L, Houtkooper RH, van de Weijer T, Goossens GH, Hoeks J, van der Krieken S, Ryu D, Kersten S, Moonen-Kornips E, Hesselink MKC, Kunz I, Schrauwen-Hinderling VB, Blaak EE, Auwerx J, *Schrauwen P*. Calorie restriction-like effects of 30 days of resveratrol supplementation on energy metabolism and metabolic profile in obese humans. *Cell Metabolism* 2011; 14:612-622.

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:

- Associate editor Diabetologia
- Editorial Board Scientific Reports (Nature Publishing group)
- Editorial Board Nutrition and Diabetes

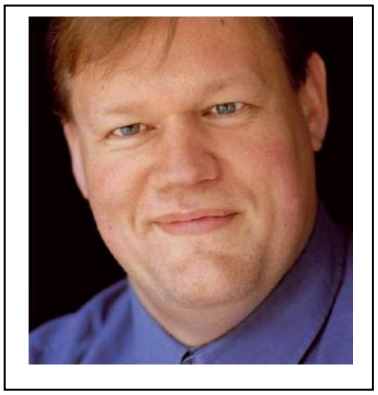
Membership of national and international scientific organizations:

- Member scientific advisory board Dutch Diabetes Foundation (DFN)
- Member of the European Association for the Study of Diabetes (EASD)

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- Corona-Gallina research award for fundamental research by Dutch Diabetic Foundation (DFN)
- Rising Star Award 2008 from the European Association for the Study of Diabetes (EASD)
- Winner of the 2006 'Silver Medal' award for young researchers from the Nutrition Society (UK) Young Investigators Award 2001 for Clinical Science from the European Association for the Study
- of Obesity (EASO)

Name: Koen Venema
E-mail: k.venema@maastrichtuniversity.nl
URL: -



GENERAL INFORMATION

Date of birth: 15-06-1968
Current position: Associate Professor
Fields of Expertise: Gut microbiota, probiotics, prebiotics, functional foods

QUALIFICATIONS:

1995: PhD Faculty of Mathematics & Natural Sciences, University of Groningen, the Netherlands
1990: MSc Life Sciences, University of Groningen, the Netherlands

SCIENTIFIC CAREER:

2014-current	Associate Professor, Department of Human Biology, MAastricht University, The Netherlands
2014-current	founder and CEO of Beneficial Microbes Consultancy
2004-current	Project leader, Top Institute Food & Nutrition [TIFN] (previously Wageningen Centre for Food Sciences [WCFS]), Wageningen, the Netherlands
1998-2013	Project leader, product manager, coordinator Gut Health, team leader, key opinion leader; TNO Earth & Environmental Life Sciences (previously TNO Food and Nutrition, and TNO Quality of Life), Zeist, the Netherlands
1997-1998	PostDoc; Department of Phytopathology, Wageningen University, the Netherlands
1996-1997	PostDoc; Department of Food Science, North CarolinaStateUniversity, Raleigh, NC, USA
1995-1996	PostDoc; Department of Genetics,University of Groningen, the Netherlands

OUTPUT:

Publications:

- Number of publications in international refereed scientific journals according to WoS: 112
- Contributions to books: 13
- Number of citations according to WoS: 2300 ; H-index: 26

Patents:

- A prokaryotic protein having functional and structural homology with the human p-glycoprotein encoded by the mdr-1 gene, nucleic acids encoding and cells expressing said protein. Application date: April 12, 1996; Inventors: Hendrik Bolhuis, Wilhelmus Nicolaas Konings, Hendrik Willem van Veen, Konraad Venema. WO1997040160 A1
- Sampling device for in vivo sampling of liquids from the gastrointestinal tract, process for the production thereof and mould or mask for use in the production process. Application date: July 12, 2007; Inventors: Adrianus Sprenkels, Antonius Johannes Stephanus Jenneboer, Konraad Venema, Albert Van Den Berg, Willem De Vos. US2007/0161928 A1.
- Butyrate as a medicament to improve visceral perception in humans. Application date: June 20, 2008; Inventors: Steven Alfons Lieven William Vanhoutvin, Friesland Foods Brand, Frederik Jan Troost, Robert-Jan Maria Brummer, Konraad Venema, Henrike Maria Hamer, Dorothea Maria Agnes Elisa Jonkers. WO2009154463 A3
- Carbohydrates enhancing the production of a C5 and/or a C6 SCFA. Application date: April 08, 2009; Inventors: Konraad Venema, Albert Arjaan de Graaf, Jan Sikkema. WO2010117274 A1

Supervision of PhD theses:

Number of PhD students supervised till thesis defence: 7 (as co-promoter). As recently started academic career at university.

Scientific teaching:
Approximately 4-6 lectures/year at different universities, summer-schools, and/or courses

Three key publications 2009 – 2014:
- Vanhoutvin SA, Troost FJ, Hamer HM, Lindsey PJ, Koek GH, Jonkers DM, Kodde A, Venema K, Brummer RJ. Butyrate-induced transcriptional changes in human colonic mucosa. PLoS One. 2009 Aug 25;4(8):e6759.
- Maathuis AJH, van den Heuvel EG, Schoterman MHC, Venema K. Galacto-oligosaccharides have prebiotic activity in a dynamic in vitro colon model using a 13C labeling technique. J Nutr. 2012 Jul;142(7):1205-12.
- Aguirre M, Ramiro-Garcia J, Koenen ME, Venema K. 2014. To pool or not to pool? Impact of the use of individual and pooled fecal samples for in vitro fermentation studies. J Microbiol Methods. 2014 Sep 3;107C:1-7.

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- 2010-current editor-in-chief of Beneficial Microbes
- 2009–current Probiotics and Antimicrobial Proteins
- 2008-current Journal of Applied Microbiology/Letters in Applied Microbiology (combined board)

Membership of national and international scientific organizations:
- Member of scientific advisory board of the International Scientific Conference On Probiotics And Prebiotics (IPC) in 2010, 2011, 2012, 2013, 2014, 2015
- President of the scientific advisory board of the Beneficial Microbes Conference in 2008, 2010, 2012 and 2015.

RELEVANT JOB-RELATED SOCIAL POSITIONS:
- not applicable

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:
- Project leader within the Top Institute Food and Nutrition (1. Microbe-mediated gut metabolism; 2. Molecular interactions of mucosal tissues, bacteria and fibers)

Name: de Vries, Nanne
E-mail: n.devries@maastrichtuniversity.nl
URL: -

GENERAL INFORMATION
Date of birth: July 4, 1956
Current position: Professor
Fields of Expertise: Health promotion, health psychology, public health

QUALIFICATIONS:
1988: PhD in psychology, Rijksuniversiteit Groningen, cum laude
1982: MSc in Psychology, Rijksuniversiteit Groningen
1977: BSc in Psychology, Rijksuniversiteit Groningen

SCIENTIFIC CAREER:
2000-present: Professor in Health Promotion, Maastricht University
1989-2000: Associate professor, Universiteit van Amsterdam
1986-1989: Assistant professor, Rijksuniversiteit Groningen
1986: Assistant professor, Rijksuniversiteit Limburg
1982-1986: PhD-student, Rijksuniversiteit Groningen

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals: 220
- Contributions to books in English: 10
- H-index: 30

Supervision of PhD theses:
Number of PhD students supervised till thesis defence: 42

Scientific teaching:
- Coordinator bachelor and master programs in Health education and promotion
- Member of various course groups in health sciences and medicine
- Coach of BSc- and MSc- students during their practical training period

Three key publications 2009 – 2014:
- Brouwer, W., Kroeze, W., Crutzen, R., Nooijer, J.M. de, Vries, N.K. de, Brug, J. & Oenema, A. (2011). Which intervention characteristics are related to more exposure to internet-delivered healthy lifestyle promotion interventions? A systematic review. *Journal of Medical Internet Research*, 13(1), e2.
- Sleddens, E.F., Gerards, S.M., Thijs, C., Vries, N.K. de & Kremers, S.P. (2011). General parenting, childhood overweight and obesity-inducing behaviors: a review. International Journal of Pediatric Obesity, 6(2-2), e12-27
- Mbonu, N.C., Van den Borne, H.W. & De Vries, N.K. (2009). Stigma of people with HIV/AIDS in sub-saharan Africa: a literature review. Journal of Tropical Medicine, art ID 145891 doi:10.1155/2009/145891

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- Associate Editor Dutch Journal of Medicine (NTvG)
- Editorial Board of Psychology and Health

Membership of national and international scientific organizations:
- International Union of Health Promotion and Education (IUHPE)

- European Association of Social Psychology (EASP)
- European Health Psychology Society (EHPS)

RELEVANT JOB-RELATED SOCIAL POSITIONS:
- Chair, Dutch Conference of Public Health (NCVGZ)
- Member, Board of the Foundation of Mental Health (Fonds Psychische Gezondheid)
- Member, diverse Advisory Boards Dutch Organization for Health Research (ZonMW)

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:
- ZonMW grant Academic Center for Public Health Limburg, with Public Health Service
- Two grants to support Diabetes Interactive Education Project, DIEP
- Implementation research for School Health Promotion

Research programme: NUTRIM , research line 2 Gut liver homeostasis

Programme leader(s): Prof Ad Masclee (2009-2015)
Prof Steven Olde Damink (2014-)
For a full staff survey see appendix 1

1. Objectives and Research Area

1.1 Vision, Mission and Objectives

The vision of research line 2 "*Gut-liver homeostasis"* is to perform 1) translational research focussed on clinically relevant disorders within the gastrointestinal (GI) and hepato-pancreatico-biliary (HPB) tract resulting form disturbances in gut liver homeostasis 2) within these disorders to explore factors, determinants and (metabolic) pathways to understand (variations in) disease manifestations, provide clues to disease management at individual and at population level, with spin off for prevention within the setting of an integrated approach and management and 3) provide or create conditions that help to maintain or restore optimal gut and liver health. The mission is that gut and liver disorders are highly prevalent and have significant impact at societal and individual level. Through translational approaches we intend to explore mechanisms and pathways that may provide new leads in patient management and future therapies.
The objectives of *research line 2* are to perform research on:

1) mechanisms, pathways and factors that contribute to obtaining and maintaining optimal gut and liver health;
2) disturbances in gut and liver health under various conditions ranging from mild stress to severe injury, acute and chronic disorders including gut or liver failure;
3) regenerative processes in gut and liver that help to restore and ultimately prevent gut or liver injury or failure

1.2 Research Area / Research Line(s)

Programme 1: Gut-liver metabolism
Research in programme 1 with respect to *gut liver metabolism* is focused on inter-organ adaptive responses to alleviate compromised liver function under conditions of stress, obesity, metabolic syndrome, liver failure, and systemic insults (sepsis, ischaemia). A close interaction between clinicians and basic researchers in RL2 has resulted in a truly translational approach and setting with 1) excellent surgical models (major liver surgery, resections) for metabolic studies 2) focus on obesity and metabolic syndrome, Non Alcoholic Fatty Liver Disease (NAFLD) and Non Alcoholic SteatoHepatitis (NASH) in cooperation with surgical clinics for bariatric surgery) and 3) animal models for liver regeneration and NASH, allowing us to explore it's underlying molecular mechanisms. In NASH cholesterol metabolism in Kuppfer cells is a focus and collaboration with groups working on atherosclerosis has been established (CARIM). Disturbances in the enterohepatic circulation (EHC) are another central theme in which research focuses on the role of bile salt signalling in the aforementioned disorders.

Programme 2: Intestinal integrity and defence
Research in programme 2 focuses on barrier (dys)function in the gastrointestinal tract, innate immune defence, luminal factors (microbiota, nutrients, chemicals), the neuro-endocrine-immune system and gut brain axis in health and disease. Since the start of RL2 in 2008 we have focussed research on *intestinal integrity and defense* on specific disease entities within the Maastricht UMC+ with clinical expertise at academic level patient care. Intestinal homeostasis is studied in several preclinical human and animal models in which disruption of intestinal integrity is central, such as intestinal ischemia-reperfusion, intestinal hypoperfusion, food deprivation, parenteral nutrition and obesity. Population based, well phenotyped cohorts

form the basis of programme 2. These cohorts consist of: a) IBD (chronic inflammatory bowel diseases), a population based cohort of 6000 patients from the South Limburg region (biobank n=2000, research data base coupled to EPD (Electronic Patient Dossiers) b) IBS (Irritable Bowel Syndrome) cohort of 600 well phenotyped patients with 300 controls (biobank, patient data) and c) colonic polyps cohort (n=10.000; GROW, collaboration with NUTRIM for sec prevention (diet, lifestyle)) d) patients with NAFLD and NASH (cohort started in 2014) These population based well phenotyped cohorts allow research with focus on interaction between chronic disease, inflammation, lifestyle and diet, metabolism, (epi)genetics and malignant transformation.

1.3 Strategy

After the reorganization of NUTRIM in 2008 RL2 was installed. From then on initiatives have been undertaken to embed and stimulate close collaboration between basic and clinically oriented research groups. Two clinical departments, GastroIntestinal + HepatoPancreaticoBiliary (GI+HPB) surgery and Gastroenterology-Hepatology form the backbone of this research line. Such clinically oriented teams guarantee clinically driven and health care relevant research aims with a truly bed-to-bench oriented approach.
Within programme 1 the focus lies on the development of truly translational models to study the programs research aims. Over the past 6 years several successful models were developed to study derangements in intestinal function (standardised human model of ischaemia-reperfusion injury) and liver function (ischaemia-reperfusion damage of the liver, interorgan metabolism and models of liver failure, Sinusoidal obstruction syndrome-SOS-). In the last years disturbance in the EHC became the central metabolic bridge, next to amino acid and short-chain fatty acid metabolism.

Within programme 2 the focus lies on epithelial barrier function and metabolic research (microbiota-nutrition-metabolism-disease interactions) predominantly in two distinct disorders: IBD as a chronic inflammatory bowel disorder and IBS as a highly prevalent functional disorder with marked societal impact. Over the past 6 years, for both disorders large population based cohorts have been set up including a biobank and have been expanded in close regional collaboration. This effort has taken many years but is now trading off with many international collaborations, participation in FP-7 programme (SYSMED IBD) and EU network for IBS (GENIEUR) and upcoming joint initiatives for Horizon 2020. In collaboration with the graduate school GROW and research line 3 cancer cachexia and sarcopenia have been added as consequence of chronic benign and malignant GI and HPB diseases.
For both programmes within RL2, there is strong interaction via collaborative projects and shared expertise. Key players at the national and international level participate in the research, allowing RL2 to become at the forefront of research innovation.
A major asset has been the translation of clinical relevant questions into research aims and the translation of results from basic research into potential preventive, therapeutic and clinical management and health care strategies.

Within Maastricht, the Maastricht UMC+ portfolio 2020 “Healthy Living” has become a major leading document. For RL 2 adjustments in focus are foreseen based on: 1) the decision expressed in the Maastricht UMC+ portfolio to focus on four clinical profiles (cardiovascular, respiratory, oncology and neurosciences). Oncology and neurosciences are within the RL 2 scope. 2) close collaboration with the university Hospital Aachen in a joint programme for HPB oncology, HPB surgery and liver transplantation. This joint programme, the Euregional HPB Collaboration (EHPBC), will be facilitated by both universities and is expanding rapidly to join the top 10 volume HPB centres in Europe. Therefore, Hepatology will increasingly become a target area. Research will focus on liver metabolism, HPB cancer, malignant transformation in chronic GI and HPB disorders, premalignant conditions and metabolic derangements. Interaction with the graduate school GROW in the study of cancer cachexia is an example of the “crossing borders” approach. Systems medicine approaches with the patient cohorts are foreseen, preferably in international networks.

1.4 Research environment and embedding

Our research is part of several national and international collaborations. Within NUTRIM a close collaboration exists with RL4 in the IBD and IBS cohorts on gene–environment interactions, biomarkers and the relation between dietary or environmental exposures and chronic diseases. The collaboration in research line 1 focusses on the liver as central organ in metabolic syndrome, morbid obesity, NAFLD and NASH and on the interaction diet-microbiota-intestinal metabolism-GI symptoms/disorders with focus on IBD and IBS. Within RL3 collaboration exists to study the interactions between chronic disorders and malignancy and wasting-sarcopenia. Within the Maastricht UMC+ collaboration exists with the Departments of Molecular Genetics and Molecular Imaging, Chemistry, Human Biology, Neurosciences, Epidemiology, Pathology, Pharmacology and Toxicology.The Maastricht research environment has been boosted in 2014 by the arrival of new research groups of Prof R. Heeren (Imaging Mass Spectrometry), Prof. P. Peters (Nanoscopy), and Prof. C. van Blitterswijk (Regenerative Medicine) via a major investment of UM and the province of Limburg *(LINK: Limburg INvesteert In Kenniseconomie)*. Especially prof Olde Damink has taken the lead in recruiting these groups to the Maastricht UMC+ and establishing a close collaboration with clinical groups. RL 2 inparticular may benefit from this collaboration.
The research areas of these groups are connected to regenerative *medicine* and high end molecular imaging and fit very well with the objective of the research line.
We participate in Technological Top Institutes in the Netherlands known as TI Food & Nutrition (TIFN), within the themes “Gut Health”, “Nutrient Sensing”, “Gut Barrier” and “Microbiota, Energy Balance and Metabolism” the Netherlands Consortium for System Biology (NCSB). From the initiation of RL 2 in 2008, much attention has been given to optimizing the alignment between clinical and basic research in the two research programs. Several bottom up initiatives have become successful such as those on obesity and NASH (VIDI grant rewarded in 2012), initiatives in the area of IBD with international collaboration (2012 EU grant SYS MED), population based cohorts and a pan European network for genetics in IBS , new therapeutic approaches (ZonMw on menthol and TRPV1 in IBS).
Especially the work of the surgical group on intestinal ischemia and innate immunity has drawn international attention with many PhD laureates and a Career Development Grant related to research on intestinal ischemia.In line with the overall integrated nature of many research projects, we also have a large number of specific collaborations with established research groups in the Netherlands, EU and outside EU.
After leaving the University College London (UCL) for Maastricht, Prof Olde Damink was appointed head of the surgical research unit in 2012 and continues to strengthen the close collaboration between Maastricht UMC+ and UCL.

2. Resources and Facilities

2.1 Researchers

As seen in table 2.1 the total fte scientific staff has decreased from 9.2 fte in 2009 to 7.3 fte in 2014 due to choices made by the MUMC board, with staff from the department of Epidemiology within NUTRIM being assigned to another research institute (CAPHRI). In 2012 prof Wim Buurman, former head of the surgical research lab, has retired and his position has been taken over by prof Steven Olde Damink. This transfer has led to a more focussed approach within the department of Surgery to metabolic research in the gut-liver axis using translational models in humans.
The number of non-tenured staff and PhD students reduced from 2009 to 2010 but thereafter has stabilized. It should be acknowledged that despite a significant reduction in staff, research in RL2 has become more aligned with fewer groups involved but closer in-between-RL’s support. Scientific output and number of PhD candidates remained stable during the period 2009-2014 despite major changes and modifications, mentioned above. Prof Peter Jansen, former professor in Hepatology at the AMC Amsterdam has joined research line 2 as senior scientist (0.2fte) and advisor to encourage and strengthen liver research, connect Maastricht UMC+ RL2 with international programs and support the Maastricht Aachen HPB Center at international platforms.

Table 2.1 - Research staff at research unit level

NUTRIM RL2	2009		2010		2011		2012		2013		2014	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific staff	31	9,2	23	6,7	22	6,0	27	7,0	28	7,4	27	7,3
Post-docs	9	3,3	6	2,6	7	3,4	4	1,5	6	1,9	6	2,9
PhD candidates	33	32,4	24	23,4	27	23,8	28	22,2	32	26,7	29	24,5
Total res. staff	**73**	**44,9**	**53**	**32,7**	**56**	**33,2**	**59**	**30,7**	**66**	**36,0**	**62**	**34,7**
Lab Technicians	28	15,1	20	13,1	16	10,4	15	9,4	14	9,2	9	5,5
Visiting fellows	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Total staff for research	**101**	**59,93**	**73**	**45,82**	**72**	**43,55**	**74**	**40,05**	**80**	**45,15**	**71**	**40,15**
Other (admin.) staff	0	0,0	2	0,7	1	0,6	1	0,6	0	0,0	1	0,6
Total staff	**101**	**59,9**	**75**	**46,5**	**73**	**44,2**	**75**	**40,7**	**80**	**45,2**	**72**	**40,8**

- *FTE: sum of actual FTE-factors (in fulltime equivalents) labelled on NUTRIM research activities on 31-dec on any year*
- *#: number of persons active on NUTRIM Research activities on 31-dec of any year*
- *Scientific Staff: Professor, Assistant Professor and Associated Professor (direct funding)*
- *Post docs: researchers with completed PhD not belonging to Scientific staff*
- *PhD candidate: Standard PhD candidate with a contract.*
- *Lab technicians: technician, dieticians, data managers, research assistants etc.*
- *Other (admin.) staff: NUTRIM Office, personal assistants to PI's and project leaders etc.*

2.2 Research Funds

During the reporting period nearly 65% of the research programme was funded externally (see table 2.2) and we obtained funding for non-tenured staff from EU, NWO and from other national and international competitive granting organisations.

Table 2.2 - Funding at research unit level

	2009		2010		2011		2012		2013		2014		Average 2009-2014	
NUTRIM RL2														
Funding:	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding (1)	18,7 fte	31%	17,3 fte	37%	16,3 fte	37%	15,6 fte	38%	14,8 fte	33%	13,6 fte	33%	16,0 fte	35%
Research grants (2)	9,9 fte	17%	5,6 fte	12%	3,0 fte	7%	2,6 fte	6%	3,6 fte	8%	4,6 fte	11%	4,9 fte	10%
Contract research (3)	30,1 fte	50%	22,3 fte	48%	22,7 fte	51%	21,9 fte	54%	24,6 fte	54%	19,5 fte	48%	23,5 fte	51%
Other (4)	1,3 fte	2%	1,3 fte	3%	2,3 fte	5%	0,6 fte	1%	2,3 fte	5%	3,1 fte	7%	1,8 fte	4%
Total funding	**59,9 fte**	100%	**46,5 fte**	100%	**44,2 fte**	100%	**40,7 fte**	100%	**45,2 fte**	100%	**40,8 fte**	100%	46,2 fte	100%
Expenditure:	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%
Personnel costs	2688 k€	70%	2051 k€	70%	2048 k€	68%	1934 k€	72%	2333 k€	72%	2112 k€	68%	2194k€	70%
Other costs	1131 k€	30%	864 k€	30%	952 k€	32%	753 k€	28%	916 k€	28%	1002 k€	32%	936k€	30%
Total expenditure	3818 k€	**100%**	2915 k€	**100%**	3000 k€	**100%**	2687 k€	**100%**	3249 k€	**100%**	3114 k€	**100%**	3131k€	100%

Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)
Research grants obtained in national and international scientific competition (e.g. grants from NWO, KNAW and European Research Council)
Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations
Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within NUTRIM)

Successful TIFN projects are ending in the coming year. This unique partnership between government research institutes and food industries will not be continued as such. More prolonged and structural partnerships with food companies as Danone, Mead Johnson and Friesland Campina are being explored. Currently efforts are put into collaborations for EU Horizon 2020. Furthermore, suitable candidates will be selected from amongst our researchers to apply for prestigious personal grants within EU (ERC and Curie fellowships) and The Netherlands (NWO). The collaboration with RL4 has resulted in very successful project on biomarkers for gut health. We will continue in this way for applications for future funding on biomarkers (gut health and disease). Meanwhile projects for innovative health care have been granted (IBD and IBS) and health care innovations (e-health, patient reported outcome measures) will be coupled-integrated with research data and data from electronic patient dossiers. This is facilitated and supported by the Maastricht UMC+ board (research IT group, big data storage and handling) Recently, facilities have been obtained within Enabling Technologies (initiative of DSM Resolve, Maastricht University/UMC+ and the Province of Limburg); Further, the ET initiative facilitates multiple expensive instruments to be used for our researchers (http://www.enablingtechnologies.eu).

3. Research Quality

Table 3.1 shows the number of publications over the years 2009-2014. The scientific output is high and consistent, with a minimum of more than 135 peer refereed publications per year. Taking into account the

reduction in scientific staff and the change of positions of head of surgical lab, scientific output has remained at high level. This holds true for the number of publications and PhD theses. In 2009 the yearly production per tenured fte scientific staff was 14,7 papers per fte and has risen to 18,3 papers in 2013, indicating an excellent input/output ratio. The same applies to the sustained number of completed PhD theses in recent years.

3.1 Demonstrable products - Research products for peers in science

Table 3.1 - Main categories of research output

	2009	2010	2011	2012	2013	2014	Total
Academic publications							
a. Refereed articles	**135**	**155**	**152**	**182**	**136**	**134**	**894**
a.1 Refereed articles WOS	**124**	**150**	**143**	**166**	**130**	**126**	**839**
a.2 Refereed articles non-WOS	**11**	**5**	**7**	**16**	**6**	**8**	**53**
b. Non-refereed articles		**3**	**2**		**1**		**6**
c. Books	**1**						**1**
d.1. Refereed book chapters	**1**	**1**	**1**	**2**	**1**		**6**
d.2. Non-refereed book chapters		**1**	**4**			**2**	**7**
e. PhD Theses	**8**	**11**	**9**	**13**	**5**	**12**	**58**
f. Conference papers							
g. other products (see 3.2 / please specify)							
Total academic publications:							

NOTE: the numbers of refereed articles in WOS Journals include full papers, letters, editorial material etc.

3.2 Demonstrable use of products - Use of research products by peers

In addition to quantity, the quality of scientific work is high and has further improved. In terms of research quality, table 3.2 shows, that in 2013 36% of our publications were within the top 10% of the research field. This percentage has constantly increased over the years. Another item reflecting high research quality is the mean relative impact (RI). The RI is given as a decimal number that shows the relation of the measure to the world average (which is set to the value of 1).The RI of RL2 2.0 with a value of 2.21 in 2013 which means that publications from research line 2 have been cited 221% more often than the world average of publications in the same research field. A RI above 1.5 is considered as a very high average impact.

As research line, we intend to sustain our high quantity and quality of research output. Furthermore, we aim to publish more often in prestigious journals ranking the top 1% (aim: >5% of publications of RL2). To reach such goal requires close (inter)national collaborations in networks

Table 3.2 – Bibliometric analysis of research output

NUTRIM RL2	N	C	Wavg	CPP	RI	%T10	%T1	%NC
2008	106	3392	1918	32,0	1,89	24%	3%	3%
2009	116	3213	1635	27,7	1,99	28%	3%	1%
2010	136	3102	1558	22,8	2,01	24%	4%	2%
2011	137	2429	1129	17,7	2,13	28%	5%	4%
2012	156	1486	821	9,5	1,82	22%	4%	8%
2013	115	583	263	5,1	2,21	36%	2%	10%
Total	**766**	**14205**	**7325**	**18,5**	**2,00**	**27%**	**3%**	**5%**

NOTE: The differences between the number of records exported from NUTRIM research information system (Metis, as in table 3.1) differs from the number of records presented in the bibliometric analysis. This is mainly caused by records that were classified in WoS, as editorial material, news item, correction etc. Some records could not be retrieved (by the WUR librarian) from WoS.

N: Number of publications; C: Number of citations of these publications; Wavg ; World average number of citations for publication in same research field; CPP: Average number of citations per publication; RI: Relative Impact; %T10: Percentage of publications within the top 10% most cited publications; %T1: Percentage of publications within the top 1% most cited publications; %NC: Percentage of non-cited articles

3.3 Demonstrable marks of recognition - Marks of recognition from peers

Science awards, Scholarly prizes, Research grants awarded to individuals

Year	*Prize description…*	*Person*
2012	VIDI	R Sverdlov
2011	Humboldt research fellowship	V Bieghs
2012	NWO Rubicon	V Bieghs
2012	Pelerin price	E Rondagh
2013	Pelerin price	R Schols
2013	Career Development Grant (DDF)	J Derikx
2014	Kootstra fellowship	E Elamin

Plenary/Keynote* Lectures at major conferences

Year	*Person*	*Conference*
2009-2014	Dejong, Olde Damink, Jansen, Derikx, Pierik, Sverdlov, Masclee	AASLD, AGA-DDW, UEG, SSAT, ESPEN

Organisation of International Scientific Conferences

Year	*Person*	*Conference*
2015	Sverdlov and Koek	1st European Fatty Liver Conference
2011	Masclee	UEG Stockholm
2012	Masclee and Pierik	UEG Amsterdam
2014	Pierik	ECCO Copenhagen
2009-2014	Dejong and Olde Damink	ESPEN
2014	Jansen	EASL

Editorships and editorial boards

Prof C Dejong	British journal of Surgery
Prof C Dejong	World Journal of Surgery
Prof C Dejong	HPB
Prof C Dejong	Clinical Nutrition
Prof A Masclee	Neurogastroenterology and Motility to 2010
Prof A Masclee	APT

Memberships of academies

Prof C Dejong	Vice chair Dutch Gastroenterology Scientific Society
Prof A Masclee	Chair Dutch Society fro Gastroenterology and Hepatology
Prof A Masclee	Chair Dutch Digestive Foundation (scientific committee)

Key publications

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Key reviews

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3. Pijls KE, Jonkers DM, Elamin EE, Masclee AA, Koek GH. Intestinal epithelial barrier function in liver cirrhosis: an extensive review of the literature. Liver Int. 2013 Nov;33(10):1457-69. doi: 10.1111/liv.12271. Epub 2013 Jul 23. Review.PubMed PMID: 23879434.
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5. Jonkers D, Penders J, Masclee A, Pierik M. Probiotics in the management of inflammatory bowel disease: a systematic review of intervention studies in adult patients. Drugs. 2012 Apr 16;72(6):803-23. doi: 10.2165/11632710-000000000-00000.Review. PubMed PMID: 22512365.

4. Relevance to Society

Teaching: Teaching at the BSc, MSc and PhD level in the medical, life science and health science programmes of the Faculty of Health Medicine and Life Sciences, is an important activity of the staff. The knowledge transfer of staff members to especially medical undergraduate students is intense but rewarding with significant spin off. Generally, we recruit PhD students from our teaching programmes or from our international networks. Many medical students become interested and apply for combined clinical and scientific internships at our departments (Surgery, Gastroenterology-Hepatology).
Training: A significant number of PhD candidates has been trained first as a medical doctor after which they apply for PhD training and thereafter have their clinical training as a surgeon or gastroenterologist at the Maastricht UMC+. This strategy results in nationwide recognition for Maastricht (but especially for RL2) in delivering medical specialists with scientific expertise and knowledge, resulting in senior staff and leading positions in Maastricht and at other academic institutions.
For postdocs that pursue a further scientific career we stimulate to submit proposals for personal grants such as VENI-VIDI grants or personal grants and have been successful in the past period.

Since a substantial percentage of the scientific staff is working as clinician, the research in RL 2 isdriven by clinically relevant research questions and thus, societal relevance is guaranteed.
We are working on important topics for healthcare, in the spectrum ranging from a) public health in terms of early detection of chronic GI-HPB disorders and malignancies with focus on environmental and dietary hazards, development of biomarkers (close collaboration with RL4) and disease prevention and b) optimal medical and surgical management of chronic GI-HPB diseases focussing on health innovation (e-health projects such as my IBDCoach, decision support systems, shared decision making) on metabolism + nutrition and wasting-sarcopenia and its prevention in GI and HPB disorders to c) integrated care with close monitoring of chronic disease and flares (e-health, biomarker management at home) with personalised care. Within the field of GI and HPB we have chosen to focus on specific topics: IBD as chronic intestinal disorder,

IBS as functional disorder with gut brain interactions, early detection of malignancies with metabolic profiling and molecular imaging (M4I), and optimal management of GI and HPB malignancies, NASH, intestinal ischemia as injury, gut and liver failure.

Our results have impact on society through our presence in governmental advisory boards. Our key scientists and clinicians are active in the Dutch Health Council including ad hoc committees, ZonMw-NWO committees (Aspasia, VENI, VIDI), chair of Dutch Gastroenterology Hepatology Society, vice chair scientific board Gastroenterology Society, chair scientific board Dutch Digestive foundation, member National Board Colon Cancer Screening, memberships of UEG and EU committees. Our collaborations with basic scientists in RL1, RL3 and RL4 lead to a focus on early diagnosis and monitoring of above mentioned diseases (among others: biomarker development) and provide important information and contributions to personalised medicine. We have visibility in newspapers, radio and television, and have optimal contact with patient organisations.

Diagnostic technologies are used to target drugs to patients for their benefit but also to stratify patients. Diverse stratifying platforms are present within NUTRIM and the Maastricht UMC+ employing metabolomics and proteomics (Maastricht Proteomics Centre) and Genetics initiatives (Genetic Prevention Centre) but also on connecting and integrating healthcare and scientific data (Maastricht UMC+ research IT). Commercial spin-offs are Healthpotential (http://www.healthpotential.eu/en/) giving personalised health advice based on DNA and life style, and Xair Diagnostics BV (http://www.lifesciencesatwork.nl/profile/xair-diagnostics/) that develops diagnostics based on breath analysis (IBD, IBS, liver diseases). Valorisation is also achieved through collaboration within several Dutch governmental and public private initiatives including Top Institute Food & Nutrition (TIFN).

Specific examples of demonstrable products of groups within RL2

- Development and validation of noninvasive biomarkers for IBD and IBS employing 1) a methodology platform with analyses of thousands of volatile chemicals (VOCs) in exhaled breath using GC-MS followed by multi-factorial analysis and 2) broad pathophysiology based maker evaluation in IBD and IBS cohorts.
- E-health initiatives such as MyIBDcoach and MyBiologicalCoach with nationwide validation, implementation and valorisation
- EU cross border collaboration of Maastricht UMC+ with Klinikum Aachen in HPB surgery and liver transplantation to merge into one Maastricht-Aachen HPB unit. Alignment of cross border clinical care and research.
- Initiation of the M4I (Maastricht Multi-Modal Molecular Imaging) initiative, resulting in an investment of 25 Million Euro and the transfer of 20 fte scientist from the FOM-Amolf institute to UM.
- Successful development of the Enhanced recovery after surgery (ERAS ©**)** concept.
- Development of mono-clonal antibodies for new biomarkers of acute intestinal ischaemia: I-FABP and SM-22 that are currently tested on large scale platforms for the use/commercialisation (in collaboration with Phadia).

Targets for the coming 5-10 years:

- Expand and intensify collaboration with Aachen to join top 10 European HPB centers (both clinically and scientifically)
- Intensify collaboration with MUMC oncology institute in metabolic research, imaging and personalised medicine, development and validation and valorisation of markers for prevention in GI and HPB oncology, prevention strategies targeting at “healthy living”
- Continue to contribute to health innovations.

4.1 Demonstrable products - Research products for societal target groups

Table 4.1 - Main categories of output for societal target groups (table format facultative)

Research products for societal target groups 2009 - 2014
• Providing PhD-level training courses related to topics within RL2, including nutrition and metabolism • Supervision of Msc and PhD students and post-doctoral fellows. • Consultancy to major global food and pharmaceutical industries, government to support the ongoing collaboration and assist in product and health care innovation. • Organising conferences for health care professionals focussed on gut and liver disorders and the liver as metabolic central organ • Setting up networks of scientists to build consortia for EU research activities. • Cooperation with patient organisations for programmes in self education, setting standards of care (guidelines), optimising patient information and decision making • Organising regional and national annual events for patients with IBD, liver diseases and motility/functional disorders • Initiation of NGM-task force (NeuroGastroenterology and Motility) for health care professionals in order to keep expertise at current levels (in the Netherlands and in EU) • Postgraduate medical and research training (MAGIS, MAastricht GI postgraduate School)

4.2 Demonstrable use of products - Use of research products by societal groups

Use of research products by societal groups 2009 - 2014
• Patents filed related to NASH pathogenesis and therapy (R Sverdlov) • Patents filed related to VOC metabolic profiling in IBD and IBS (with RL4) • National campaign by Dutch Digestive Foundation on VOCs in chronic diseases (IBD), cancer and necrotising enterocolitis • Health innovation: national project IBD coach and Biological coach (e health, integrated care) • EU campaign for IBS: *HELP EU in IBS* (UEG) • Participation in FP7 and Horizon 2020 projects related to IBD and IBS • Organisation of national and international conferences (1st EFLC: European Fatty Liver Conference, Maastricht, MAGIS

4.3 Demonstrable marks of recognition - Marks of recognition by societal groups

• The Joop Roels Impact Award 2013 for research in TIFN project 'Validation of biomarkers'. Food industry prize to recognise the best scientists and scientific achievements and to highlight the societal and industrial impact of research. (RL2 and RL4) • Frequent appearances in national, regional and popular magazines and television and radio • Effects of alcohol on intestinal epithelial barrier (publicity at national level, newspapers) PhD thesis E Elamin • Spectroscopy in abdominal surgery: national publicity and award PhD thesis R Schols • NWO Rubicon award: V Bieghs • Humboldt Research Fellowship V Bieghs 'Chronic liver diseases: the cell-specific approach' • DSM Science & Technology award 2012, Veerle Bieghs • Career Development Grant 2013 J Derikx " Intestinal ischaemia"

5. Viability

5.1 Benchmark

Researchers within RL2 compete at national and international level with various groups. We are considered to belong to the leading groups within the fields of clinical and basic GI and HPB research, especially at translational level. The strength of NUTRIM, and explicitly of RL2 is the integrated approach combining clinical research with basic and applied sciences in the Gastrointestinal and HPB tract, with truly translational approaches with unique focus on nutrition and metabolism. All research activities have been initiated by clinically relevant questions and topics. The opportunities provided by the alliance and integration of the Academic Hospital Maastricht and Maastricht University are well recognized within the scientific community and are particularly relevant for chronic gut and liver disorders, gut and liver failure and malignant transformation in gut and liver.
From a clinical perspective, collaboration in the South Eastern part of the Netherlands (2 million inhabitants) has been initiated starting in 2011 focusing on GI and HPB disorders. Maastricht UMC+ is initiator and leader of this network activity. We aim to further facilitate general hospitals with large volume centres for GI and HPB medical and surgical care with respect to research infrastructure and innovative health care initiatives.
Excellent facilities exist within RL2 for in vivo human models (examples: intestinal ischemia during pancreatic surgery; intestinal intubation for ileal brake studies) for ex vivo models with Ussing chambers (whole gut biopsy sampling during endoscopy) and in vitro models with cell cultures in 2D and 3D for epithelial barrier function and culturing of intestinal organoids from patient's intestinal stem cells for high throughput screening of drugs and for screening of efficiancy of drugs for personalised medicine. Excellent facilities are available for in vivo human metabolic research, with the recent opening of the Metabolic Research Unit Maastricht (MRUM) providing state of the art facilities within NUTRIM. The work performed in our research line is attractive for funding from public-private partnerships as has been realised within the Top Institute Food and Nutrition. Researchers are publishing in top journals in GI and HPB fields with citation scores well above average. As described in section 3, the research output is high both from a quantitative and qualitative perspective with an average research impact score of 2.
National and international collaborations are ongoing with research groups sharing common interests and research perspectives. National institutes include Wageningen University (Human Nutrition), University of Groningen (Life line cohort, genetics), Academic Medical Center Amsterdam, ICC (Initiative on Crohn and Colitis: collaboration of all eight University Hospitals in the Netherlands).
Regional collaboration with Catharina Hospital Eindhoven (topics: GI and HPB oncology, advanced endopscopy, bariatric surgery) Maxima Medical Center Eindhoven, Viecuri Hospital Venlo and Heerlen-Sittard Medical Center sharing with the Maastricht UMC+ facilities for complex GI and HPB surgery.

International collaborations exist with the Universities of Manchester, Liverpool, UCL London, Queen Mary University London in the UK, the Universities of Kiel, Aachen, Essen and Heidelberg in Germany, the Universities of Leuven and Hasselt and Liege in Belgium, Karolinska Institute and University of Goteborg in Sweden, the University of Toulouse in France, the University Hospital Vall d'Hebron, Barcelona in Spain, the University of Georgia in Augusta, the University of North Carolina at Chapel Hill, the UCLA Los Angeles in the USA. With these institutes we share common expertise and infrastructure and publish in the same areas of research. Our research performs at an equal level with the added advantage of excellent opportunities provided by the close interaction between basic researchers and clinical researchers in Maastricht. However, we need to focus on utilising these opportunities and chances to a greater extent and we need to find even more common ground within our research line to collaborate in joint projects.

5.2 SWOT analysis

Strengths

- Research topics are highly relevant and focused on understanding, diagnosis and novel future therapies of common GI and HPB diseases. Strong network of collaborations.
- Well-organized clinical expertise and academic level patient care.
- Internationally acknowledged translational research within RL2 with focus on chronic intestinal and (metabolic) liver disorders, gut and liver failure, HPB and CRC malignant transformation, metabolism and nutrition.
- Excellent in vivo, ex vivo, and in vitro human models and experimental animal models as tools for translational, aetiological research and (nutritional and metabolic) intervention studies to study GI health mildly disturbed GI health and gut liver diseases for translational research.
- Large population based cohorts with extensive biobanking coupled with well structured clinical care databases IBD, IBS and NASH-NAFLD).
- Clinical expertise centres for HPB and GI medical and surgical care embedded in a regional network and cross border collaboration with Aachen.
- Strong alignment with FHML/Maastricht UMC+ research strategies in relation to healthy living, prevention, malignant transformation, oncology and health innovation.
- International network and research collaborations.

Weaknesses

- Small scientific staff with demanding clinical workload.

Opportunities

- Systems Biology approaches to unravel relations between environment, diet, genetic susceptibility in onset of disease, disease subtypes with prediction of disease course and therapeutic interventions.
- Applications of omics-biomarkers in disease cohorts, early detection of malignant transformation and optimal management of GI and HPB chronic diseases and malignancies.
- Growing interest of food and pharma industry in personalised healthcare and nutrition with possibilities for valorisation.
- Excellent interaction with the other research lines within NUTRIM with RL 1 (obesity and metabolic syndrome), RL line 3 (wasting, sarcopenia) and RL 4 (gene environment interactions).
- (Epi)Genetics and diet/gene interactions in the (population based) patient cohorts.
- MUMC 2020 profile with focus of oncology, neurosciences, cardiovascular and respiratory disorders. More structured collaboration shifting towards oncology and neurosciences.
- Aachen Maastricht HPB centre and shared liver transplant facility.
- Shared clinical facilities within the Maastricht UMC+ with activities becoming embedded in one large Gastrointestinal and Liver Unit in the Maastricht UMC+.

Threats

- Growing demand for clinical support and increasing clinical workload.
- Strong (inter)national competition in obtaining prestigious grants and funding

6. Reflection and future strategy

6.1 Reference to previous assessments

In the previous assessment (VLAG-NUTRIM external review 2009) RL2 only had a one year track record as newly initiated research line focussed on gut liver homeostasis. Ratings were received with respect to scientific quality (4), productivity (4), relevance (4) and vitality and feasibility (4). The opportunities were clearly seen by the review committee but several of the activities needed further focus and integration, with hypothesis driven research. Also the need for more high impact publications was mentioned. The large population based cohorts and excellent human models were recognised as opportunities. The mid-term review in 2012 positively elaborated on this. It was mentioned that in the period from 2009 to 2011 collaboration within and outside RL2 has intensified and research has become more focused on a) gut liver metabolism: NAFLD and NASH with successful collaborations between the departments of Genetics and Cell Biology, Surgery, Internal Medicine: Gastroenterology-Hepatology and Human Biology, and on b) intestinal integrity and defence: focus on IBD, intestinal ischemia, and IBS. The societal relevance and impact was considered to be guaranteed. The retirement of Prof. Buurman and the appointment of Prof. Olde Damink as head of the surgical research lab has not even temporarily affected research or PhD output in a negative way. Within RL2 programme 1 the focus now includes the gut liver axis and malignant transformation and metabolism in HPB cancer and disturbances in enterohepatic circulation (EHC). It is anticipated that the joint liver transplant programme Aachen-Maastricht and close collaboration in HPB surgery will result in a joint HPB Euregional network competing at the European top level. Investments have been made for attracting senior staff expertise in Hepatology (prof Jansen) and appointing a young ambitious hepatologist, starting at the Maastricht UMC+ in august 2015.
Within NUTRIM, collaboration with the other RL's has intensified. Especially with RL 4 we have collaborated in a TIFN project on biomarkers for gut health and IBS, (epi)genetic epidemiology within the cohorts (IBD).

6.2 Viability and future strategy

In 2014 co-leadership was introduced by appointing Prof. Steven Olde Damink as vice-leader of the research line for reasons of collaboration and shared responsibilities. Prof. Olde Damink will take over the leadership in July 2015 and a basic scientist will be appointed as vice leader to balance clinical and basic expertise in the leading team. Regularly PIs and representative staff members of the research line meet to discuss basic and clinical scientific results and plans. Viability will receive impulses from closer clinical collaboration between Surgery and Gastroenterology-Hepatology departments leading to shared facilities and hospital beds.
Within the separate departments weekly scientific meetings with representatives of all levels of personnel, plenary meetings on research and education, and journal clubs (with PhD students) are organized. Interactions between staff members, both in the research line and in the departments, are further strengthened via educational responsibilities. All senior staff members are encouraged to come up with new ideas and submit research grants and become responsible for their own research funding. Important interactions are achieved within each department with yearly combined lab+clinical social meetings, summer BBQs and winter Xmas parties, sports activities in summer (cycling) and winter (skiing).
Nowadays the gut is considered a pivotal organ from which not only GI and HPB but also many systemic disorders originate. The changing demographics with global ageing will lead to a potentially more compromised gut and barrier dysfunction in the elderly. Many GI and HPB disorders become more pronounced at older age, both chronic disorders and (pre) malignancies. With respect to liver disorders: within the next decade viral hepatitis wil become curable (and cured) and the spectrum of patients referred for liver failure will change dramatically with metabolic diseases (NASH) becoming the most prevalent indication for liver transplantation. RL 2 anticipates these developments by focusing further on obesity and NASH and seeking for strategies to prevent or reverse steatohepatitis and liver failure. The focus of RL 2 in programmes 1 and 2 will remain centered among clinical relevant themes and disorders where cohorts have been set up but the Maastricht UMC+ 2020 focus will be incorporated.

In our opinion RL2 has excellent prospects based on 1) joint clinical expert centre for HPB and GI disorders (surgery, gastro-hepatology at Maastricht-Aachen) 2) cohorts and human models with truly translational research and translational approach 3) optimal balance between clinicians and basic scientific staff 4) the NUTRIM inter-RL collaborations and 5) (inter)national networks and high level of research quality.

Appendix 1 - Research staff at research unit level

FTE: fte's employed at 31-dec of any year

		2009	2010	2011	2012	2013	2014
Staff		FTE	FTE	FTE	FTE	FTE	FTE
Full professors	**Funding**	**1,95**	**1,95**	**0,95**	**1,25**	**1,15**	**1,10**
Baeten CGMI	1	0,15	0,15	0,15	0,15	0,15	0,00
Beets G	1	0,00	0,00	0,00	0,00	0,00	0,10
Buurman WA	1	0,50	0,50	0,00	0,00	0,00	0,00
Dejong, CHC	1	0,40	0,40	0,40	0,40	0,40	0,40
Jansen P.	1	0,00	0,00	0,00	0,00	0,20	0,20
Lamers WH	1	0,40	0,40	0,00	0,00	0,00	0,00
Masclee A.	1	0,40	0,40	0,40	0,40	0,40	0,40
Meyenfeldt von MF	1	0,10	0,10	0,00	0,00	0,00	0,00
Buurman WA	4	0,00	0,00	0,00	0,30	0,00	0,00
Associate professors	**Funding**	**1,45**	**0,35**	**0,35**	**1,45**	**1,45**	**1,35**
Beets G	1	0,10	0,10	0,10	0,10	0,10	0,00
Dagnelie PC	1	0,60	0,00	0,00	0,00	0,00	0,00
Köhler SE	1	0,25	0,25	0,25	0,25	0,25	0,25
Olde Damink S	1	0,00	0,00	0,00	0,40	0,40	0,40
Sverdlov R	1	0,00	0,00	0,00	0,60	0,60	0,60
Thijs C	1	0,50	0,00	0,00	0,00	0,00	0,00
Sverdlov R	2	0,00	0,00	0,00	0,10	0,10	0,10
Assistant professors	**Funding**	**6,75**	**5,40**	**5,50**	**5,10**	**5,70**	**5,70**
Arts I	1	0,55	0,00	0,00	0,00	0,00	0,00
Conchillo J.	1	0,00	0,00	0,10	0,10	0,10	0,10
Dongen van, M.C.J.M.	1	0,35	0,00	0,00	0,00	0,00	0,00
Jonkers DMAE	1	0,40	0,40	0,40	0,40	0,40	0,40
Koek GH	1	0,20	0,20	0,20	0,20	0,20	0,20
Köhler SE	1	0,45	0,00	0,00	0,00	0,00	0,00
Lenaerts K	1	1,00	1,00	1,00	0,50	0,50	0,50
Mommers M	1	0,10	0,00	0,00	0,00	0,00	0,00
Olde Damink S	1	0,40	0,40	0,40	0,00	0,00	0,00
Penders J	1	0,00	0,00	0,00	0,20	0,20	0,20
Pierik M.	1	0,40	0,40	0,40	0,40	0,40	0,40
Poeze M.	1	0,20	0,20	0,20	0,20	0,20	0,20
Rensen S	1	0,70	0,70	0,70	0,50	0,50	0,50
Schaap F.	1	0,00	0,00	0,00	0,40	0,40	0,40
Sverdlov R	1	0,50	0,60	0,60	0,00	0,00	0,00
Troost, F	1	0,00	0,00	0,20	0,20	0,20	0,20
Vreugdenhil A.	1	0,40	0,40	0,40	0,40	0,50	0,50
Waardenburg DA	1	0,10	0,10	0,10	0,10	0,20	0,20
Xanthouleas S.	1	0,00	0,00	0,00	1,00	1,00	1,00
Troost, F	3	0,60	0,60	0,40	0,00	0,40	0,40
Jonkers DMAE	4	0,40	0,40	0,40	0,50	0,50	0,50

Post-docs	***Funding***	***2,30***	***1,60***	***2,60***	***0,70***	***1,00***	***2,00***
Bieghs V.	*1*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*
Elamin E.	*1*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Hendrikx T.	*2*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Reijven N.	*2*	*0,20*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Bours M	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Eck van - Beijer S	*3*	*0,50*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Ham, van den E.C.H.	*3*	*0,00*	*0,60*	*0,60*	*0,70*	*0,00*	*0,00*
Penders J	*3*	*0,60*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Segers F.	*3*	*0,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Elamin E.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
PhD Students	***Funding***	***32,40***	***23,40***	***23,80***	***22,20***	***26,70***	***24,50***
Avesaat van M.	*1*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*	*0,00*
Beek van der K.	*1*	*0,00*	*0,00*	*0,50*	*0,50*	*0,50*	*0,50*
Bouwens M.	*1*	*0,90*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Dello S.	*1*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Garcia Caraballo S.	*1*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Grootjans J.	*1*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Heinen M	*1*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Hendrikx T.	*1*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Meesters D.	*1*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*
Neis E.	*1*	*0,00*	*0,00*	*0,50*	*0,50*	*0,50*	*0,50*
Pijls K.	*1*	*1,00*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*
Walenbergh S.	*1*	*0,00*	*0,00*	*0,75*	*0,75*	*0,75*	*0,75*
Bieghs V.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Breedveld-Peters J.	*2*	*0,70*	*0,60*	*0,00*	*0,00*	*0,00*	*0,00*
Comhair T.	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Dijk van D.	*2*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*
Jeurissen M.	*2*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*
Koelfat K.	*2*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*
Lubbers T	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Mpabanzi L.	*2*	*1,00*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*
Tedjo D.	*2*	*0,00*	*0,00*	*0,00*	*0,50*	*0,50*	*0,50*
Visschers R	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Wijnands - Kentgens K.	*2*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Wyers C.	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Adriaanse M.	*3*	*1,00*	*1,00*	*1,00*	*1,00*	*0,20*	*0,00*
Arts M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*
Avesaat van M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Barneveld van K.	*3*	*0,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Beek van der K.	*3*	*0,00*	*0,00*	*0,50*	*0,50*	*0,50*	*0,50*
Bloemen J.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Bours P.	*3*	*0,00*	*0,00*	*0,00*	*0,20*	*0,00*	*0,00*
Dello S.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Deutz R.	*3*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*
Elamin E.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Geraedts M	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Hendrikx T.	*3*	*0,00*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*
Heuvel van den T.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*
Hodin C.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Houben T.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*
Hundscheid I.	*3*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*

Jeuring S.	*3*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*
Jong de J.	*3*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*
Jong de M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Keszthelyi D.	*3*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Leenarts C.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Li J.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,50*	*0,50*
Lodewick T.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Ludidi S.	*3*	*1,00*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*
Mierlo van K.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*
Mujajic Z.	*3*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*0,00*
Neis E.	*3*	*0,00*	*0,00*	*0,50*	*0,50*	*0,50*	*0,50*
Reisinger K.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Rinsma N.	*3*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*
Schellekens D.	*3*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*0,00*
Schepens M	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Swennen ELR	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Theije de G	*3*	*0,80*	*0,80*	*0,80*	*0,00*	*0,00*	*0,00*
Vanhoutvin S	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Verdam F.	*3*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Verhaegh B.	*3*	*0,00*	*0,00*	*0,00*	*0,50*	*0,00*	*0,00*
Verhaegh P.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Vermeulen Windsant I.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Walenbergh S.	*3*	*0,00*	*0,00*	*0,25*	*0,25*	*0,25*	*0,25*
Weerts Z.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Wesselius A.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Wijck van K.	*3*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Wilms E.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Wong-Lun-Hing E.	*3*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*	*0,00*
Bouwens M.	*3*	*0,00*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*
Elamin E.	*3*	*0,00*	*0,00*	*1,00*	*1,00*	*0,00*	*0,00*
Haan de JJ	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Jong de M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Karimi Elizee P.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
*Koning CJA**	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Rondagh E.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Salden B.	*3*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*
Schellekens D.	*3*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Tedjo D.	*3*	*0,00*	*0,00*	*0,00*	*0,50*	*0,50*	*0,50*
Verhaegh B.	*3*	*0,00*	*0,00*	*0,00*	*0,50*	*1,00*	*1,00*
Vork L.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Wilms E.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Dello S.	*4*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*

Total scientific staff		***44,85***	***32,70***	***33,20***	***30,70***	***36,00***	***34,65***

Support staff	***Funding***	***15,08***	***13,12***	***10,35***	***9,35***	***9,15***	***5,50***
Boonen B.	*1*	*0,00*	*1,00*	*0,50*	*0,50*	*0,50*	*0,50*
de Zwart - Voorspui M.	*1*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Debie W	*1*	*0,10*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Duysens-Wijckmans	*1*	*0,50*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Elizalde Vilalta M.	*1*	*0,00*	*0,00*	*0,00*	*0,25*	*0,25*	*0,25*
Gorp van PJJ	*1*	*0,20*	*0,50*	*0,40*	*0,60*	*0,60*	*0,60*
Hadfoune M	*1*	*0,50*	*0,50*	*1,00*	*1,00*	*1,00*	*1,00*
Hesselink-van der Kruijs M	*1*	*0,35*	*0,35*	*0,35*	*0,35*	*0,35*	*0,35*
Heuvel van den T.	*1*	*1,00*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*
Janssen R.	*1*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Jong de M.	*1*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Kodde FD	*1*	*0,25*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Kuijpers HJH	*1*	*0,10*	*0,10*	*0,10*	*0,00*	*0,00*	*0,00*
Odekerken J.	*1*	*0,30*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Schaepkens E.	*1*	*0,00*	*0,25*	*0,25*	*0,25*	*0,00*	*0,00*
Slangen J.	*1*	*0,13*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Theije de G	*1*	*0,20*	*0,20*	*0,20*	*0,00*	*0,00*	*0,00*
Tomlow H.	*1*	*0,00*	*0,70*	*0,70*	*0,00*	*0,00*	*0,00*
Wolfs TGAM	*1*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Bartholome R	*2*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Hendrikx A.	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Meesters D.	*2*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Vaessen M.	*2*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Aerts van R.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Bakker N.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Bessems B.	*3*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*	*0,00*
Best van N.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Boer de E.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Bonekamp-Schutte I.	*3*	*0,40*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Boonen B.	*3*	*1,00*	*0,00*	*0,50*	*0,50*	*0,50*	*0,50*
Bosch ten N.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Degens J.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Deutz R.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Dongen van D.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Eijk van HMH	*3*	*1,00*	*1,00*	*1,00*	*1,00*	*1,00*	*1,00*
Elizalde Vilalta M.	*3*	*0,00*	*0,00*	*0,00*	*0,75*	*0,75*	*0,00*
Esten S.	*3*	*0,80*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Garcia Fuentes A.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,80*
Hadfoune M	*3*	*0,50*	*0,50*	*0,00*	*0,00*	*0,00*	*0,00*
Harmelen van R.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Heuvel van den T.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Janssen - Koolaard, D.	*3*	*0,00*	*0,42*	*0,00*	*0,00*	*0,00*	*0,00*
Jong de J.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Kodde FD	*3*	*0,75*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
*Kodde FD**	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Martens JE	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Pieters H.J.	*3*	*0,00*	*0,60*	*0,60*	*0,70*	*0,70*	*0,00*
Rijks J.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,50*	*0,50*
Rijt	*3*	*0,60*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Roosta S.	*3*	*0,80*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Schaepkens E.	*3*	*0,00*	*0,75*	*0,75*	*0,75*	*0,00*	*0,00*
Sleijpen R.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*

Smeets F.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Theije de G	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Theunisz E.	*3*	*1,00*	*0,25*	*0,00*	*0,00*	*0,00*	*0,00*
Tomlow H.	*3*	*0,00*	*0,00*	*0,00*	*0,70*	*0,00*	*0,00*
Ummels V.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Waarenburg van de M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Wijckmans-Duysens N.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Winants BHM	*3*	*0,60*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Mujagic Z.	*3*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*

Other Staff	***Funding***	***0,00***	***0,65***	***0,60***	***0,60***	***0,00***	***0,60***
Oltmans H.	*3*	*0,00*	*0,65*	*0,00*	*0,00*	*0,00*	*0,00*
Smits L-A	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,60*
Golde van J.	*3*	*0,00*	*0,00*	*0,60*	*0,60*	*0,00*	*0,00*

Total staff		***59,93***	***46,47***	***44,15***	***40,65***	***45,15***	***40,75***

Appendix 2: Curricula

Name: **Ronit Shiri-Sverdlov**
E-mail: r.sverdlov@maastrichtuniversity.nl
URL: http://gcb.mumc.nl/medewerkers

GENERAL INFORMATION
Date of birth: 22/4
Current position: Associate Professor
Fields of Expertise: lipids, inflammation, metabolism, NASH

QUALIFICATIONS:
1997-2002: PhD: Tel-Aviv University, Israel.
1999: Granted title of genetic counselor by the Ministry of Health.
1994-1996: Master's degree: Tel-Aviv University, Israel.
1990-1994: Bachelor's degree: Bar-Ilan University, Israel

SCIENTIFIC CAREER:
2012- now: Associate Professor at Department of Molecular Genetics, Maastricht University.
2004-2012: Assistant Professor at Department of Molecular Genetics, Maastricht University.
2001-2004: Postdoctoral fellow, Department of Molecular Genetics, Maastricht University.

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 48
- Contributions to books: 2 chapters

Number of patents: 6
- Supervision of PhD theses supervised till thesis defence: 3

Scientific teaching:
- Coordinator and tutor in senior year 2 Biomedical Sciences Master program
- Member of the planning group committee and lecturer for block 1.6,
- Tutor and lecturer in several blocks in the Biomedical Sciences FHML.

Three key publications 2009 – 2014:
- Bieghs V. and Shiri-Sverdlov R. Role of scavenger receptor A and CD36 in diet-induced nonalcoholic steatohepatitis in hyperlipidemic mice. Gastroenterology. 2010
- Bieghs V….and Shiri-Sverdlov R. The cholesterol derivative 27-Hydroxycholesterol reduces steatohepatitis in mice. Gastroenterology, 2013
- Hendrikx T… and Shiri-Sverdlov R. Hematopoietic overexpression of Cyp27a1 reduces hepatic inflammation independently of 27-hydroxycholesterol levels in Ldlr-/- mice.J Hepatol. 2014,

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- Annual issue: Oxidized LDL in Inflammation: From Bench to Bedside (2014)
- International Journal of Inflammation (2013)
- Mediators of inflammation (2012)

Membership of national and international scientific organizations:
- American association of Liver Dieses (AALSD)
- Dutch Atherosclerosis Society (DAS)
- European Lipoprotein Club

RELEVANT JOB-RELATED SOCIAL POSITIONS:
- Board member of the Nederlandse vereniging voor hepatology (NVH)
- Grant Reviewer for ZonMw
- Grant Reviewer French National Research Agency

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- Nederlandse Hartstichting (NHS), CVON grant
- European commission, FP7-PEOPLE-2012
- VENI subsidie, NWO ZonMW fellowship
- VIDI subsidie, NWO ZonMW fellowship
- Maag Lever Darm Stichting

Mini Curriculum

Name: Cornelis Hubertus Carolus Dejong
E-mail: chc.dejong@mumc.nl
URL:

GENERAL INFORMATION

Date of birth: 14-01-1962

Current position: Head Section Gastrointestinal Surgery and Surgical Oncology, Department of Surgery, Maastricht University Medical Center

Fields of Expertise:

Clinical: hepatobiliary and pancreatic surgery, improving perioperative care in elective surgical patients (ERAS), translating knowledge acquired in basic research into everyday clinical practice, teaching and training of medical students and surgical trainees.

Research: improving perioperative care in surgical patients (ERAS), translational research (liver failure after live resection, nitrogen metabolism, gut barrier function)

QUALIFICATIONS: (diplomas, degrees)

1980 Graduation High School (Gymnasium ß, extra qualification in History)
1985 Masters in Medicine (Doctoraal), Nijmegen University
1987 MD 'Artsexamen', Nijmegen University
1993 PhD 'Ammonia and glutamine metabolism during liver failure', Promotor Prof.dr. P.B. Soeters
1997 Board Certification as General Surgeon
2013 UEMS Honorary Diploma of HPB Surgery (FEBS)
2014 Fellow of the Royal College of Surgeons of Edinburgh (ad hominem)

SCIENTIFIC CAREER: (major steps)

1993 PhD 'Ammonia and glutamine metabolism during liver failure', Promotor Prof.dr. P.B. Soeters
2008 Professor of HepatoPancreatoBiliary Surgery (Maastricht University
2014 Fellow of the Royal College of Surgeons of Edinburgh (ad hominem)

OUTPUT:

Publications:

- Number of publications in international refereed scientific journals according to WoS: 255
- Contributions to books: 28

Patents: none

Supervision of PhD theses:

- Number of PhD students supervised till thesis defense: 16 (12% with distinction).

Scientific teaching:

- ERAS board member (www.erassociety.org); worldwide teaching in perioperative care
- ESPEN e-teacher, on site teaching in nutrition in perioperative care
- ESORT (European Society of Radiology) teacher in liver surgery, pancreatic surgery
- British Journal of Surgery writing and reviewing courses teacher
- UEMS HPB examiner and teacher (European HPB Exam)

Three key publications 2009 – 2014:

- van den Broek MA, Bloemen JG, Dello SA, van de Poll MC, Olde Damink SW, Dejong CH. Randomized controlled trial analyzing the effect of 15 or 30 min intermittent Pringle maneuver on hepatocellular damage during liver surgery. J Hepatol. 2011 Aug;55(2):337-45.
- Søreide K, Alderson D, Bergenfelz A, Beynon J, Connor S, Deckelbaum DL, Dejong CH, Earnshaw JJ, Kyamanywa P, Perez RO, Sakai Y, Winter DC; International Research Collaboration in Surgery (IRIS) ad-hoc working group. Strategies to improve clinical research in surgery through international collaboration. Lancet. 2013 Sep 28;382(9898):1140-51.
- Bakker OJ, van Brunschot S, van Santvoort HC, Besselink MG, Bollen TL, Boermeester MA, Dejong CH, van Goor H, Bosscha K, Ahmed Ali U, Bouwense S, van Grevenstein WM, Heisterkamp J, Houdijk AP, Jansen JM, Karsten TM, Manusama ER, Nieuwenhuijs VB, Schaapherder AF, van der Schelling GP, Schwartz MP, Spanier BW, Tan A, Vecht J, Weusten BL, Witteman BJ, Akkermans LM, Bruno MJ, Dijkgraaf MG, van Ramshorst B, Gooszen HG; Dutch Pancreatitis Study Group. Early versus on-demand nasoenteric tube feeding in acute pancreatitis. N Engl J Med. 2014 Nov 20;371(21):1983-93.

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals: (max 3)

- Editor British Journal of Surgery
- Editorial Board World Journal of Surgery
- Editorial Board HPB
- Editorial Board Clinical Nutrition
- Associate Editor Nederlands Leerboek Chirurgie (2011-2012)

Membership of national and international scientific organizations: (max 3)

1989-present Dutch Society for Gastroenterology (currently Vice-Chairman till 2017)
1990-present Dutch Society of Surgeons
1989-present European Society of Parenteral and Enteral Nutrition
1995-present Netherlands ESPEN (NESPEN)
2000-present Dutch Society for Hepatology
2000-present Dutch Society for Gastrointestinal Surgery
2000-present Dutch Liver Working Group (currently Chairman)
2001-present Dutch Society for Surgical Oncology
2000-present International HepatoPancreatoBiliary Association (currently Scientific Committee Member)
2000-present European-African HPB Association (currently Council Member)
2001-present European Digestive Surgery (EDS)
2007-present International Society of Surgery
2013-present European Surgical Association (member by appointment)
2013-present Dutch HepatoBiliary Audit (currently Chairman)

RELEVANT JOB-RELATED SOCIAL POSITIONS: (max 3)

Not applicable

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

1991 ESPEN Travel Award (best abstract), Antwerpen
1993 Poster Prize, 8th International Symposium on Ammonia, Frascati/ Rome
1994 Glaxo Gastroenterology Prize (€3,500, Best Dutch PhD Thesis in Gastroenterology), Dutch Society of Gastroenterology, Veldhoven
1998 Stipendium Niels Stensen Foundation, for 1 year in Royal Infirmary of Edinburgh, Scotland
2005 Sanofi Aventis Colorectal Theme Year Prize of the Dutch Society of Gastrointestinal Surgeons (€5,000, Fast Track Colonic Surgery, Noordwijk aan Zee)
2005 Dutch Society for Hepatology Prize for research project “The role of the kidney in ammonia metabolism in a human model of acute liver insufficiency” (€6,000, jointly with M.C.G. van de Poll (PhD Student), Veldhoven)

2006 Nomination University Hospital Maastricht Clinician of the Year

2007 Harry M. Vars Award of the American Society for Parenteral and Enteral Nutrition for paper “Does the route of administration (enteral or parenteral) of isotopically labelled glutamine affect the conversion of [2-15N]glutamine into [2-15N]citrulline and [2-15N]arginine in humans” (€5,000, jointly with M.C.G. van de Poll (PhD Student), P.A.M. van Leeuwen and G.C. Ligthart-Melis, Phoenix, Arizona, USA).

2010 ESPEN Faculty Membership award (nr 00045) for contributions to the field of Clinical Nutrition and Metabolism

Name: **Adrian Masclee**
E-mail: a.masclee@mumc.nl
URL: http://mdl.mumc.nl/medewerkers

GENERAL INFORMATION
Date of birth: 25/06/1955
Current position: Professor Gastroenterolgy-Hepatology
Fields of Expertise: Neurogastroenterology and Motility

QUALIFICATIONS and SCIENTIFIC CAREER

1981-1990	training internal medicine, Gastroenterology and Hepatology, Nijmegen
1986-1990	PhD thesis University Medical Center Nijmegen (aspects of CCK release)
1990- 2006	ssociate professor, Head of Neurogastroenterology and Motility Unit Leiden
2006- present	Professor in Gastroenterology-Hepatology, University Maastricht , head division G-H
2006- present	Head of training facility med specialists (Gastroenterology-Hepatology)

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 312
- Contributions to books: 8 chapters

Number of patents: 2
- Supervision of PhD theses supervised till thesis defense: 27 (defense succesfully completed)
- Current supervision of PhD students n=22

Scientific teaching:
- Coordinator of several blocks in years 1-4, medical training, Leiden University
- Coordination GI-HPB research, own division. Topics a) IBD b) NGM with IBS c) liver- NASH d) CRC genesis

Three key publications 2009 – 2014:
- Keszthelyi D…. and Masclee AAM. Does acute tryptophan depletion affect peripheral serotonin metabolism in the intestine? Am J Clin Nutr 2012
- Mujagic Z…. and Masclee AAM. Small intestinal permeability in increased in diarrhoea predominant IBS. Aliment Pharmacol Ther 2014
- LeClerq CM…. and Masclee AAM. Postcolonoscopy colorectal cancers are preventable: a population based study. Gut 2014.

RELEVANT SCIENTIFIC SERVICES
Membership of editorial boards of international scientific journals:
- Neurogastroenterology and Motility
- Alimentary Pharmacology and therapeutics

Membership of national and international scientific organizations:
- American Gastroenterology Association (AGA)
- UEG (European Gastroenterology)
- Dutch society for Gastroenterology (scientific)
- Dutch society for Hepatology
- Dutch association for Gastroenterology and Hepatology (chair)
- European Society and World Society for Neurogastroenterology and Motility

RELEVANT JOB-RELATED SOCIAL POSITIONS:
- Dutch association for Gastroenterology and Hepatology (chair)
- Board member MUMC clinical staff
- Chair Dutch Digestive Foundation (scientific)
- Reviewer national grants ZON MW and NWO and international
- Advisory board CTCM (Clinical Trial Center Maastricht)

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:
Dutch Digestive Foundation, ZON MW

Name: **Steven WM Olde Damink**
E-mail: steven.oldedamink@maastrichtuniversity.nl
URL:

GENERAL INFORMATION
Date of birth: 16-09-1968
Current position: GI and HPB Surgeon & Director Research Laboratories, Department of General Surgery, Maastricht University Medical Centre +, Maastricht
Fields of Expertise: Hepatopancreaticobiliary surgery, the care for patients with enterocuteneous fistulae as part of surgical complications and the nutritional and metabolic support of metabolically compromised patients. My main research interests centre on the pathogenesis, diagnosis, prevention and treatment of gut and liver failure. I've conducted translational research in patients on the consequences of acute and acute-on-chronic liver failure on interorgan ammonia and amino acid metabolism. Currently, the influence of an interrupted entero-hepatic cycle on gut and liver homeostasis is a main research theme.

QUALIFICATIONS:

2005(9) - 2006(4)	Fellow Hepato-Pancreatico-Biliary Surgery der Klinik für Allgemein-, Viszeral- und Transplantationchirurgie, Universitätsklinikum Essen, Germany (Director: Prof. Dr. med. C.E. Broelsch).
October 2005	Registration as Surgeon (Royal Dutch Medical Association)
31 May 2005	PhD Dissertation (Cum Laude): Pathophysiological basis of hepatic encephalopathy (Promotores: Prof. dr. PB Soeters & Prof. Dr. PC Hayes)
April 1995	Medical Degree, Maastricht University
August 1992	Doctoral Degree Medical School, Maastricht University
August 1992	Master of Science degree Health Sciences, Maastricht University

SCIENTIFIC CAREER:

2012 - present	Director Research Laboratories, Department of Surgery, Maastricht University Medical Centre +, Maastricht
2012(2) - present	Consultant HPB Surgery & Liver Transplantation (academic post), Royal Free Hampstead NHS, and Senior Lecturer University College London, London, UK (0,2 Fte)
2008 - present	Clinical Lead Nutrition Team, Maastricht University Medical Centre +, Maastricht
2005(10) - present	GI and HPB Surgeon Department of General Surgery, Maastricht University Medical Centre +, Maastricht
2010(7) - 2012(2)	Consultant HPB Surgery & Liver Transplantation, Royal Free Hampstead NHS, and Senior Lecturer University College London, London, UK (0,5 Fte)
2008 - 2012	Co-Director HPB Surgical Research Lab Institute of Hepatology, UCL, London, UK
2009(4) - 2010(7)	Honorary Consultant Surgeon Liver Transplantation, Royal Free Hampstead NHS
2008(2) - 2010(7)	Consultant HPB Surgery, University College London Hospital and, Senior Lecturer HPB Surgery University College London, London. UK (0,5 Fte)
2006(4) - 2007(4)	Clinical and Surgical associate der Klinik für Allgemein-, Viszeral- und Transplantationchirurgie, Universitätsklinikum Essen (Germany) (Director Prof. Dr. med. C.E. Broelsch).
31 May 2005	PhD Dissertation (Cum Laude): Pathophysiological basis of hepatic encephalopathy (Promotores: Prof. dr. PB Soeters & Prof. Dr. PC Hayes)
1997(11) - 1999(9)	Wellcome Trust Clinical Research Fellow and Hon. Senior House Officer, Department of Medicine, Royal Infirmary of Edinburgh, Scotland, UK, Head: Prof. dr. PC Hayes.
April 1996	Start AGIKO General Surgery, Department of Surgery, Academic Hospital Maastricht, Head: Prof. dr. G. Kootstra
June 1995	Start PhD research at the Department of Surgery, Academic Hospital Maastricht, Promotor: Prof. dr. PB Soeters, co-promotor: Dr. NEP Deutz/Dr. CHC Dejong

OUTPUT:

Publications:

- Number of publications in international refereed scientific journals according to WoS: 105 Wi-1 papers
- Contributions to books: #
- Number of citations according to WoS: average citations per item: 10.7; H-index: 22 (November 2014, Web of Science)

Patents:

Supervision of PhD theses:

1. Mr. Tarek Ezzat Abdel-Aziz
   Title: MD-PhD: UCL (Medicine) and University of Alexandria: Novel therapeutic strategies for prevention of post-resectional liver failure
   Principal Supervisor: Dr. SWM Olde Damink
   Promotor: Prof. M. Malago, co-promotores: Dr. SWM Olde Damink & Dr. D. Dhar
   Sponsor: Egyptian Research Council and Jason Boas Foundation, UK
   Graduation date: 16th February 2012
2. Mrs. Maartje AJ van den Broek
   Title: PhD-MUMC+: Assessing outcomes after liver surgery: current status and future prospects
   Principal Supervisor: Dr. SWM Olde Damink
   Promotor: Prof. CHC Dejong, co-promotor: Dr. SWM Olde Damink
   Sponsor: ZonMW: Clinical Fellowship
   Graduation Date: 28th March 2013
3. Mrs. Fatma El Zahraa Ammar Saleh Mohammed
   Title: PhD-UCL: Role of TLR's in HCC
   Principal Supervisor: Prof. R. Jalan.
   Promotor: Prof. R. Jalan, co-promotores: Dr. SWM Olde Damink & Dr. R. Mookerjee
   Sponsor: Egyptian Research Council
   Graduation date: 4th July 2013
4. Mrs. Celien PH Vreuls
   Title: PhD-MUMC+: Sinusoidal obstruction syndrome: a multidisciplinary approach.
   Principal Supervisor: Dr. A. Driessen & Dr. SWM Olde Damink
   Promotor: Prof. CHC. Dejong, co-promotores: Dr. A. Driessen; Dr. SWM Olde Damink and Dr. G Koek
   Sponsor: Dept. of Pathology and Surgery, MUMC+
   Graduation date: 4th July 2014
5. Mr. Jamie Skipworth
   Project: PhD-UCL: Mitochondrial Renin-Angiotensin Systems.
   Principal Supervisor: Prof. H. Montgomory.
   Promotor: Prof. H. Montgommory, co-promotor: Dr. SWM Olde Damink
   Sponsor: UCL and Jason Boas Foundation
   Graduation Date: 29th August 2014
6. Mr. Ronald M van Dam
   Title: PhD-MUMC+: Clinical Optimization in Liver Surgery
   Principal Supervisor: Prof. CHC Dejong.
   Promotor: Prof. CHC Dejong, Co-promotor: Dr. SWM Olde Damink
   Sponsor: NA
   Graduation date: 12th September 2014
7. Mrs. Marielle Coolsen
   Title: PhD-MUMC+: Enhanced perioperative care in liver rand pancreatic surgery.
   Principal Supervisor: Prof. CHC Dejong.
   Promotor: Prof. CHC Dejong, Co-promotor: Dr. SWM Olde Damink
   Sponsor: Dept Surgery, MUMC+.
   Graduation date: 31st October 2014.

Scientific teaching:

Regular Courses

2012 - present	Supervisor WESP
2012 - present	Supervisor GEZP
2010 - 2011	Primary Supervisor Research Master Student (Joris Schreurs), MUMC
2009 - present	Mentor 5th Year Medical Students, MUMC (5 students/year)
2008 - present	Tutor AKO students, Maastricht University Medical Centre
2008 - 2010	Clinical Teacher 3rd Year Medical Students, University College London
2008 - present	Tutor AKO students, Maastricht University Medical Centre
2006 - 2008	Tutor 3rd Year Medical Students (Blok Abdomen)
2006 - present	Tutor Outpatient Clinics General Surgery 3rd Year Medical Students

Post-Doctoral Courses

2014	Dutch Life Long Learning Course, Post-Graduate course on behalf of NESPEN
2008 - present	Tutor National Education Course Surgical Trainees (CASH), Dutch Surgical Society
2008 - 2010	Specialist Registrar Course Evidence Based Hepatology, UCL, UK
2008 - 2010	Instructor Organ Retrieval, Post-Graduate Course, Royal Free Hospital, University
2006 - 2011	Tutor and Director Advanced Course Clinical Nutrition, European Society of Parenteral and Enteral Nutrition (Director from 2009, 8 days International Postgraduate Course) College London, UK
2000 - 2005	Instructor Advanced Trauma Life Support, Dutch Chapter

Miscellaneous teaching activities

2008-2011	Supervisor of 5 Maastricht Exchange students, University College London

Three key publications 2009 – 2014:

- Skipworth JRA, Nijmeier R, van Santvoort HC, Besselink MGH, Schulz HA, Cooper JA, Acharva J, Kivimaki M, Shanker A, Malago M, Humphries SE, Olde Damink SWM, Montgomery HE. The effect of renin angiotensin system genetic variants in acute pancreatitis. Ann Surg 2014 Apr 16. [Epub ahead of print]. IF: 8.058.
- van den Broek MA, Vreuls CP, Winstanley A, Jansen RL, van Bijnen AA, Dello SA, Bemelmans MH, Dejong CH, Driessen A, Olde Damink SWM. Hyaluronic acid as a marker of hepatic sinusoidal obstruction syndrome secondary to oxaliplatin-based chemotherapy in patients with colorectal liver metastases. Ann Surg Oncol. 2013; 20(5): 1462-9. IF: 4.308.
- van den Broek MAJ, Bloemen JG, Dello SAWG, van de Poll MC, Olde Damink SWM, Dejong CHC. Randomized controlled trial analyzing the effect of 15 or 30 min intermittent Pringle manoeuvre on hepatocellular damage during liver surgery. J Hepatology 2011; 55: 337-45

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:

Membership of national and international scientific organizations:

2012 – present	Member Institutional Board Nutrition and Toxicology Research Institute Maastricht (NUTRIM)
2010 – present	Secretary Special Interest Group AIF European Society of Parenteral and Enteral Nutrition (ESPEN)
2008 – 2013	Member Board Netherlands Society of Hepatologist (Surgical representative)

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

2006	NUTRIM Research School Prize for the best PhD, period 2005-2006
2006	2nd Prize best PhD 2005-2006 Dutch Society of Gastroenterology (AstraZeneca Gastrointestinale Research Award 2006)
2005	Hendrik Casimir-Karl Ziegler Research Price of the Royal Dutch Academy of Science (KNAW) and the Nordrhein-Westfälische Akademie der Wissenschaften
2005	Altena Prize Dutch Society of Hepatology
2005	Elected as rising star of Gastroenterology 2005 by the ASNEMGE (Association of National European and Mediterranean Societies of Gastroenterology, Ceremony UEGW meeting Copenhagen October 2006)
2001	Winner Pelerin Prize, Academic Hospital Maastricht
1993	Winner research award, Medical School, Maastricht University

Research programme: NUTRIM Research line 3: Chronic Inflammatory Disease and Wasting

Research line leader(s): **Prof. Luc J.C. van Loon (chair)**
Prof. Jeroen P. Kooman (vice-chair)
For a full staff survey see appendix 1

1. Objectives and Research Area

1.1 Vision, Mission and Objectives

The mission of research line 3 (RL3) Chronic Inflammatory Disease and Wasting is to perform research on determinants and pathways involved in respiratory and systemic inflammation in chronic diseases, and to understand systemic manifestations and metabolic alterations in ageing and chronic disease, with a focus on muscle health. From a clinical perspective, the multi-component involvement of COPD is used as a translational model, which is further supported by the study of other chronic diseases such as chronic kidney diseases (CKD) and rheumatoid arthritis as well as by the study of cancer cachexia as muscle wasting models. A specific focus of RL3 is the involvement of skeletal muscle weakness in ageing as well as in chronic organ diseases, with specific attention to the role of inflammation, hypoxia, oxidative stress and physical activity and skeletal muscle disuse. The interaction between underlying pathophysiological mechanisms, physical activity, muscle wasting and body composition phenotypes forms an important study target. The main objective of RL3 is to provide novel insight in healthy as well as pathological and accelerated ageing, and to provide insight into shared mechanisms involved in the pathogenesis of systemic complications of ageing and chronic organ disease, which may lead to the development of novel treatment strategies.

1.2 Research Area / Research Line(s)

The research line is concentrated around two complementary and interacting programmes: (1) host-defense mechanisms, inflammation, and metabolic networks and (2) skeletal muscle weakness and body composition in ageing and disease. It integrates both mechanistic, translational as well as clinical research. Unravelling molecular mechanisms is considered as a starting point for the development of strategies for early diagnosis and treatment of the systemic consequences of chronic organ disease, with special emphasis on the role of inflammation and oxidative stress, which is a significant interaction link between programme 1 and 2. An important approach is the translation of basic research into clinical phenotypes and potential treatment strategies, bridging the gap between academia and medicine, providing a great valorisation potential of this RL. The combined study of (healthy) ageing and chronic organ diseases as models of accelerated ageing provides many opportunities to increase our understanding of systemic manifestations of both ageing and disease, and has large societal impact given the changing demographics of the global population.

<u>Programme 1: Host-defense and metabolic networks</u>

This programme focuses on the study of innate immunological processes in relation to a variety of environmental exposures like smoke, inorganic dust, particulate matter and bacterial and viral organisms in stable conditions and during exacerbations of COPD. Moreover, understanding of the cellular and molecular redox-regulating mechanisms in inflammation is important to design anti-oxidant strategies for the treatment of various inflammatory disease conditions, with relevance also beyond COPD. More insight into these mechanisms may also aid in the prevention or treatment of muscle wasting, as well as other systemic complications in chronic diseases and cancer cachexia. Research on oxidant-anti-oxidant balances in local and systemic compartments forms an important topic in this programme.

Programme 2: Skeletal muscle weakness and body composition in ageing and disease

Skeletal muscle tissue exhibits a remarkable plasticity in response to the environment. Questions concerning the control, reversibility, and functional consequences of adaptive modifications of muscle architecture are key domains of the research of programme 2. Programme 2 covers the broad spectrum of disturbances in energy and substrate metabolism to molecular mechanisms and modulation of muscle protein synthesis, breakdown and regeneration, translating into phenotypic alterations in muscle structure and function as well as body composition. In addition, the role of shared pathophysiological mechanisms, such as inflammation and oxidative stress, in the pathogenesis of systemic complications of ageing and chronic organ diseases are studied in a translational manner. Moreover, the assessment of physical (in)activity and performance in both health and disease forms an important line of research.

Whereas a significant part of this programme is dedicated to studying ageing in healthy subjects, the most important disease studied in this programme is COPD. COPD is a highly prevalent chronic disease that can serve as a model for understanding systemic consequences of other chronic diseases, such as chronic kidney disease, type 2 diabetes, rheumatoid arthritis and heart failure. It becomes increasingly clear that shared underlying mechanisms can be identified in the pathogenesis of systemic complications of different chronic diseases, which are in itself models of premature ageing. The interaction between investigators focusing on muscle metabolism and body composition phenotypes in healthy ageing and those focusing on chronic diseases in this RL provides ample opportunity for identification of underlying mechanisms for muscle wasting and abnormalities in body composition such as seen in cachexia, sarcopenia or sarcopenic obesity. This may facilitate the design of innovative treatment strategies supporting more healthy ageing, even in those patients with chronic organ diseases. In addition to chronic organ diseases, cancer cachexia represents an important model of acute muscle wasting. The study of the pathophysiology and phenotyping of the most important wasting conditions encountered in clinical practice in this RL guarantees considerable societal impact. Recently, the programme has been further strengthened by including the study of bone disorders in ageing and chronic disease, applying state-of-the art diagnostic techniques. The study of the musculoskeletal interaction provides more insight into the pathogenesis and diagnosis of systemic complications of chronic disease.

1.3 Strategy

After the reorganization of NUTRIM in 2008, the strategy of this research line was to bring together expertise in the field of host-defense and metabolic networks including the oxidant-anti-oxidant and muscle metabolism and function with a focus on chronic inflammatory processes particularly in COPD patients. The integration of host-defense in relation to viral and microbial agents, as well as environmental factors, and the focus on COPD as multi-component disease condition has strengthened the position of programme 1 in this research line. In programme 2, the skeletal muscle weakness and body composition research focuses on translational research into the metabolic aberrations and molecular mechanisms in chronic organ diseases, with emphasis on ageing, COPD, type 2 diabetes and cancer cachexia. Programme 2 has expanded by including research into the systemic complications of other chronic organ diseases, such as chronic kidney disease (CKD), heart failure and rheumatoid arthritis. The goal is to identify shared patho-physiological pathways between different chronic diseases, as well as similarities with the normal ageing process. In collaboration with the graduate school GROW cancer cachexia has been added as a model for acute muscle wasting. Furthermore, the programme has been strengthened by the study of bone disorders in different chronic diseases, increasing our insight in musculoskeletal interaction in both health and disease. For both programmes within this RL, there is strong internal interaction via collaborative projects and shared expertise. Key players at the national and international level participate in the research, allowing RL3 to remain at the forefront of research innovation.

Over the previous 6 years major contributions have been made to the various fields of research, as evidenced by the large number of high-ranking publications and PhD theses. The number of PhD students has increased progressively over the past few years. A major asset has been the translation of basic research into clinical phenotypes, and the translation of results from basic research into potential preventive or treatment strategies. Combining research methodology and expertise within the departments of Human Movement Sciences and Respiratory Medicine has stimulated and facilitated extension of the research from

the model of cachexia to other phenotypes of muscle wasting. This includes sarcopenia and sarcopenic obesity in chronic diseases relative to age related skeletal muscle adaptive responses. Using COPD as a clinical model, Maastricht has obtained a leading position in the impact of nutritional and exercise interventions in COPD management and its associated systemic complications. Research in the assessment of physical (in)activity and the clinical benefits of exercise intervention to improve health and functional performance of patients with chronic diseases and healthy older adults has proven a key research topic within RL3, and has resulted in a strong valorization component. Recently, the programme has adopted research focusing on other chronic diseases, such as rheumatoid arthritis, heart failure and chronic kidney disease. This has led to an increased understanding of shared pathophysiological pathways involved in systemic manifestations, and specifically the phenomenon of accelerated ageing in patients suffering from chronic diseases. The same holds true for cancer cachexia and the resulting emphasis on a multimodal approach in its prevention and treatment. Furthermore, the use of sport and exercise to improve metabolic and functional performance in health remains an active topic of research in this research line. This research line is of great importance regarding the emphasis on prevention in the Maastricht UMC+ portfolio 2020, as well as on the increasing societal attention for more healthy ageing.
No major adjustments in the main focus of RL3 are foreseen. Both programmes will expand their impact by stimulating interactions within the RL as well as beyond its borders. Increasing attention will be devoted to interactions between research into healthy ageing and into accelerated ageing in patients with chronic disease. This will hold true for both basic experimental research, as well as for epidemiological research in large cohorts, with the aim of translating basic mechanisms into clinical phenotypes. Interaction with the graduate school GROW in the study of cancer cachexia is an example of the “crossing borders” approach of this RL. Given the rapid developments in systems medicine, larger cohorts of both healthy subjects as well as patients with chronic diseases will be studied, for which fostering of existing collaborations and further expansion of collaboration at the national and international level is necessary.

1.4 Research environment and embedding

Participation in graduate/research school(-s)
Several departments cooperate within research line 3, including the departments of Toxicology, Human biology and movement sciences, Medical microbiology, Internal medicine (rheumatology and nephrology, since 1-1-2012) and Respiratory medicine. The research line has an open management style characterized by scientific leadership. Scientific meetings are held on a weekly basis in combination with research line 1 to stimulate interaction between the research lines and optimize the integration between academic and clinical groups. The scientific meetings are in English to also serve the many international researchers working within the research line. An active policy is present in guiding, stimulating and motivating the researchers, post-docs and PhD students by a variety of scientific meetings with supervising staff members in weekly research group meetings within the various research groups led by the principal investigators. Senior scientists and representative staff members of the research line meet to discuss managerial issues of organizational, financial and/or scientific nature in scheduled meetings. This discussion platform not only serves for streamlining new developments, but also functions as an intermediate between management and researchers. Additional to the meetings in the research line and research schools, interactions between staff members, both in the research line and in the departments, are further strengthened by educational responsibilities. Teaching at the BSc, MSc and PhD level in the life science, health science and medicine programmes of the Faculty of Health, Medicine and Life Sciences, is a core activity for the participating departments. In addition, clinical researchers are involved in the academic health care of the MUMC. Besides the interaction within the research line and the graduate school NUTRIM itself, there is increasing interaction with other graduate schools, such as GROW (oncology and developmental biology) and CARIM (cardiovascular research), as discussed in the previous paragraphs.

National and international positioning / Number and nature of (inter)national affiliations
The research activities of research line 3 are fully embedded in academic and top-referral clinical work. Research within this RL is part of several national and international Centres of Excellence and is integrated in Technological Top Institutes in the Netherlands such as TI Food & Nutrition (TIFN), Netherlands

Toxicogenomics Centre (NTC) and the Netherlands Nutrigenomics Consortium (NGC). Staff members are well known clinical experts in their field and internationally acknowledged for their work as illustrated by regular invitations to speak on symposia, invitations to review for international journals, and the fact that they act as editors or members of editorial boards of a wide range of well established scientific/clinical journals. Several of the members are either at the local, national and international level active on scientific boards or serve as reviewers for research proposals submitted to Dutch funding agencies, EU or other funding agencies outside the Netherlands. On a regular basis researchers are invited as speakers at international meetings and asked to chair scientific sessions.
Researchers in both programme 1 and 2 have established collaborations with important international research partners. As examples may serve the interaction with the University of Vermont (prof. E. Wouters), National Institute of Aging (prof. A. Schols), Renal Research Institute in New York (prof. J.P. Kooman), McMaster University and University Medical School Nottingham (prof. L. van Loon). At a national level, there is extensive collaboration with academic as well as regional hospitals. The appointment of prof. J. van den Bergh, working as internist-endocrinologist at the Viecuri Hospital Venlo, as an extraordinary professor at Maastricht University may serve as an example. A very important collaboration within this RL is the collaboration with CIRO Horn (Centre of Expertise for Chronic Organ Failure). This centre is highly equipped to study the systemic complications of chronic organ diseases, with focus on COPD. Interaction between researchers in this RL (prof. E. Wouters and prof. A. Schols) and CIRO has resulted in numerous publications in high ranking journals. Another example of collaboration at the regional level is the study towards the relation between pulmonary function, osteoporosis and risk of vertebral fractures which is performed in a collaborative effort between CIRO Horn, Catharina Hospital Eindhoven and the Technical University Eindhoven (prof. J. van den Bergh). The same holds true for collaboration between the researchers in this RL (prof. J.P. Kooman and prof. L. van Loon) with the Technical University Eindhoven, TNO, Maxima Medical Center, and the Catharina Hospital in Eindhoven regarding innovative diagnostic and treatment modalities in patients with chronic disease.

2. Resources and Facilities

2.1 Researchers

From the start of research line 3, the number of tenured and non-tenured staff has grown from 37,8 fte to 49,7 fte, largely due to an increase in non-tenured staff positions. This was accompanied by a decrease in the tenured/non tenured staff ratio, following national trends. Despite this, several successful young researchers have achieved tenured staff positions in the last few years. The change in ratio has not impacted the quality of the programme. In contrast, the number of high ranking publications has actually increased significantly during the last years.

Table 2.1 - Research staff at research unit level

	2009		2010		2011		2012		2013		2014	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific staff [1]	21	7,3	24	8,4	23	8,3	24	8,8	24	8,7	24	8,9
Post-docs [2]	12	8,6	18	14,2	16	13,7	13	9,7	13	8,5	12	9,3
PhD candidates[3]	24	21,9	26	25,6	29	28,9	28	27,9	28	32,2	33	31,5
Total res. staff	**57**	**37,8**	**68**	**48,2**	**68**	**50,9**	**65**	**46,4**	**65**	**49,4**	**69**	**49,7**
Lab Technicians	20	16,3	22	16,9	20	15,8	18	13,3	15	10,8	24	18,3
Visiting fellows	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Total staff for research	**77**	**54,0**	**90**	**65,1**	**88**	**66,7**	**83**	**59,7**	**80**	**60,1**	**93**	**68,0**
Other (admin.) staff	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Total staff	**77**	**54,0**	**90**	**65,1**	**88**	**66,7**	**83**	**59,7**	**80**	**60,1**	**93**	**68,0**

- *FTE: sum of actual FTE-factors (in fulltime equivalents) labelled on NUTRIM research activities on 31-dec on any year*
- *#: number of persons active on NUTRIM Research activities on 31-dec of any year*
- *Scientific Staff: Professor, Assistant Professor and Associated Professor (direct funding)*
- *Post docs: researchers with completed PhD not belonging to Scientific staff*
- *PhD candidate: Standard PhD candidate with a contract.*
- *Lab technicians: technician, dieticians, data managers, research assistants etc.*
- *Other (admin.) staff: NUTRIM Office, personal assistants to PI's and project leaders etc.*

2.2 Research Funds

In the period 2009-2014 the earning power of RL3 increased with 22%, largely by an increase in contract research. Based on a more structured and focused research organization in the next period RL3 aims to apply for research grants in national and international competition. RL3 will develop strategic plans to overcome the limitation in resources of most charity funds in the Netherlands. We are in the process of trying to obtain funding within EU Horizon 2020. Potential candidates among our researchers are stimulated to apply for personal grants (NWO, ERC and Marie Curie fellowships). Several major research projects financed by Top Institute Food and Nutrition (TIFN) are being finalized and new initiatives with partners within the food industry are presently being developed to ensure continuation of the research performed within the running TIFN projects.

Table 2.2 - Funding at research unit level

Table 2.2 - Funding at research unit level

	2009		2010		2011		2012		2013		2014		Average 2009-2014	
Research Unit														
Funding:	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding (1)	17,4 fte	32%	19,4 fte	30%	15,1 fte	23%	15,5 fte	26%	17,2 fte	29%	18,0 fte	27%	17,1 fte	28%
Research grants (2)	2,5 fte	5%	4,5 fte	7%	3,5 fte	5%	3,3 fte	6%	4,3 fte	7%	6,3 fte	9%	4,0 fte	6%
Contract research (3)	32,8 fte	61%	39,2 fte	60%	43,4 fte	65%	33,8 fte	57%	32,8 fte	54%	38,6 fte	57%	36,8 fte	59%
Other (4)	1,4 fte	3%	2,0 fte	3%	4,8 fte	7%	7,0 fte	12%	5,8 fte	10%	5,1 fte	7%	4,3 fte	7%
Total funding	**54,0 fte**	100%	**65,1 fte**	**100%**	**66,7 fte**	**100%**	**59,7 fte**	**100%**	**60,1 fte**	**100%**	**68,0 fte**	**100%**	62,2 fte	**100%**
Expenditure:	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%
Personnel costs	2685 k€	63%	3332 k€	63%	3242 k€	68%	3226 k€	67%	3567 k€	69%	3477 k€	68%	3255k€	66%
Other costs	1579 k€	37%	1925 k€	37%	1546 k€	32%	1558 k€	33%	1627 k€	31%	1657 k€	32%	1649k€	34%
Total expenditure	**4264 k€**	**100%**	**5258 k€**	**100%**	**4788 k€**	**100%**	**4784 k€**	**100%**	**5195 k€**	**100%**	**5135 k€**	**100%**	**4904k€**	**100%**

Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)
Research grants obtained in national and international scientific competition (e.g. grants from NWO, KNAW and European Research Council)
Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations
Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within NUTRIM)

Some major externally funded research grants obtained in 2009-2014 are:

- Muscle mass preservation (L. van Loon, 01-01-2011, TIFN, € 4,680,000)
- Muscle health (L. van Loon, 01-09-2012, TIFN, € 3,648,815)
- "Beweegkuur": The prevention and treatment of type II diabetes and overweight (H. Savelberg, 01-04-2010, ZonMw, € 730,000).
- Respiratory effects of biological agents (E. Wouters, 26-5-2009, € 780.000)
- TIP 2-01 (A. Schols en E. Wouters, 13-5-2008, € 2.195.000)
- Transcriptionele regulation of muscle oxidative phenotype by PPAR's en NF-kB (R. Langen/ A.Schols, Dutch Lung Foundation € 244.200)
- Take muscle to heart (A. Remels, 1-2-2012, NWO VENI grant, € 250.000)
- Cost-effectiveness of nutritional rehabilitation on physical functioning and cardiometabolic risk modification in COPD patients with muscle atrophy 2010-2014; (A.Schols Netherlands Lung Foundation + Danone Advanced Medical Nutrition (500.000 €)
- NUTRIM Graduate Programme "Metabolism and Chronic Disease 2011-2016 (A.Schols NWO; 800.000 €)
- Maastricht University Interfaculty Programme 'Eat well' Participants: see www.um-eatwell.nl. PI A.Schols 2012-2014: Maastricht UMC+ stimulation grant: 375.000 €; 2014-2017: Project: Eatwell combats globesity: Maastricht University: 1.000.000 €

3. Research Quality

3.1 Demonstrable products - Research products for peers in science

The research output of RL 3 remains consistently high, both from a quantitative as well as from a qualitative perspective. Table 3.1 presents the number of publications over the years 2009-2014, with on average 155 articles published per year. This translates in an average productivity of ~20 papers per fte scientific staff per year. Furthermore, 55 PhD theses have been successfully finalized, with as much as 16 theses in 2014 only.

Table 3.1 - Main categories of research output

	2009	2010	2011	2012	2013	2014	Total
Academic publications							
a. Refereed articles	102	120	144	192	184	171	913
a.1 Refereed article in WoS (Web of Science)	95	100	137	178	173	167	850
a.2 Refereed articles non-WoS (Web of Science)	3	20	7	12	11	4	60
b. Non-refereed articles	3	1	2	5	2	8	18
c. Books							
d.1. Refereed book chapters		1		3	5	1	10
d.2. Non-refereed book chapters						1	1
e. PhD Theses	6	6	8	10	9	16	55
f. Conference papers	3	2		2			7
g. other products (see 3.2 / please specify)							
Total academic publications:							

3.2 Demonstrable use of products - Use of research products by peers

Table 3.2 provides more insight in the quality and impact of the research output of the research line. 32% of our publications are within the top 10% of the research field, with 6% within the top 1%. The research quality is also expressed in the mean relative impact (RI) score. The RI is given as a decimal number that shows the relation of the measure to the world average (which is set to the value of 1). With a RI of 2.98 in 2013 (and an overall 2.55 average over 2008-2013) the impact of the work presented is high. Furthermore, in the 2010 “special topics” rankings by Thomas Reuters Science Watch (www.sciencewatch.com), 2 of the senior scientists in our research line were ranked within the authors top 20. Prof. Wouters was ranked no 2 for the number of papers and no 3 for citations, Prof. Schols was ranked no 6 for papers and no 13 for citations. Our research line intends to sustain the high level of productivity and strives to further increase the impact of the presented work by publishing in high(er) impact journals.

Table 3.2 – Bibliometric analysis of research output

Year	N	C	Wavg	CPP	RI	%T10	#T10	%T1	#T1	%NC	#NC
2008	80	3613	1358	45,2	2,68	30%	24	5%	4	3%	2
2009	92	2602	1365	28,3	1,97	28%	26	1%	1	2%	2
2010	94	3147	1108	33,5	2,96	29%	27	6%	6	3%	3
2011	120	2173	999	18,1	2,26	33%	40	6%	7	4%	5
2012	156	1853	818	11,9	2,35	32%	50	6%	10	8%	12
2013	155	1038	365	6,7	2,98	35%	55	9%	14	17%	27
2008-13	**697**	**14426**	**6014**	**20,7**	**2,55**	**32%**	**222**	**6%**	**42**	**7%**	**51**

A few key publications:

- Geusens P, Chapurlat R, Schett G, Ghazem-Zadeh A, Seeman E, de Jong J, van den Bergh J. High-resolution in vivo imaging of bone and joints: a door to microarchitecture. Nat Rev Rheumatol. 2014 May; 10(5): 304-13
- Kooman JP, Kotanko P, Schols AM, Shiels PG, Stenvinkel P. Chronic kidney disease and premature ageing. Nat Rev Nephrol. 2014 Dec;10(12): 732-42
- Annegarn J, Spruit MA, Savelberg HH, Willems PJ, van de Bool C, Schols AM, Wouters EF, Meijer K. Differences in walking pattern during 6-min walk test between patients with COPD and healthy subjects. PLoS One. 2012;7(5):e37329.

- Vanfleteren LE, Spruit MA, Groenen M, Gaffron S, van Empel VP, Bruijnzeel PL, Rutten EP, Op 't Roodt J, Wouters EF, Franssen FM. Clusters of comorbidities based on validated objective measurements and systemic inflammation in patients with chronic obstructive pulmonary disease. Am J Respir Crit Care Med. 2013;187:728-35.

- Schols A, Ferreira IM, Franssen FM, Gosker HR, Janssens W, Muscaritoli M, Pison C, Rutten-van Molken M, Slinde F, Steiner MC, Tkacova R, Singh SJ. Nutritional assessment and therapy in COPD: a European Respiratory Society Statement. Eur Respir. J. 2014; 44(6):1504-20.

- Pennings B, Koopman R, Beelen M, Senden JM, Saris WH, van Loon LJ. Exercising before protein intake allows for greater use of dietary protein-derived amino acids for de novo muscle protein synthesis in both young and elderly men. Am J Clin Nutr 2011;93: 322-31.

3.3 Demonstrable marks of recognition - Marks of recognition from peers

Science awards, Scholarly prizes, Research grants awarded to individuals

Year	Prize description	Person
2009	Humboldt/NWO fellowship VENI	A. Remels
2009	ERS COPD travel grant	J. Annegarn
2009	International Exxentia Award	N. Anson
2010	ECSS Young Investigator Award	B. Pennings
2011	ESPEN Research fellowship	A. Haegens
2011	ECSS Young Investigator Award	N. Cermak
2011	ECSS Young Investigator Award	T. Snijders
2011	ECSS Young Investigator Award	J.W. van Dijk
2011	Canadian Institute of Health Grant	N. Cermak
2012	ECSS Young Investigator Award	T. Snijders
2012	ECSS Young Investigator Award	J. Smeets
2012	International Dairy Nutrition Prize	L. van Loon
2012	BASIS Young Investigator Award	H. Hamer
2012	ERS travel grant	I. Eurlings
2013	LSC poster award	N. Ubags
2013	ATS Pioneer Award	E. Wouters
2013	ASBMR Young Investigator Award	S. Bours
2013	ECSS Young Investigator Award	S. Gorissen
2013	TIFN Joop Roels Impact award	L. van Loon
2013	GSSI Nutrition Award	T. Snijders
2013	ACSM International student Award	T. Snijders
2013	Tulipmed PhD thesis award	M. Beelen
2014	ACSM Charles M. Tipton Student award	M. Dirks
2014	VvBN presentation prize	M. Oosterwaal
2014	NRS Swierenga Thesis award	Bram van den Borst
2014	ESPEN research fellowship	Coby van den Bool
2014	ECSS Young Investigator Award	M. Dirks
2014	VvBN PhD thesis award	T. Snijders
2014	Wretlind Lecture (career) Award	A. Schols
2014	Fellow of the ERS	A. Schols and E. Wouters
2015	Marie Curie Grant	T. Churchward-Venne
2015	NSERC	T. Churchward-Venne
2015	Francqui Chair	L. van Loon
2015	EB International Early Career Award	M. Dirks
2015	Nutrition and Bone Health award	L. van Loon

Plenary/Keynote* Lectures at major conferences

Year	Person	Conference
2010	L. van Loon	American College of Sports Medicine (ACSM), invited lecture "Type 2 diabetes, exercise and glycemic control", June 2010, Baltimore, USA.
2011	L. van Loon	Royal Society or Medicine (RSM), invited lecture "The impact of nutrition on the adaptive response to exercise in health and disease", March 2011, London, UK.
2012	L. van Loon	IDF World Dairy Summit. Invited lecture "Milk protein and muscle protein maintenance in the elderly", November 2012, Cape Town, South Africa.
2013	L. van Loon	European Conference on Enteral and Parenteral Nutrition (ESPEN), invited lecture "Dietary protein and physical activity in ageing and disease", August 2013, Leipzig, Germany.
2014	L. van Loon	American Diabetes Association (ADA), invited lecture "Moderate Exercise is the Key What Really Works in Patients with Type 2 Diabetes?", June 2014, San Francisco, USA.
2012	A. Schols	Pathophysiology of cachexia. Common features in lung cancer and COPD? 7th World Research Congress of the European Association for Palliative Care Trondheim 7-6-2012.
2013	A. Schols	Keynote lecture: Obesity and Chronic lung disease. International Primary Care Respiratory Group (IPCRG) 7th World Conference. Athens 22-5-2014
2013.	A. Schols	Keynote lecture: Multimodal intervention in cancer. Lessons from COPD research. 4th International Conference on Cancer Nutrition Therapy, Zagreb 14/16-5-2013
2014	A. Schols	Wretlind (Award) lecture: Metabolism and Nutrition: Shifting Paradigms in COPD management ESPEN Conference Geneva
2014	A. Schols	Clinical Year in Review: Nutritional issues in respiratory diseases. ERS Conference Munchen
2014	H. Savelberg	International Autumn School on Movement Science, Humbolt Universität zu Berlin
2015	H. Savelberg	Tagung der Deutschen Vereinigung für Sportwissenschaften. An evolutionary perspective on exercise, physical activity, sitting less and health, Berlin
2015	H. Savelberg	ActivPAL-meeting "Context is key: Unlocking physical behaviour data", Classifying cycling in daily livings, Glasgow

Editorships and editorial boards

A. Schols	Associate Editor for Journal of Applied Physiology (2011 and onwards) Associate Editor for the Journal of Cachexia, Sarcopenia and Muscle (2011 and onwards) Editor of "Nutrition and physiological function" of Current Opinion of Clinical Nutrition and Metabolic Care (2010 and onwards)
L. van Loon	Associate Editor of the International Journal of Sport and Exercise Metabolism (2008 and onwards) Associate Editor of the Scandinavian Journal of Medicine and Science in Sports (2011 and onwards) Editorial Board of the European Journal of Sport Science (2010 and onwards)
A. Bast	Editorial Board Environmental Toxicology and Pharmacology (2007 and onwards) Editorial Board Bentham Open Access – The open Bioactive Compounds Journal (2008 and onwards)
G. Haenen	International Journal of Molecular Sciences Oxidative Medicine and Cellular Longevity
J. Kooman	Nephrology Dialysis Transplantation

Memberships of academies

A. Schols European Society for Clinical Nutrition and Metabolism (ESPEN) Faculty Membership

	(2010 and onwards)
	Fellow of European Respiratory Society (FERS) (2014 and onwards)
	Board member of the Netherlands Health Council (2006 and onwards)
	Member of ECRIN: European Clinical Research Infrastructure Network
	Member of the Executive Board of Top Institute Food and Nutrition (2014 and onwards)
L. van Loon	Scientific Board of the European College of Sport Science
	Fellow of the European College of Sport Science
	Scientific Board of the Benelux Association of Stable Isotope Scientists
	Member of ACSM, ASN, ADA, EASD
R. vd Hulst	Member of Dutch Society of Plastic, Reconstructive and Hand surgery (1998 an and onwards)
	Member of International Society for Aesthetic Plastic Surgery (2006 and onwards)
	Member of European Association of Plastic Surgeons (2010 and onwards)
A. Bast	Member of the Royal Dutch Society of Chemistry (1974 and onwards)
	Member and past president of the Dutch Society for Toxicology (1981 and onwards)
	Member and co-founder of the Dutch Society for Pharmaceutical Sciences (1989 and onwards)
G. Haenen	Society for Free Radical Research
	Dutch Toxicology Society (NVT)
	Dutch Society for Clinical Pharmacology and Biopharmacy
J. Kooman	European Dialysis Transplant Association (Guideline Committees)
	International Society Peritoneal Dialysis (Guideline committee)
	International Society of Nephrology

4. Relevance to Society

Non-communicable diseases, including COPD and diabetes, represent the major global health problem of the 21st century. They affect all age groups and their burden is greater than that of infectious diseases. NCDs are the world leading cause of disease burden and mortality and are increasing in prevalence and burden worldwide. NCDs are an underappreciated cause of poverty and hinder economic development. Co-morbidity and multimorbidity are common signatures of NCDs and are associated with worse health outcomes, complex pharmacological interventions and clinical management, and increased healthcare costs. Socio-economic determinants are intertwined with the onset, progression, severity and control of NCDs and ageing increases disease complexity by adding tissue and cell senescence. Ongoing research activities within RL3 focus on understanding specific processes in the complexity of COPD and diabetes in particular and contribute to the development of more effective nutritonal and physical activity based interventions to prevent and treat chronic diseases and promote more healthy ageing.

In line with the changing demographics there has been an increasing awareness within the general public regarding ageing and the development of chronic diseases. This researchline actively reaches out to translate basic and clinical research outcome to generic advice that can help to prevent chronic disease and support more healthy ageing. Our researchers have taken up many positions to bring across the message that nutrition and physical activity are of key importance to maintain or achieve proper health. In that respect there are numerous ongoing efforts to educate the general population, health professionals as well as specific patient groups. Strategies to realize these aims include giving numerous national and international lectures in both scientific as well as non scientific gremia, participating in committees and organisations involved in disease prevention and healthy ageing, writing articles and giving interviews for radio, television, national and local newspapers and popular magazines.

Besides research and research innovation, the staff has a substantial teaching responsibility within the Faculty of Health, Medicine and Life Sciences. Students, PhD students and post-doctoral fellows are provided with theoretical and practical support to prepare them for their future careers. Besides continuing research, these students often take on jobs in the food and pharmeutical industry (including many of the

industrial partners we collaborate with) and in various national or local health authorities. As a consequence, our teaching responsibilities transcend the direct impact and societal relevance of our research work.

4.1 Demonstrable products - Research products for societal target groups

Table 4.1 - Main categories of output for societal target groups

Societal relevance: demonstrable products 2009-2014
Development of novel research methods and research infrastructure (MRUM) to support the research performed within and outside NUTRIM. Reports and guidelines regarding the application of exercise and nutrition to support more healthy ageing. Numerous presentations in non-scientific settings (health professionals, high school students, elderly population, studium generale, patient organisations) to inform and educate.

4.2 Demonstrable use of products - Use of research products by societal groups

Societal relevance output: demonstrable use of research products 2009 - 2014
Providing PhD-level training courses in nutrition and metabolism. Supervision of Msc and PhD students and post-doctoral fellow, who have obtained influential positions in academia, food industry and various research and governmental institutes. Consultancy to major global food industries to support the ongoing collaboration and assist in product innovation. Organisation of conferences for health professionals to inform and educate. Setting up networks of scientists to build consortia for EU research activities.

4.3 Demonstrable marks of recognition - Marks of recognition by societal groups

Societal relevance output: demonstrable marks of recognition 2009 - 2014
Based on contributions from RL3, NUTRIM was awarded a prestigious grant in 2011 by the National Research Council NWO for the graduate programme “metabolism and chronic diseases”. RL3 initiated in 2011 the interfaculty research programme “Eatwell” (www.um-eatwell.nl) to join unique strengths of Maastricht University within the nutrition and health domain and accelerate novel insights from biomedical research into effective health promotion strategies. This programme was awarded in 2012 with a grant by Maastricht UMC+. Researchers in RL3 are member of or consultant to the Dutch Health Council and serve in several adhoc committees to advice the Dutch Government on health issues. Numerous young investigator awards for poster and oral presentations, abstracts and theses were awarded to students and post-doctoral fellows within the research line. Senior researchers were awarded with various awards for recognition of their work in the field of nutrition, exercise and health.

The Joop Roels Impact Award 2013 was awarded for the TIFN project 'Dietary strategies to support healthy ageing', a prestigious industry prize to recognise the best scientists and scientific achievements and to highlight the societal and industrial impact of the performed research.

The research performed within the research line was given much attention in international, national, regional and popular magazines (e.g. New York Times, Volkskrant, NRC, Telegraaf, Limburger, Voeding, Fiets, Quest, and many more...)

Numerous appearances in popular media such as television and radio, regional, national and international (Pavlov, Labyrinth, Omroep Max, L1 etc).

5. Viability

5.1 Benchmark

Researchers within RL3 compete in the national and international research arena and are considered leaders in their field of research. The strenght of NUTRIM, with research line 3 in particular, is the integrated approach combining basic and applied science with clinical research. The opportunities provided by the integration of academic hospital and university are well recognized within the scientific community and are particularly relevant when studying the impact of ageing and chronic disease on health and functional capacity. Facilities are optimized for in vivo human metabolic research, with the recent opening of the Metabolic Research Unit Maastricht (MRUM) providing state of the art facilities within NUTRIM. The work performed in our research line is increasingly funded by the succesful participation in public-private partnerships within various Top Institutes. Researchers are publishing in the top journals in their fields with citation scores well above average. As described in section 3, the research output is both from a qualitative and quantitative perspective high, with an average research impact score exceeding 2.5.
National and international collaborations are ongoing with research groups sharing common interests and research perspectives. National institutes include Wageningen University (Human Nutrition), CIRO Horn (Centre of Expertise for Chronic Organ Failure), Maxima Medical Center (Eindhoven), Catharina Hospital (Eindhoven), Technical University (Eindhoven), TNO, and of course the Viecuri Hospital (Venlo).
International collaborations (some with exchange students and post-docs) exist with the University Medical School Nottingham (UK), Birmingham University (UK), McMaster University (Hamilton, Canada), University of Vermont (USA), National Institute of Aging (USA), Renal Research Institute (New York, USA), Karolinska Institute (Stockholm, Sweden), Deakin University Melbourne (Australia) and ISERM (Clermond-Ferrand, France). These institutes share common expertise and infrastructure and publish in the same areas as the research performed in research line 3. Our research performs at a similar level and in many ways the opportunities provided by the close interaction between basic researchers and clinical researchers allows us to surpass many of these benchmark groups. However, we need to focus on applying these opportunities to a greater extend and need to find more common ground within our research line to collaborate in joint projects in which the various research topics can be combined.

5.2 SWOT-analysis

Internal organisation	**Strengths**	**Weaknesses**
	- well organized departments - strong interaction between basic and clinical researchers; alignment of research and health care - high level of expertise at both basic science and clinical level - multidisciplinary and translational approach - strong interaction between young and established researchers - unique and established expertise in the	- success in obtaining major personal grants at the junior and mid-career level, but less at senior level - limited participation in EU networks - limited tenured staff positions - difficulty recruiting and maintaining top researchers
External context	**Opportunities**	**Threats**
	- Collaboration with private and public partners in the field of life sciences - Recognition of Nutrition and Metabolism as major theme in MUMC+ portfolio 2020 - Increased societal attention for healthy ageing and chronic diseases - Application of RL3 technology and expertise in major population studies - System biology tools to unravel multi-component pathology in chronic diseases	- Lack of resources in charity funds - Limited tenured staff with competing responsibilities (health care, education, research) - Limited possibility to create continuity for young research talents - Lack of opportunities to incorporate research in national top-sector policies and EU programmes - Limited resources to sustain state of the art facilities.

6. Reflection and future strategy

6.1 Reference to previous assessments

In the previous assessment (VLAG-Nutrim external review 2009) the research line was judged for scientific quality excellent (5), productivity very good (4), relevance excellent (5), and for vitality and feasibility excellent (5). The reviewers identified subtyping of patients as one of the strengths of RL3. In the previous period RL3 further focused on COPD patients as pars pro toto for multi-component involvement of chronic inflammatory disease conditions. By setting up collaborations with international groups, a systems medicine programme was developed. The research field of respiratory biology focuses on host defense processes on environmental, occupational and infectious triggers. Further integration of research activities between respiratory medicine and medical microbiology was realized and RL3 participates in international networks as CAPNETZ. RL3 significantly increased its earning power, particularly for contract research. In the previous period, RL3 was very successful to receive grants from public/private collaborations such as TIFN and TI Pharma but also several very competitive NWO projects were funded. Initiatives are taken to participate in future EU networks. In the previous period, the number of PhD students within RL3 has increased significantly. RL3 has set up a regional academic network for clinical research (CIRO+) and collaborates with Burlington University Vermont to create a joint PhD programme. Besides nutriceutical intervention and exercise, future clinical intervention studies will be oriented on more biological interventions within the context of personalised medicine.
In the midterm review, it was noted that there was little descriptive evidence of collaborations between Wageningen University and NUTRIM within the VLAG Graduate School. As noticed by the reviewers there

are major opportunities going forward in linking the Food Science and basic Nutrition expertise at Wageningen University with the more clinical translational aspects in NUTRIM, to the benefits of both partners. The proposed strategy has been successfully followed up upon by forming a strong collaboration between principal investigators in this research line (A. Schols and L. van Loon) with Prof. de Groot at Wageningen University within several ongoing multicenter TIFN projects on the topic of dietary and physical activity interventions to support healthy ageing. These projects have been extremely successful in respect to building a strong consortium as well as providing extensive scientific output and developing novel experimental methodology. These projects have also led to the use of large sample databases for application of genomics and metabolomics analyses. As proposed by the reviewers we indeed developed joined PhD studentships and joint postdoctoral fellowships.

6.2 Viability and future strategy

The changing demographics due to the global ageing will lead to a massive rise in the number of (older) patients with various chronic, non-communicable, diseases. To more effectively prevent and treat these diseases we need to increase our understanding of the etiology of normal and pathological ageing. Given the focus of the two research programmes, with researchers embedded in both academia as well as clinical care, research line 3 is particularly suited to address this goal. Future research should focus on understanding how non-communicable diseases such as cardiovascular diseases, cancer, chronic kidney disease, chronic respiratory diseases and type 2 diabetes cluster at the genetic, molecular and mechanistic levels. Moreover, an adequate assessment of physical (in)activity and muscle function is a prerequisite for the success of the program. This enables the detailed study of the combination of pathophysiology, lifestyle, and phenotyping. In a discovery driven approach new phenotypes must be identified based on statistical modeling of all the complex components of non-communicable diseases in terms of onset, persistence and prognosis. Also risk factors for chronic diseases and its systemic complications, such as obesity, should be included. Accelerated ageing as an underlying pathophysiological factor contributing to systemic complications of chronic diseases also necessitates further interaction with experts in the (general) ageing process. This will likely contribute to novel preventive and treatment strategies. These developments also require a transformation towards a systems medicine approach to understand the mechanisms, prognosis, diagnosis and treatment of disease. Systems medicine involves the transition to a predictive, preventive, personalized and participatory medicine. These systems medicine developments require a further collaboration within the FHML in order to create facilities to participate to systems medicine programmes within Europe and the rest of the world. This future treatment strategy necessitates the crossing of borders with other research schools, as mentioned previously regarding the interaction with GROW on the topic of cancer cachexia. The interaction with diabetes and obesity should be studied in combination with RL1 of NUTRIM and CARIM. Moreover, collaboration at a national and international level is necessary to fulfill these goals, to share expertise and cohorts in future studies. Collaboration with established research partners, as well as the necessary infrastructure and expertise is already in place to fulfill this goal. Ongoing developments within the research organization of FHML in general and NUTRIM in particular largely reflect the physiological, metabolic and biochemical approach aiming to understand specific, separate entities contributing to a certain disease condition, but also to understand shared pathways between chronic diseases. This is highly congruent with the profile “Metabolism and nutrition” of the Portfolio Maastricht UMC+ 2020. Due to its central role in this profile, RL3 is ideally equipped as a central actor in future research towards healthy and pathological ageing. Special attention will be given to valorization of both clinical and experimental research in this RL.

Appendix 1 - Research staff at research unit level

Funding:

1= Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)

2 = Research grants obtained in national and international scientific competition (e.g. grants from NWO, KNAW and

3 = Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations

4= Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within

FTE: funding per 31-dec

		2009	2010	2011	2012	2013	2014
Staff		FTE	FTE	FTE	FTE	FTE	FTE
Full professors	**Funding**	**1,75**	**2,25**	**2,25**	**2,45**	**2,55**	**2,55**
Bast A	1	0,50	0,50	0,50	0,50	0,50	0,50
Drent M	1	0,20	0,20	0,20	0,00	0,00	0,00
Hulst van der R	1	0,20	0,20	0,20	0,20	0,20	0,20
Kooman JP	1	0,00	0,00	0,00	0,20	0,20	0,20
Loon, LJC van	1	0,00	0,50	0,50	0,50	0,50	0,50
Savelkoul P.	1	0,00	0,00	0,00	0,20	0,20	0,20
Schols A	1	0,50	0,50	0,50	0,50	0,50	0,50
Wouters EFM	1	0,25	0,25	0,25	0,25	0,25	0,25
Zimmermann L.	1	0,10	0,10	0,10	0,10	0,20	0,20
Associate professors		**1,35**	**1,55**	**1,40**	**1,60**	**1,60**	**2,30**
Bergh van den J.	1	0,00	0,00	0,00	0,40	0,40	0,40
Christiaans M.	1	0,00	0,20	0,20	0,20	0,20	0,20
Gosker, HR	1	0,00	0,00	0,00	0,00	0,00	0,50
Haenen GRMM	1	0,50	0,50	0,50	0,50	0,50	0,50
Loon, LJC van	1	0,50	0,00	0,00	0,00	0,00	0,00
Oenema A.	1	0,00	0,00	0,00	0,00	0,00	0,20
Savelberg H	1	0,00	0,50	0,50	0,50	0,50	0,50
Stobberingh E	1	0,10	0,10	0,10	0,00	0,00	0,00
Tiel van F	1	0,10	0,10	0,10	0,00	0,00	0,00
Vijgh W	3	0,15	0,15	0,00	0,00	0,00	0,00
Assistant professors		**5,30**	**5,15**	**4,95**	**5,80**	**4,60**	**4,10**
Drost M	1	0,40	0,40	0,00	0,00	0,00	0,00
Geel van T.	3	0,00	0,00	0,00	0,40	0,40	0,20
Gosker, HR	1	0,50	0,50	0,50	0,50	0,50	0,00
Gosker, HR	3	0,50	0,50	0,50	0,50	0,00	0,00
Hageman G	1	0,45	0,50	0,50	0,50	0,50	0,50
Hartog den G.J.	1	0,45	0,45	0,45	0,45	0,45	0,45
Hendriks JJE	1	0,10	0,10	0,10	0,10	0,00	0,00
Jobsis Q	1	0,30	0,30	0,30	0,30	0,00	0,00
Koopman R	1	0,50	0,00	0,00	0,00	0,00	0,00
Langen, R	1	0,50	0,50	0,50	0,50	0,50	0,50
Langen, R	3	0,50	0,50	0,50	0,50	0,00	0,00
Linssen C.F.M.	1	0,10	0,10	0,10	0,00	0,00	0,00
Meijer K	1	0,50	0,50	0,50	0,50	0,50	0,50
Rohde G.	1	0,00	0,30	0,00	0,00	0,00	0,00
Savelberg H	1	0,50	0,00	0,00	0,00	0,00	0,00
Stassen F.	1	0,00	0,00	0,50	0,50	0,50	0,50
Straetemans S.	1	0,00	0,00	0,00	0,00	0,20	0,20
Verdijk LB	1	0,00	0,50	0,50	0,50	0,50	0,50
Well van G.	1	0,00	0,00	0,00	0,00	0,20	0,20
Weseler A.	1	0,00	0,00	0,00	0,10	0,10	0,10
Weseler A.	3	0,00	0,00	0,00	0,35	0,15	0,35
Wolffs P.	1	0,00	0,00	0,00	0,10	0,10	0,10

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1= Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)

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3 = Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations

4= Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within

FTE: funding per 31-dec

		2009	2010	2011	2012	2013	2014
Staff		FTE	FTE	FTE	FTE	FTE	FTE
Post-docs		**7,75**	**13,05**	**12,70**	**7,95**	**7,75**	**8,55**
Balk J.	1	0,00	1,00	1,00	0,00	0,00	0,00
Bergh van den J.	1	0,20	0,20	0,20	0,00	0,00	0,00
Boots AW	3	1,00	0,10	1,00	0,00	0,00	0,00
Burd N.	3	0,00	0,00	1,00	1,00	1,00	0,00
Cermak N.	4	0,00	0,00	1,00	1,00	0,00	0,00
Churchward-Venne T.	3	0,00	0,00	0,00	0,00	1,00	1,00
Dentener M.A.	3	0,75	0,75	0,75	0,75	0,75	0,75
Deurenberg R.	1	1,00	1,00	0,00	0,00	0,00	0,00
Geijskes C.	3	0,00	0,00	0,00	0,00	0,00	1,00
Haegens A	3	1,00	1,00	1,00	0,00	0,00	0,00
Hamer - Lahaye HM	3	0,00	1,00	1,00	1,00	0,00	0,00
Hendriks M.	2	0,00	1,00	1,00	1,00	0,00	1,00
Horstman A.	3	0,00	0,00	0,00	0,00	1,00	1,00
Mateo Anson N	1	0,00	1,00	0,00	0,00	0,00	0,00
Melai T.	3	0,00	0,00	0,00	0,00	0,00	0,80
Murgia A.	3	1,00	1,00	0,00	0,00	0,00	0,00
Murgia A.	3	0,00	0,00	1,00	0,00	0,00	0,00
Pennings E.	3	0,00	0,00	0,00	0,20	0,00	0,00
Remels	1	0,00	1,00	0,00	0,00	0,00	0,00
Remels	2	0,00	0,00	0,00	1,00	1,00	0,00
Remels	3	0,00	0,00	1,00	0,00	0,00	1,00
Reynaert N	1	0,85	0,85	0,85	0,45	0,45	0,45
Reynaert N	2	0,15	0,15	0,15	0,00	0,00	0,00
Reynaert N	4	0,00	0,00	0,00	0,55	0,55	0,55
Senden R.	3	0,30	0,00	0,00	0,00	0,00	0,00
Verdijk LB	1	0,50	0,00	0,00	0,00	0,00	0,00
Wall B.	4	0,00	1,00	1,00	1,00	1,00	0,00
Weseler A.	3	1,00	1,00	0,75	0,00	0,00	0,00
Wyers C.	3	0,00	0,00	0,00	0,00	1,00	1,00
Xanthouleas S.	3	0,00	1,00	0,00	0,00	0,00	0,00

Funding:
1= Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)
2 = Research grants obtained in national and international scientific competition (e.g. grants from NWO, KNAW and
3 = Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations
4= Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within
FTE: funding per 31-dec

		2009	2010	2011	2012	2013	2014
Staff		FTE	FTE	FTE	FTE	FTE	FTE
PhD Students		**21,60**	**25,60**	**28,90**	**27,90**	**32,16**	**31,50**
Annegarn J.	1	1,00	1,00	0,00	0,00	0,00	0,00
Balk J.	3	1,00	0,00	0,00	0,00	0,00	0,00
Beijers R.	3	0,00	0,00	0,00	0,00	1,00	1,00
Bellinghausen C.	1	0,00	0,00	0,00	0,50	0,50	0,50
Bellinghausen C.	3	0,00	0,00	0,00	0,50	0,50	0,50
Benedikter B.	2	0,00	0,00	0,00	0,00	1,00	1,00
Berendsen B.	2	0,00	1,00	1,00	1,00	1,00	1,00
Boer de A.	3	0,00	0,00	0,00	0,00	1,00	1,00
Boesten D.	3	1,00	1,00	1,00	1,00	0,00	0,00
Bool van de C.	3	0,00	1,00	1,00	1,00	1,00	0,00
Bool van de C.	3	0,00	0,00	0,00	0,00	0,00	1,00
Borst v.d. B.	3	1,00	1,00	1,00	0,00	0,00	0,00
Ceelen J.	3	0,00	0,00	0,00	1,00	1,00	1,00
Dijk van J.W.	2	1,00	1,00	1,00	0,00	0,00	0,00
Dijk van J.W.	3	0,00	0,00	0,00	1,00	1,00	0,00
Dirks M.	1	0,00	0,00	0,50	0,50	0,50	0,50
Dirks M.	4	0,00	0,00	0,50	0,50	0,50	0,50
Dort van M.	3	0,00	0,00	0,00	0,00	1,00	1,00
Duvivier B.	3	0,00	0,00	0,00	0,00	0,00	1,00
Essers H.	2	0,00	0,00	0,00	0,00	0,00	1,00
Eurlings I.	3	0,00	1,00	1,00	1,00	1,00	0,00
Gopal P.	3	0,00	1,00	1,00	1,00	1,00	1,00
Gorissen S.	3	0,00	0,00	1,00	1,00	1,00	1,00
Gransier R.	3	0,00	1,00	1,00	1,00	0,00	0,00
Groen B.	3	0,00	1,00	1,00	0,00	0,00	0,00
Groen B.	4	0,00	0,00	0,00	1,00	1,00	0,00
Gulraiz F.	3	0,00	0,00	0,00	1,00	1,00	0,00
Hazewindus M.	3	1,00	1,00	1,00	0,00	0,00	0,00
Heuvel van den MGW	3	1,00	0,00	0,00	0,00	0,00	0,00
Heyer F.	3	0,00	0,00	0,00	0,00	1,00	1,00
Holwerda A.	3	0,00	0,00	0,00	0,00	1,00	1,00
Ijzerman H	2	1,00	1,00	0,00	0,00	0,00	0,00
Jacobs H.	3	1,00	1,00	1,00	0,00	0,00	0,00
Kneppers A.	4	0,00	0,00	0,00	0,00	0,00	1,00
Konings G.	3	0,00	1,00	1,00	1,00	1,00	0,00
Kouw I.	3	0,00	0,00	0,00	0,00	1,00	1,00
Kramer I.F.	3	0,00	0,00	1,00	1,00	1,00	1,00
Kuipers I.	1	1,00	1,00	0,00	0,00	0,00	0,00
Kuipers I.	4	0,00	0,00	1,00	0,00	0,00	0,00
Leenders M.	3	1,00	1,00	1,00	0,00	0,00	0,00
Leermakers P.	1	0,00	0,00	0,00	0,00	0,00	0,75
Leermakers P.	4	0,00	0,00	0,00	0,00	0,00	0,25
Lemmens K.	1	0,00	0,00	0,40	0,40	0,40	1,00
Lemmens K.	3	0,00	0,00	0,50	0,50	0,50	0,00
Liu W.Y.	3	0,00	0,00	0,00	0,00	0,26	0,00
Mateo Anson N	3	1,00	0,00	0,00	0,00	0,00	0,00
Moorsel van D.	3	0,00	0,00	0,00	0,00	0,00	1,00
Mount S.	3	0,00	0,00	0,00	0,00	0,00	1,00
Nyakayiru J.	2	0,00	0,00	0,00	0,00	1,00	1,00
Oomen P.	1	0,00	0,00	0,00	0,00	1,00	0,50
Oomen P.	3	0,00	0,00	1,00	1,00	0,00	0,00
Oomen P.	3	0,50	0,00	0,00	0,00	0,00	0,00
Op den Kamp C.	3	1,00	1,00	0,00	0,00	0,00	0,00
Pansters N.	3	1,00	1,00	1,00	1,00	0,00	0,00
Peeters P.	3	1,00	1,00	1,00	1,00	1,00	0,00
Pennings B.	3	1,00	1,00	0,00	0,00	0,00	0,00
Perkins T.	3	0,00	0,00	0,00	1,00	2,00	1,00
Peters M.	3	0,00	0,00	0,00	0,00	0,50	0,50
Remels	3	0,10	0,00	0,00	0,00	0,00	0,00
Res P.	3	0,00	0,00	1,00	0,00	0,00	0,00
Res P.	4	0,00	0,60	0,00	0,00	0,00	0,00
Ruijters E.	3	1,00	1,00	1,00	1,00	0,00	0,00
Sanders K.	3	0,00	0,00	0,00	0,00	0,00	1,00
Scharmga A.	3	0,00	0,00	0,00	0,00	0,50	0,50
Slot I.	3	1,00	1,00	1,00	1,00	0,00	0,00
Snijders T.	1	1,00	0,00	0,00	0,00	0,00	0,00
Snijders T.	3	0,00	1,00	1,00	1,00	1,00	0,00
Stoilkova A.	3	1,00	1,00	1,00	1,00	0,00	0,00
Trommelen	3	0,00	0,00	0,00	1,00	1,00	1,00
Ubags N.	3	0,00	0,00	1,00	1,00	1,00	1,00
Verhees K.	3	1,00	1,00	1,00	0,00	0,00	0,00
Volgers C.	3	0,00	0,00	0,00	1,00	1,00	1,00
Vrolijk M.	3	0,00	0,00	0,00	0,00	1,00	1,00
Waard de E.	3	0,00	0,00	0,00	0,00	0,00	1,00
Wier van de B.	3	0,00	0,00	1,00	1,00	0,00	0,00

Funding:

1= Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)

2 = Research grants obtained in national and international scientific competition (e.g. grants from NWO, KNAW and

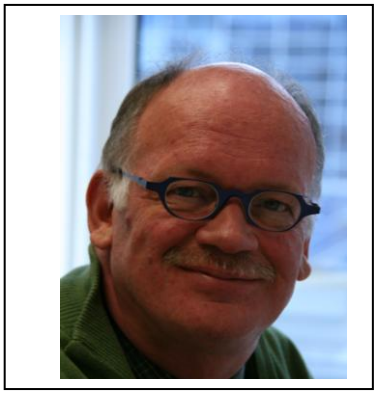
3 = Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations

4= Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within

FTE: funding per 31-dec

		2009	2010	2011	2012	2013	2014
Staff		FTE	FTE	FTE	FTE	FTE	FTE
Total scientific staff		**37,75**	**47,60**	**50,20**	**45,70**	**48,66**	**49,00**
Support staff		**16,25**	**17,45**	**16,48**	**13,96**	**11,46**	**18,98**
Ariss Z.	3	1,00	1,00	1,00	0,00	0,00	0,00
Ballak S.	3	0,00	0,60	0,00	0,00	0,00	0,00
Bartholome R	1	0,74	0,74	0,74	0,74	0,74	0,74
Bartholome R	3	0,26	0,26	0,26	0,26	0,26	0,26
Beugels J.	2	0,00	0,00	0,00	0,00	0,00	1,00
Bijnens W.	3	0,00	0,00	0,00	0,00	0,00	0,60
Broen S.	3	0,00	0,00	0,00	0,00	0,00	1,00
Driessen CC	1	0,25	0,25	0,25	0,25	0,25	0,25
Duvivier B.	3	0,00	0,00	0,00	0,00	1,00	0,00
Essen van A.	3	1,00	1,00	0,00	0,00	0,00	0,00
Franssen R.	3	0,00	0,00	0,00	0,00	0,00	1,00
Geijselaers C.	3	1,00	1,00	1,00	1,00	0,00	0,00
Goessens J.	3	0,00	0,00	0,00	0,00	1,00	1,00
Grauls G.	1	0,00	0,00	0,00	0,00	0,50	0,50
Hellwig V.	3	1,00	1,00	1,00	0,00	0,00	0,00
Heyen C.	3	0,00	0,60	0,70	0,70	0,70	0,70
Hoeven v.d. L.	3	1,00	1,00	1,00	0,00	0,00	0,00
Hoor - Groot E	1	0,30	0,30	0,30	0,30	0,43	0,15
Jacquot C.	3	0,00	0,80	0,00	0,00	0,00	0,00
Kan van L.	3	0,00	0,00	0,00	0,00	0,00	0,80
Kelders MCJM	1	0,88	0,88	0,88	0,88	0,88	0,88
Kelders MCJM	3	0,12	0,12	0,12	0,00	0,00	0,00
Konings G.	3	1,00	0,00	0,00	0,00	0,00	0,00
Kornips E	2	0,30	0,30	0,30	0,30	0,30	0,30
Kornips E*	1	0,30	0,30	0,30	0,30	0,30	0,30
Kouw I.	3	0,00	0,00	0,00	1,00	0,00	0,00
Kranenburg van J.	3	1,00	1,00	0,00	0,00	0,00	0,00
Kranenburg van J.	3	0,00	0,00	1,00	1,00	0,00	1,00
Krastev T.	3	0,00	0,00	0,00	0,00	0,00	1,00
Krijgsman R.	3	0,00	0,00	1,00	1,00	1,00	1,00
Lange de A.	3	0,00	0,70	0,00	0,00	0,00	0,00
Nilwik R.	3	0,00	0,00	0,00	1,00	0,00	0,60
Nilwik R.	3	0,00	0,00	1,00	0,00	0,00	0,00
Pöttgens C.	3	0,00	0,00	0,00	0,00	0,00	0,80
Reijnders-Dritty MJHJ	1	0,50	0,50	0,50	0,50	0,50	0,50
Schuijlenburch A.	3	1,00	0,00	0,00	0,00	0,00	0,00
Senden J	3	1,00	1,00	1,00	1,00	1,00	1,00
Smeets J.	3	0,00	0,00	0,53	0,53	0,00	0,00
Snepvangers F.	3	1,00	1,00	1,00	0,00	0,00	0,00
Theije de G	1	0,00	0,00	0,00	1,00	1,00	1,00
Tummers K.	3	0,00	0,50	0,00	0,00	0,00	0,00
Verhees K.	2	0,00	0,00	0,00	0,00	0,00	1,00
Vliet van S.	3	0,00	0,00	0,00	0,60	0,00	0,00
Willems J	3	1,00	0,00	0,00	0,00	0,00	0,00
Willems P.	1	0,80	0,80	0,80	0,80	0,80	0,80
Zanden van der B.	3	0,00	1,00	1,00	0,00	0,00	0,00
Zorenc	1	0,80	0,80	0,80	0,80	0,80	0,80
Total staff		**54,00**	**65,05**	**66,68**	**59,66**	**60,12**	**67,98**

Appendix 2 – Mini Curricula



Name: **A. Bast**
E-mail: a.bast@maastrichtuniversity.nl
URL: http://www.maastrichtuniversity.nl

GENERAL INFORMATION
Date of birth: 14-8-1953
Current position: Professor of Human Toxicology
Fields of Expertise: toxicology, pharmacology, nutrition, redox processes

QUALIFICATIONS:

1978	Doctoral Medicinal Chemistry, Vrije Universiteit, Amsterdam
1978–1981	PhD Medical Faculty, Dept. of Pharmacology, Erasmus University Rotterdam (1978 and 1979) and Faculty of Pharmacy, Dept. of Pharmacology, University Utrecht (1980 and 1981).
1977	Licence for teaching high school chemistry
1983	Registration as Pharmacologist
1988	Registration as European Toxicologist

SCIENTIFIC CAREER:

1981-1985:	Assistant Professor, Dept. of Pharmacology, Faculty of Pharmacy, University of Utrecht.
1985-1988:	Associate Professor, Dept. of Pharmacochemistry, Division of Molecular Pharmacology, Faculty of Chemistry, VU Amsterdam.
1988-1998:	Professor 'Molecular Pharmacology of Radicals', Dept. of Pharmacochemistry, VU Amsterdam. Head of Division Molecular Pharmacology of the Leiden/Amsterdam Centre for Drug Research.
1998-till now:	professor 'Human Toxicology', Faculty of Health Medicine Life Sciences, Maastricht University.

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 469
- Contributions to books: 58
- Number of citations according to WoS: 12.570 ; H-index: 56

Patents:
1. Rise F, Wikström H, Ugland S, Dijkstra D, Gundersen LL, De Boer P, Bast A, Haenen GRMM, Antonsen OG, Liao Y, Nasir Al. The use of heterocyclic compounds as antioxidants, radical scavengers, Fe complexing agents, tissue- and/or neuroprotectants. 1996: WO1996/021662
2. Biewenga G, Haenen GRMM, Bast A. Thioctic acid metabolites and methods of use thereof. 1999: US Patent 5,925,668 and Eur. Patent EP0855396.
3. Van der Vijgh WJF, Bast A, Van Acker FAA, Menge WMPB, Haenen GRMM. Novel flavonoids. March 2001: WO 2001/021608
4. Van der Vijgh WJF, Bast A, Brugnara C, de Franceschi L. Use of 7-monohydroxyethylrutoside for the treatment of haematological disorders, particularly beta-thalassemia. July 2003. WO 2003/053449
5. Hageman GJ, Moonen HJJ, Geraets L, Bast A, Wouters EFM. Fused bicyclic natural compounds and their use as inhibitors of parp and parp-mediated inflammatory processes.March 2006. WO 2006/024545
6. Bast A, Haenen GRMM, Rietjens SJ, Kies AK. Use of Anti-Oxidant Compounds for Muscle Recovery. May 2006: WO 2006/053872

7. Van der Vijgh WJF, Bast A, Bruynzeel AME, Van Groeningen CJ. Enhancement of anticancer therapy by flavonoids. Sept. 2008: WO 2008/108647
8. Dagnelie PC, Swennen ELR, Bast A, Skrabanja ATP, Beijer S, Bours MJI. Use of ATP for the manufacture of a medicament for the prevention and treatment of oxidative stress and related conditions. August 2009. Patent number 20090215713
9. Rietjens JS, Bast A, Haenen GRMM, van der Heyden LCG. Olive juice extracts for promoting muscle health. March 2011. Patent number 20110052750
10. Kies AK, Rietjens SJ, Haenen GRMM, Bast A. Use of antioxidant compounds for muscle recovery. July 2011. Patent number 20110172301
11. Balk JM, Bast A, Haenen GRMM. Method for the preparation of a dry composition comprising a stable ABTS. 2013. Patent number 12157763.9

Supervision of PhD theses:
Number of PhD students supervised till thesis defence: 46.

Scientific teaching:
- Very extensive pre- and post-doctoral teaching experience (practical courses, lectures, tutor groups) in the area of pharmacology, toxicology, biochemistry and pharmacochemistry for students in chemistry, pharmacy, medical biology, biological health sciences, molecular life sciences, and medicine.
- Involved in undergraduate as well as graduate education. On a national level involved in lecturing post-docs in toxicology as well as in cardiovascular sciences.
- 2013: Best teaching award Maastricht University.

Three key publications 2009 – 2014:
- Jacobs H, Koek GH, Peters R, Moalin M, Tack J, van der Vijgh WJ, Bast A, Haenen GRMM. Differences in pharmacological activities of the antioxidant flavonoid monoHER in humans and mice are caused by variations in its metabolic profile. Clin. Pharmacol. Ther. 90 (6), 852-859 (2011).
- Weseler AR, Bast A. Pleiotropic-acting nutrients require integrative investigational approaches: The example of flavonoids. J Agric Food Chem. 60 (36), 8941-8946 (2012)
- Bast A, Haenen GRMM. Ten misconceptions about antioxidants. Trends in Pharmacol. Sci. 34 (8), 430-436 (2013)

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- Editorial Board Environmental Toxicology and Pharmacology (2007-now
- Editorial Board Bentham Open Access – The open Bioactive Compounds Journal (2008-now)

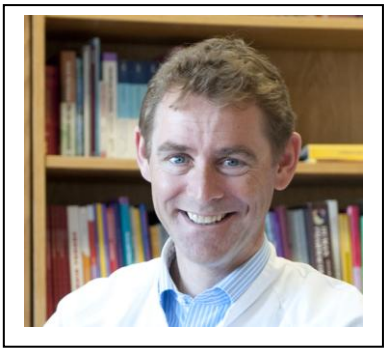
Membership of national and international scientific organizations:
- Member of the Royal Dutch Society of Chemistry (1974-now)
- Member and past president of the Dutch Society for Toxicology (1981-now)
- Member and co-founder of the Dutch Society for Pharmaceutical Sciences (1989-now)

RELEVANT JOB-RELATED SOCIAL POSITIONS:
- Member of the National Health Council (de Gezondheidsraad) (2004-now)

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:
During the last five years:
- National Food Safety Authority. Interaction food supplements and drugs
- Ministery of Economic Affairs. Design of blockers for intestinal sugar uptake
- Ministery of Economic Affairs. Design of a personalized vitamin juicer
- EU 7TH framework programme FLAVIOLA. Flavanols and their positive impact on cardiovascular health (http://www.flaviola.org).
- Nationaal Fonds tegen kanker. Increased efficacy of cancer therapy by selective depletion of GSH

- Kootstra Fellowship, Niels Stensen Foundation, Sarcoidose Foundation. Role of reactive oxygen species in signal transmission
- INC company. Cardiovascular effect of grape seed extracts.
- Foundation Chronic diseases. Flavonoid protection against doxorubicin cardiotoxicity
- Van de Laar Foundation. Synthesis biological activity of methylated metabolites of flavonoids.
- Heinz. Antioxidants in tomato ketch up.
- Roche. Pharmacokinetics of Ribavarin
- Hero. Measurement of ROS scavenging in vitro and in vitro.

Name: J.P. van den Bergh
E-mail: joop.vandenbergh@maastrichtuniversity.nl
URL: http://www.maastrichtuniversity.nl



GENERAL INFORMATION
Date of birth: 01-07-1965
Current position: Professor of Bone Quality and metabolic bone disorders
Fields of Expertise: Endocrinology, metabolic bone disease, Bone quality and bone biomechanics

QUALIFICATIONS:

1983 – 1988:	Study of Medicine, Faculty of Medical Sciences, Radboud University, Nijmegen
1989 – 1991:	MD degree, cum laude, Faculty of Medical Sciences, Radboud University, Nijmegen
1991 – 1999:	Training and registration Internal Medicine (1-12-1999), Radboud University Medical Center, Nijmegen
1999 – 2000:	Fellow and registration Endocrinology (1-4-2000), Radboud University Medical Center, Nijmegen
1997 – 2001:	Thesis : Quantitative Ultrasound of bone: in-vitro and in-vivo studies, Faculty of Medical Sciences, Radboud University, Nijmegen
2000 – present:	Internist - Endocrinologist at the department of Internal Medicine, Viecuri Medical Center Noord-Limburg, Venlo
2012 – present:	Professor of Endocrinology. Faculty of Medicine and Life Sciences, University Hasselt, Belgium

SCIENTIFIC CAREER:

2009 – 2012:	Assistant Professor at the Department of Internal Medicine, Faculty of Health, Medicine, and Life Sciences, Maastricht University Medical Centre^{+}
2009 – 2014:	Associate Professor at the Department of Internal Medicine, Faculty of Health, Medicine, and Life Sciences, Maastricht University Medical Centre^{+}
2015 – present:	Professor of Bone Quality and Metabolic Bone Disorders at the Department of Internal Medicine, Faculty of Health, Medicine, and Life Sciences, Maastricht University Medical Centre^{+}

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 64
- Contributions to books: 5
- Number of citations according to WoS: 372 ; H-index: 12

Supervision of PhD theses:
Number of PhD students supervised till defense: 3

Scientific teaching:
- Endocrine topics in ROIG curriculum every 2 years
- Endocrinology for bachelor and master students, Faculty of Medicine and Life Sciences, University Hasselt, Belgium
- Courses metabolic bone disease and osteoporosis, University if applied Sciences Utrecht
- Teaching courses for fellows Endocrinology (Dutch Society of endocrinology)
- Internships: supervising > 30 students
- Lectures at multiple national and international Hospitals and Universities

Three key publications 2009 – 2014:

- Bours SP, van Geel TA, Geusens PP, Janssen MJ, Janzing HM, Hoffland GA, Willems PC, van den Bergh JP. Contributors to secondary osteoporosis and metabolic bone diseases in patients presenting with a clinical fracture. J Clin Endocrinol Metab. 2011;96(5):1360-7

- van den Bergh JP, van Geel TA, Geusens PP. Osteoporosis, falls and frailty in patients presenting with a fracture: Implications for case finding and therapy. Nat Rev Rheumatol. 2012 Jan 17;8(3):163-72

- Geusens P, Chapurlat R, Schett G, Ghazem-Zadeh A, Seeman E, de Jong J, van den Bergh JP. High-resolution in vivo imaging of bone and joints: a door to microarchitecture. Nat Rev Rheumatol 2014:10(5):304-13

RELEVANT SCIENTIFIC SERVICES

- Membership of national and international scientific organizations:
- American Society of Bone and Mineral Research
- Dutch Society of Endocrinology
- Dutch Society for Calcium and Bone metabolism

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Board member and treasurer of the Interdisciplinary Working group on Osteoporosis
- Board member of the Dutch Foundation of Osteoporosis
- Board member Zichtbare Zorg Ziekenhuis Indicatoren osteoporosis

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

<u>Research grants (NWO and non-profit organisations)</u>

- Mortality and subsequent fractures in patiens with a recent fracture
- Fracture healing of the distal radius
- Bone Quality in patients with high-risk for osteoporosis or fractures
- Metabolic bone disease in patients with COPD
- High resolution imaging of finger joints in patients with RA

<u>Research grants (industry)</u>

- Comparison of tolerability and efficacy of brand versus generic alendronate
- Vitamin D analysis in patients with a recent fracture
- Fracture assessment in the FLS
- Impact of implementation of new osteoporosis guidelines on diagnosis of vertebral fractures
- Assessment of muscle strength, gait and physical quality in patients presenting with a recent clinical fracture at the fracture liaison service
- HR-pQCT analysis in high risk patients
- Intervention of CaD: XtremeCT study in distal radius fracture healing
- MUSIC-Os study; an international study on quality of life in osteoporosis

Total acquisition: 4.070.000,- Euro

Name: **G.R.M.M. Haenen**
E-mail: g.haenen@maastrichtuniversity.nl
URL: http://www.maastrichtuniversity.nl

GENERAL INFORMATION
Date of birth: 17-6-1959
Current position: Associate Professor of Human Toxicology
Fields of Expertise: nutrition, bioactives, flavonoids, redox modulation

QUALIFICATIONS:

1977 – 1984: Master of Science, Faculty of Pharmacy, Utrecht University
1984 – 1985: Registration as Pharmacist, Faculty of Pharmacy, Utrecht University
1985 – 1989: PhD student, Department of Medicinal Chemistry, Faculty of Chemistry, Free University, Amsterdam. Thesis successfully defended on 21-12-1989. “Thiols in Oxidative Stress”

SCIENTIFIC CAREER:

1989 - 1993: Assistant Professor, Department of Medicinal Chemistry, Free University, Amsterdam
1993 – 1998: Head of the Department of Experimental Biology, TNO, Zeist
1998 – present: Associate Professor, Department of Pharmacology and Toxicology, Nutrim, Faculty of Health, Medicine and Life Sciences, Maastricht University

OUTPUT:
Publications:

- Number of publications in international refereed scientific journals according to WoS (1996-2015): 209; According to Google Scholar (1983-2015): 310
- Contributions to books: 10
- Number of citations and H-index according to WoS (1996-2015): 6.699 and 43; according to Google Scholar (1983-2015): 11.836 and 55

Patents:

- EP 2013/12157763.9: Method for the preparation of a dry composition comprising a stable ABTS radical
- U.S. 2011/13/064,449: Use of anti-oxidant compounds for muscle recovery
- U.S. 2007/12/443,548: Olive Juice Extracts for promoting Muscle Health
- US 2002/20020147353A1: Novel Flavonoids
- US 1999/5,925,668: Thioctic acid metabolites and methods of use thereof
- WO 1996/021662: The Use of Heterocyclic Compounds as Antioxidants, Radical Scavengers, Fe Complexing Agents, Tissue- and/or Neuroprotentants

Supervision of PhD theses:
Number of PhD students supervised since thesis defence: 20

Scientific teaching:

- Member of the Exam review board Faculty of Health, Medicine and Life Science (2015-present)
- Course-unit builder and coordinator in Biological Health:
- Course unit BGK2003. “Introduction into Pharmacology”
- Course-unit builder and coordinator in Medicine:
- Course unit Course 2.5. “Ageing”
- Designing and coordination of the “Persoonlijk Formularium” Medicine
- Planning group member (1.3 BMW, 1.4 BMW)
- Internships: supervising >50 students

Other teaching responsibilities
- PAO course Food Toxicology
- Lectures at multiple national and international Universities

Three key publications 2009 – 2014:
- Ten misconceptions about antioxidants. Bast, A. & Haenen, G. R. Trends in Pharmacological Sciences 34 (2013) 430–436
- Bioprocessing of wheat bran in whole wheat bread increases the bioavailability of phenolic acids in men and exerts anti-inflammatory effects ex vivo. Anson, N. M., Aura, A. M., Selinheimo, E., Mattila, I., Poutanen, K., van den Berg, R., Havenaar, R., Bast, A. and Haenen, G. R. The Journal of Nutrition 141 (2011), 137-143
- Competition between Ascorbate and Glutathione for the Oxidized Form of Methylated Quercetin Metabolites and Analogues. Moalin, M., van Strijdonck, G. P., Bast, A., & Haenen, G. R. Journal of Agricultural and Food Chemistry 60 (2012) 9292-9297

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:
- International Journal of Molecular Sciences
- Oxidative Medicine and Cellular Longevity

Membership of national and international scientific organizations:
- Society for Free Radical Research
- Dutch Toxicology Society (NVT)
- Dutch Society for Clinical Pharmacology and Biopharmacy

RELEVANT JOB-RELATED SOCIAL POSITIONS:
- Member of the Medical Ethical Review Board of Maastricht University
- Expert reviewer of forensic reports
- Reviewer of the Dutch Food and Drug Administration

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

1991 Shell Price for the best thesis in Chemistry
2011 Maastricht University Teaching Award
2012 Nominated for the Maastricht University Teaching Award
2013 Nominated for the Maastricht University Teaching Award
2014 Nominated for the Maastricht University Teaching Award

Research grants (NWO and non-profit organisations)
- Modulation of the Nitric Oxide System
- Superoxide Dismutase as Toxicity Modulator
- Effect of Vitamin E on Glutathione-dependent Enzymes
- The interaction of flavonoids with the NO-system
- Assessing Antioxidant Activity
- Antioxidant Activity: from Model to Man
- Quercetin and its Methylated Metabolites: The Chemical Basis of Activity
- Covalent Protein Modification by Acrolein: Toxicity and Adaptation
- Health Benefits of (-)-Epicatechin and other flavonoids
- Nutrient Drug Interactions
- Adaptation to Oxidative Stress
- Oxidative stress-induced glucocorticoid resistance: Protection by the flavonoid quercetin

Research grants (industry)

- Lipoic Acid
- Food related Antioxidants in Oxidative Stress
- New synthetic Flavonoids as Protectors against Doxorubicin-induced Cardiotoxicity
- Antioxidants and their Metabolites
- Health Effects of Quercetin
- Hydroxytyrosol: A versatile Antioxidant from Olive Oil
- Bioactive Compounds in Whole Grain Wheat
- The Antioxidant Flavonoid Mono-Hydroxy-Ethyl-Rutoside
- Tomatoes as Functional Food
- Optimizing the Health Benefit of the Flavonoid Mono-Hydroxy-Ethyl-Rutoside
- Bioactives in the Therapy of Non Alcoholic Steatohepatitis

Total acquisition: 2,980,991.33 Euro

Name: **R.R.W.J. van der Hulst**
E-mail: t.vanderhulst@mumc.nl
URL: http://www.mumc.nl

GENERAL INFORMATION
Date of birth: 03/06-1966, Heerlen
Current position: professor of Plastic Surgery
Fields of Expertise:
Reconstructive surgery (Oncology and Trauma)
Breast reconstructive surgery
Complex wound healing
Craniofacial surgery

QUALIFICATIONS:

Nov 1990 - Nov 1994	Fellow clinical nutrition and surgery AZM
Nov 1994 - May 1998	Surgical training University Hospital Maastricht (AZM)
May 1998 - Aug 1998	Surgical training Atrium Medical Centre Heerlen
Aug 1998 - Aug 2001	Training Plastic, Reconstructive and Hand surgery University Hospital Maastricht (AZM)
Aug 2000 - Mar 2001	Training in Craniofacial Surgery Rotterdam Sophia Childrens Hospital (Dr. Vaandrager-Prof.dr. Hovius)
March 2001-June 2001	Training in Hospital Necker Craniofacial surgery(Prof Marchac-Prof.dr.Renier)
August 2001	Registration as plastic surgeon
April 2009	Professor Plastic Surgery

SCIENTIFIC CAREER:

1990-1994	Researched fellow general surgery
1996	Thesis: Glutamine, An Essential Nutrient For The Gut
April 2009	Professor Plastic Surgery

Number of PhD students supervised till thesis defense:

1999-2003	Co promotor Francesca de Lorenzi June 20th 2003 ”Refinements in microvascular surgery”
2002-2011	Promotor Iris Debats, September 23rd 2011 “Arginine metabolism in wound healing”
2005-2014	Promotor Darren Booi, March 14th 2014 ‘’Partial flap loss and fat necrosis in autologous breast reconstruction ”
2008	Promotor Marieke van den Heuvel “Ischemia reperfusion injury in a DIEP flap’’
2010-2014	Promotor Stefania Tuinder, March 14th 2014. ‘’Anatomical radiological and clinical findings on perforator flaps’
2013-2014	Promotor Morteza Enajat; 15 december 2014. Deep Inferior Epigastric Artery Perforator Flap Breast Reconstruction: Optimization of Technique, Perioperative Measures, and Outcomes

Key publications 2009 - 2014

- Stefania Tuinder, Rene van der Hulst, Marc Lobbes, Bas Versluis, Arno Lataster. Septocutaneous Gluteal Artery Perforator (Sc-GAP) Flap for Breast Reconstruction: How we do it. 07/2013: pages 135-160;, ISBN:978-953-51-1181-8.
- Lopez Penha TR, Voogd AC, Heuts EM, Ijsbrandy C, Hendrix NA, von Meyenfeldt MF, van der Hulst RR. Reduced Prevalence of Lymphedema in Patients with Reconstructive Breast Surgery. Breast J. 2014 Sep 24. Doi: 10.1111/tbj.12342. (Epub 2014 Sep 24) PMID: 25252125 (PubMed – as supplied by publisher)

- Jetten N, Roumans N, Gijbels MJ, Romano A, Post MJ, de Winther MP, van der Hulst RR, Xanthoulea S. Wound administration of M2-polarized macrophages does not improve murine cutaneous healing responses. PloS One. 2014 Jul 28;9(7):e102994. Doi:10.1371/ journal.pone.0102994.eCollection 2014. PMID:25068282 (PubMed – in process)
- Hundscheid T, van der Hulst RR,Rutten BP, Leue C. Body dysmorphic disorder in cosmetic surgery – prevalence, psychiatric comorbidity and outcome. Tijdschrift Psychiatr. 2014:56(8);514-22. Review. Dutch. PMID: 25132592 (Pubmed–in process) Free PMC Article.

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:

Membership of national and international scientific organizations:

1998-	Member of Dutch Society of Plastic, Reconstructive and Hand surgery
2006-	Member of International Society for Aesthetic Plastic Surgery
2010-	Member of European Association of Plastic Surgeons

RELEVANT JOB-RELATED SOCIAL POSITIONS

2008-now	Head of dept. Plastic, Reconstructive and Hand surgery, AZM
2009-now	Consultant Orbis Medical Centre
2012-now	Chairman Nederlandse Vereniging voor Plastische Chirurgie

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

1992	Espen-Ajinomoto research fellowship
1994	Glaxo travel award
1994	Shoemacher award
1996	Second winner !0 year AZM award
1998	Winner vd Linden award

Name: **Jeroen Kooman**
E-mail: jeroen.kooman@mumc.nl

GENERAL INFORMATION
Date of birth: 12-06-1966
Current position: Professor
Fields of Expertise: Nephrology

QUALIFICATIONS:

1988	Doctoral exam (MSc) Geneeskunde (cum laude), University of Maastricht
1990	Medical degree (M.D.) (cum laude), University of Maastricht
1992	PhD thesis graduation: "the role of the venous system in hemodynamics during hemodialysis"
1998	Registration as medical specialist (internist-nephrologist)
2011	Master of Health Professions Education (MHPE; MSc Educational Sciences) (cum laude); University of Maastricht

SCIENTIFIC CAREER:

1990-1992	PhD candidate, University of Maastricht,
1996	guest scientist, Karolinska Institute, Stockholm, Sweden
2003-2012	associate professor, internal medicine and nephrology
October 2012	professor, internal medicine and nephrology

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to pubmed: 198
- Contributions to books: 7
- H-index: 32

Supervision of PhD theses:
- (Co)supervisor of 11 PhD students with completed thesis, 5 PhD students pending

Scientific teaching:
- 2007-2014 coordinator bachelor program in Medicine, University Maastricht

Three key publications 2009 – 2014:
Kooman JP, Kotanko P, Schols AM, Shiels PG, Stenvinkel P.
Chronic kidney disease and premature ageing. Nat Rev Nephrol. 2014;10:732-42.

Marcelli D, Usvyat L, Kotanko P, Bayh I, Canaud B, Etter M, Gatti E, Grassmann A, Wang Y, Marelli C, Scatizzi L, Stopper A, van der Sande FM, Kooman JP. Body composition and survival in dialysis patients: Results from an international cohort study. Clin J Am Soc Nephrol 2015; 10; Apr 21 [epub ahead of print]

Usvyat LA, Barth C, Bayh I, Etter M, von Gersdorff GD, Grassmann A, Guinsburg AM, Lam M, Marcelli D, Marelli C, Scatizzi L, Schaller M, Tashman A, Toffelmire T, Thijssen S, Kooman JP, van der Sande FM, Levin NW, Wang Y, Kotanko P. Interdialytic weight gain, systolic blood pressure, serum albumin, and C-reactive protein levels change in chronic dialysis patients prior to death. Kidney Int. 2013;84:149-57.

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- Nephrology Dialysis Transplantation

Membership of national and international scientific organizations:

- European Dialysis Transplant Association (Guideline Committees)
- International Society Peritoneal Dialysis (Guideline committee)
- International Society of Nephrology

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Member advisory council NeoKidney (Dutch Kidney Foundation)
- Member Scientific Board Dutch Kidney Foundation (until 2012)
- Member advisory council “wearable and artificial kidney”; Dutch Kidney Foundation (until 2013)

Name: **L.J.C. van Loon**
E-mail: l.vanloon@maastrichtuniversity.nl
URL: http://www.maastrichtuniversity.nl

GENERAL INFORMATION
Date of birth: 23-11-1971
Current position: Professor of Physiology of Exercise
Fields of Expertise: exercise, nutrition, muscle, aging

QUALIFICATIONS:
1990 – 1995: Master of Science, Department of Human Movement Sciences,
Faculty of Health Sciences, Maastricht University

1996 – 2000: PhD student, Department of Human Biology, Maastricht University
Thesis successfully defended on 20-04-2001.
"The effects of exercise and nutrition on muscle fuel selection"

SCIENTIFIC CAREER:
2000 - 2003: Post-doctoral research fellow based on a NWO-Talent stipendium and NWO-VENI fellowship, Department of Human Biology, NUTRIM, Maastricht University
2004 – 2006: Assistant Professor at the Departments of Human Biology (0.05 fte) and Human Movement Sciences (0.95 fte), NUTRIM, Maastricht University
2006 – 2009: Associate Professor at the Department of Human Movement Sciences, NUTRIM, Faculty of Health, Medicine, and Life Sciences, Maastricht University Medical Centre+
2010 – present: Professor of Physiology of Exercise (with special interest in the role of nutrition) at the Department of Human Movement Sciences (1.0 fte), NUTRIM, Faculty of Health, Medicine, and Life Sciences, Maastricht University Medical Centre+

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 209
- Contributions to books: 10
- Number of citations according to WoS: 2.516 ; H-index: 38

Patents:

DE 69930464D
Composition comprising carbohydrate and peptide material and its use as an energy supplement after or during physical exercise or as a metabolic nutrient for oral consumption
WO 2004/022083
A nutritional and therapeutic composition of an insulin sensitizer and a peptide fraction
US 2005/0271744
A nutritional and therapeutic composition of an insulin sensitizer and a peptide fraction
EP1534314
A nutritional and therapeutic composition of an insulin sensitizer and a peptide fraction
WO 2006/077202
Novel nutraceutical compositions

Supervision of PhD theses:
Number of PhD students supervised since thesis defense: 14.

Scientific teaching:

- Member of the Educational Board of the Faculty of Health, Medicine and Life Sciences (2009-2013)
- Course-unit builder and coordinator in the Master Physical Activity and Health:
- Course unit M0474. "Designing effective intervention programs"
- Course unit M0871. "Human performance, in health, chronic disease, aging, and sports"
- Course unit M0873. "Writing a research proposal"
- Designing and optimizing the Master Physical Activity and Health
- Planning group member (2.4.7, 2.3.7, 3.1.6, 3.3.7, 3.7.1, 4.7.1, 4.7.2, M0872)
- Nominated for the Maastricht University Teaching Award (1999)
- Internships: supervising >20 students

Other teaching responsibilities

- Espen course: The use of tracers in nutrition and metabolism research
- NUTRIM PhD-course on the use of stable isotope methodology in nutrition research
- International Olympic Committee (IOC) course on Sports Nutrition
- Sports nutrition courses (SOS, HAG, VUB, MINT, and WUR/VLAG)
- Lectures at multiple national and international Universities
- Honorary chair position at the Free University of Brussels

Three key publications 2009 – 2014:

- Tieland M, Dirks ML, van der Zwaluw N, Verdijk LB, van de Rest O, de Groot LC, van Loon LJ. Protein supplementation increases muscle mass gain during prolonged resistance-type exercise training in frail elderly people: a randomized, double-blind, placebo-controlled trial. J Am Med Dir Assoc 2012;13:713-9.
- Cermak NM, Res PT, de Groot LC, Saris WH, van Loon LJ. Protein supplementation augments the adaptive response of skeletal muscle to resistance-type exercise training: a meta-analysis. Am J Clin Nutr 2012;96:1454-64.
- Pennings B, Koopman R, Beelen M, Senden JM, Saris WH, van Loon LJ. Exercising before protein intake allows for greater use of dietary protein-derived amino acids for de novo muscle protein synthesis in both young and elderly men. Am J Clin Nutr 2011;93:322-31.

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:

- Associate Editor of the International Journal of Sport and Exercise Metabolism
- Associate Editor of the Scandinavian Journal of Medicine and Science in Sports
- Editorial Board of the European Journal of Sport Science

Membership of national and international scientific organizations: **(max 3)**

- Scientific Board of the European College of Sport Science
- Scientific Board of the Benelux Association of Stable Isotope Scientists
- Fellow American College of Sports Medicine

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Advisor for the Dutch Health Council on Physical Activity
- Advisor for the Dutch Health Council on Protein requirements in the elderly

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

1997 Gatorade Science Institute - Young Scientist Award
1998 European College of Sport Science - Young Investigators Award
2002 NWO-Talent stipendium
2002 European College of Sport Science - Young Investigators Award
2002 Den Hartog Award for best thesis in the field of Human Nutrition

2005 Deakin University travel stipendium
2012 Sixth International Dairy Nutrition Prize 2012 from the Utrecht Group
2014 Francqui Chair from the Francqui Foundation
2015 Nutrition and Bone Health award from the International Institute for Nutrition and Bone Health

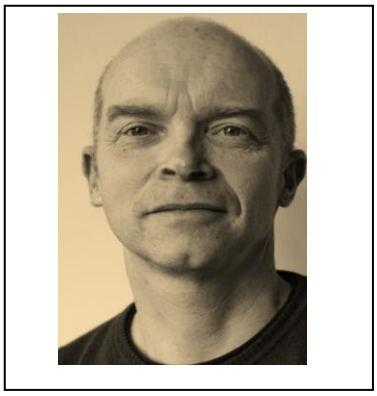
Research grants (NWO and non-profit organisations)

- NWO-Talent stipendium - The effects of creatine on body composition, fuel selection, and performance.
- NWO-ZonMw Fellowship - Determinants of lipid transport and metabolism in human skeletal muscle
- Activation of AMPK in skeletal muscle: effects on carbohydrate and fat metabolism in patients with type 2 diabetes
- The regulation of intramyocellular lipid use during exercise
- The adaptive response of skeletal muscle mass and function to resistance type exercise training in elderly men
- Defining the characteristics of effective exercise intervention in type 2 diabetes
- Kootstra fellowship- The role of satellite cells in skeletal muscle hypertrophy of senescent muscle
- Timed protein supplementation to maximize the skeletal muscle adaptive response
- Casein in milk as a functional ingredient for the prevention of sarcopenia

Research grants (industry)

- The use of protein/free amino acid/carbohydrate supplements following strength training exercise as a means to increase muscle mass and strength
- Amino acid induced insulin secretion and protein anabolism in type 2 diabetes
- The impact of carbohydrate ingestion on muscle fuel selection during exercise
- Post-exercise protein ingestion to augment skeletal muscle adaptation
- Impact of moderate alcohol use on skeletal muscle oxidative capacity
- The effect of carbohydrate and protein co-ingestion on muscle damage
- An exploratory study into the effects of 4 different enteral feeds on postprandial glycemia in type 2 diabetic patients
- Protein hydrolysate versus intact protein to promote muscle protein anabolism
- Bloodglucose homeostase and type 2 diabetes
- The Influence of post-exercise protein ingestion on the adaptive response to resistance exercise training in health elderly men
- Metabolic fate of ingested Sucromalt
- Impact of macronutrient composition on post-prandial glycemia
- Dietary strategies to augment muscle mass and function
- Protein hydrolylate versus intact protein ingestion in type 2 diabetes patients
- Dietary strategies to augment muscle mass and function (extension)
- Nutrition and overnight recovery
- The effect of meat texture on promoting muscle protein synthesis in elderly humans
- Muscle mass preservation
- The impact of the macronutrient composition and energy content on muscle protein synthesis
- Sucrose as a preferred carbohydrate source in sports nutrition
- Dietary strategies to augment muscle mass and function (extension)
- Muscle health and function
- Sucrose as a preferred carbohydrate source in sports nutrition
- Post-prandial muscle protein synthesis rates following wheat protein ingestion
- Muscle health: Active aging and dietary protein
- The effects of protein type and added leucine on post-exercise muscle protein synthesis

Total acquisition: 19.336.340,- Euro



Name: **Hans H.C.M. Savelberg**
E-mail: hans.savelberg@maastrichtuniversity.nl
URL: http://www.maastrichtuniversity.nl

GENERAL INFORMATION
Date of birth: February 28, 1962
Current position: Associate Professor of Human Movement Science
Fields of Expertise: movement analysis, inactivity physiology, musculoskeletal system, biomechanics

QUALIFICATIONS:
- 1992: PhD Medical Sciences, Radboud Universiteit Nijmegen; Thesis: Wrist joint kinematics and ligament behaviour
- 1986: MSc Human Movement Science, Vrije Universiteit Amsterdam

SCIENTIFIC CAREER:
- 2013 – present: Director of Education for Biomedical Sciences, Fac Health Medicine Life Science, Maastricht University
- 2011 – present: Associate professor, dept Human Movement Science, Fac Health Medicine Life Science, Maastricht University
- 1996 – 2011: Assistant professor, dept Human Movement Science, Fac Health Medicine Life Science, Maastricht University
- 1991 – 1996: Postdoc, dept Functional Morphology, Faculty of Veterinary Medicine, Utrecht University
- 1986 – 1991: Ph.D. student, dept Anatomy and Embryology, Faculty of Medicine, Radboud Universiteit Nijmegen

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 85; Google Scholar: 151; own calculations: 96
- Contributions to books: 11, 21 including published conference proceedings
- Number of citations according to WoS: 1668; Google Scholar: 2946 ; H-index WoS: 23; Google Scholar: 31

Patents: No
Supervision of PhD theses:
Number of PhD students supervised till thesis defense: 6

Scientific teaching:
- 2013 – present Director of Education for Biomedical Science
- 2012 – 2015 Co-ordinator for UM in the EU MSc Advance Rehabilitation Technology
- 2010 – 2013 member opleidingscommissie Health
- 2010 – 2013 programme co-ordinator for the track Human Movement Sciences in bachelor programme BioMedical Sciences
- 2009 - 2010 member taskforce for restructuring of the bachelor programme Health Science
- 2008 initiator for restructuring the masterprogramme Biology of Human Performance and Health
- 2004-2011 programme co-ordinator master Biology of Human Performance and Health
- 2003 programme builder of master Physical Activity and Health
- 2001 - 2012 programme co-ordinator of major track Human Movement Science in bachelor Health
- 2001 designer of the major track Human Movement Science for the bachelor Health
- 1997-2012 co-ordinator of 4 units in bachelors and masters Health and Biomedical Sciences
- 1996-present member of 14 unit planning teams in bachelors and masters Health and Biomedical Sciences

Three key publications 2009 – 2014:

- Duvivier, B.M.F.M., Schaper, N.C., Bremers, M.A., Van Crombrugge, G., Menheere, P.P.C.A., Kars, M. and Savelberg, H.H.C.M. Minimal intensity physical activity (standing and walking) of longer duration improves insulin action and plasma lipids more than shorter periods of moderate to vigorous exercise (cycling) in sedentary subjects when energy expenditure is comparable. PLoS ONE 8(2): e55542. doi:10.1371/journal.pone.0055542. http://dx.plos.org/10.1371/journal.pone.0055542
- van Sloten, T.T., Savelberg, H.H.C.M., Duimel-Peeters, I.G., Meijer, K., Henry, R.M., Stehouwer, C.D.A. and Schaper, N.C. Peripheral neuropathy, decreased muscle strength and obesity are strongly associated with walking in persons with type 2 diabetes without manifest mobility limitations. Diabetes Research in Clinical Practice, 2011, 91(1): 32-39
- Savelberg, H.H.C.M., Schaper, N.C., Willems, P.J.B., De Lange, A.L.H., and Meijer, K. Redistribution of joint moments is associated with changed plantar pressure in diabetic polyneuropathy BMC Musculoskeletal Disorders, 2009., 10:16 (3 February 2009) http://www.biomedcentral.com/1471-2474/10/16

RELEVANT SCIENTIFIC SERVICES:

Membership of editorial boards of international scientific journals:

Membership of national and international scientific organizations:

- Vereniging voor Bewegingswetenschappen Nederland (VvBN, Dutch Society of Human Movement Science)
- Nederlandse Vereniging voor Medisch Onderzoek (NVMO, Dutch Society of Medical Education)

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- 2010: External reviewer for audit of Fontys lectureship Fysieke Activiteit en Gezondheid (Physical Activity & Health).
- 2009: Co-editor of guidelines for physical activity interventions in Diabetes Mellitus type II for Dutch Physical Therapists Society (KNGF)

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

Research grants Non-profit

2013 Royal Dutch Institute for Physical Therapy, €12.000 project leader, cost-effectiveness of physical therapy for diabetes type 2
2010 ZonMw, programme Sport, Physical Activty and Health, € 730.000, project leader, Effectiveness and cost-effectiveness of package 3 of the BeweegKuur, a lifestyle intervention for people with an overweight related health risk
2009 Ministry of Economic Affairs, RAAK programme € 25.000 participant Sporten met je prothese

Research grants Industry

2014 Kinematix €100.000, project leader, Improving the cost-effectiveness of therapeutic shoes for diabetic patients with a previous foot ulcer using an in-shoe pressure device.
2014 Unilever R&D €134.681 The effect of low intensity physical activity on insuline sensitivity, mood and cognitive performance.
2014 Novo Nordisk €131.061, Effect of sitting less on glucose regulation in type 2 diabetes patients
2013 Unilever R&D €25.000, project leader, Literature review

Total acquisition:€1.157.742

Name: **Annemie Schols**
E-mail: a.schols@maastrichtuniversity.nl
URL:

GENERAL INFORMATION
Date of birth: 26-07-1961
Current position: Professor
Fields of Expertise: Nutrition and Metabolism in Chronic Diseases

QUALIFICATIONS:
- Masters in Human Nutrition, Main subjects Clinical Nutrition, Statistics, Wageningen University, The Netherlands, 1985
- PhD in Medical Sciences, Maastricht University University, The Netherlands, 1991

SCIENTIFIC CAREER:
- 1991-1997 Assistant Professor, Dept of Respiratory Medicine, Maastricht University
- 1997-2004 Associate Professor, Dept of Respiratory Medicine, Maastricht University
- 2004 Full Professor, Dept of Respiratory Medicine, Maastricht University
- 2006 Director of research school NUTRIM

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 250
- Contributions to books: >50
- Number of citations: 17588 ; H-index: 65

Patents: 1 applications
Supervision of PhD theses: 35 of which 25 are completed

Scientific teaching:
because of my position as scientific director, I have currently no formal teaching obligations. But nevertheless I have been involved in the design and execution of several new teaching modules. Furthermore I established in 1998 MINT Institute for Postgraduate Education to accelerate new scientific insights from nutrition and metabolism to health care using problem based learning as guiding principle (www.mintonline.org)

Three key publications 2009 – 2014:
- Schols A, Ferreira IM, Franssen FM, Gosker HR, Janssens W, Muscaritoli M, Pison C, Rutten-van Molken M, Slinde F, Steiner MC, Tkacova R, Singh SJ. Nutritional assessment and therapy in COPD: a European Respiratory Society Statement. Eur Respir. J. 2014; 44(6):1504-20.
- Langen RC, Haegens A, Vernooy JH, Wouters EF, de Winther MP, Carlsen H, Steele C, Shoelson SE, Schols AM. NF-kB activation is required for the transition of pulmonary nflammation to muscle atrophy. Am. J. Respir. Cell Mol Biol 2012; 47(3):288-97.
- van Wetering CR, Hoogendoorn M, Mol S, Rutten van Molken MP, Schols AM. Short- and longterm efficacy of a community based COPD management programme in less advanced COPD: a randomized controlled trial. Thorax. 2010;64(1):7-13.

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- Associate Editor for Journal of Applied Physiology (2011->)
- Associate Editor for the Journal of Cachexia, Sarcopenia and Muscle (2011->)

- Editor of "Nutrition and physiological function" of Current Opinion of Clinical Nutrition and Metabolic Care (2010->)

Membership of national and international scientific organizations:
- Board member of the Netherlands Health Council (2006->)
- Member of ECRIN: European Clinical Research Infrastructure Network. NUTRIM is also reference centre for nutrition within ECRIN.
- Member of the Executive Board of Top Institute Food and Nutrition (2014->)

RELEVANT JOB-RELATED SOCIAL POSITIONS:
- Member of Dutch Health Council committees 'Nutrition' and 'Health Research'.
- Director of MINT Institute for Postgraduate Education in "Clinical Nutrition and Metabolism".
- Member of the research program committee of the Netherlands Lung Foundation (2003-2010)

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

AWARDS:
- 2010: European Society for Clinical Nutrition and Metabolism (ESPEN) Faculty Membership for contribution in Clinical Nutrition and Metabolism Research
- 2014: ESPEN Wretlind (Career) Award for scientific achievements in the field of Clinical Nutrition and Metabolism.
- 2014: Fellow of European Respiratory Society (FERS) as recognition of excellence in research contribution to respiratory medicine.

GRANTS:
- The role of NFkB and the ubiquitin proteasome pathway in cancer cachexia in lung cancer patients 2007-2011; Dutch Cancer Research Foundation (KWF) 250.000 €
- COPD: Transition of systemic inflammation into multiorgan pathology 2008-2012 Top Institute Pharma; 4.800.000 € (Maastricht: 3.200.000 €) Participants: NUTRIM, UMCU, UMCG, Altana, GSK, Astra Zeneca, Numico Research
- Establishment of a Centre for Sports, Physical Activity and Health within the Network 'MOVE'. 2008-2011; Dutch Research Council (ZonMW); 250.000 € Participants: research institutes NUTRIM, CAPHRI and University Hospital Maastricht
- Transcriptional regulation of skeletal muscle oxidative phenotype by PPARs and NF-κB: Who has the longest breath in COPD? 2010-2013; Netherlands Lung Foundation 250.000 €
- Cost-effectiveness of nutritional rehabilitation on physical functioning and cardiometabolic risk modification in COPD patients with muscle atrophy 2010-2014; Netherlands Lung Foundation + Danone Advanced Medical Nutrition; 500.000 €
- NUTRIM Graduate Program "Metabolism and Chronic Disease 2011-2016 NWO; 800.000 €
- Maastricht University Interfaculty Program 'Eat well' Participants: see www.um-eatwell.nl 2012-2014: Maastricht UMC+ stimulation grant: 375.000 €; 2014-2017: Project: Eatwell combats globesity: Maastricht University: 1.000.000 €
- Prevention of muscle wasting in COPD by targeting the cellular origin of systemic inflammation. 2012-2016; Netherlands Lung Foundation 250.000 €
- Reduction of elevated metabolic and cardiovascular risk in overweight COPD patients 2013-2017; Netherlands Lung Foundation 250.000 €
- Inactivation of GSK-3β: A breath of fresh air in the regulation of skeletal muscle oxidative phenotype; Netherlands Lung Foundation 200.000 €
- Focus on resistance 2013-2017; ZonMW programme Sport; 450.000 €
- The role of autophagy and satellite cell function in skeletal muscle plasticity 2014-2018; Maastricht University as part of NUTRIM Centre of Excellence programme; 230.000 €
- Synergy between experimental research and Medical excellence to outweigh Cancer Cachexia 2014-2018; Maastricht University Medical Centre. 250.000 €

Name: **Emiel Wouters**
E-mail: e.wouters@mumc.nl
URL: http://www.mumc.nl

GENERAL INFORMATION
Date of birth: May 16, 1953
Current position: Professor Respiratory Medicine
Fields of Expertise: COPD, systemic effects, rehabilitation, Comorbidities.

QUALIFICATIONS:
1971-1978: Diploma Medical Doctor, University Leuven
1978-1984: Training chest physician University Hospital Maastricht

SCIENTIFIC CAREER:
1984-1987: Assistant professor department of Respiratory medicine, University Hospital Maastricht
1997-1992: Associate professor department of Respiratory medicine, University Hospital Maastricht
1992-till now: Professor in Respiratory Medicine and chairman department of Respiratory medicine, University Hospital Maastricht.

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 600
- Contributions to books: 50
- Number of citations according to WoS: # ; H-index: 99

Patents:
Supervision of PhD theses:
Number of PhD students supervised till thesis defense: 48

Scientific teaching:
Not applicable

Three key publications 2009 – 2014:
- Magnussen H, Disse B, Rodriguez-Roisin R, Kirsten A, Watz H, Tetzlaff K, Towse L, Finnigan H, Dahl R, Decramer M, Chanez P, Wouters EF, Calverley PM; WISDOM Investigators. Withdrawal of inhaled glucocorticoids and exacerbations of COPD. N Engl J Med 2014; 371(14):1285-94.
- Vestbo J, Edwards LD, Scanlon PD, Yates JC, Agusti A, Bakke P, Calverley PMA, Celli B, Coxson HO, Crim C, Lomas DA, MacNee W, Miller BE, Silverman EK, Tal-Singer R, Wouters EF, Rennard SI, for the ECLIPSE Investigators*. Changes in Forced Expiratory Volume in 1 Second over Time in COPD. N Engl J Med 2011; 365:1184-92.
- Hurst JR, Vestbo J, Anzueto A, Locantore N, Müllerova H, Tal-Singer R, Miller B, Lomas DA, Agusti A, Macnee W, Calverley P, Rennard S, Wouters EF, Wedzicha JA; Evaluation of COPD Longitudinally to Identify Predictive Surrogate Endpoints (ECLIPSE) Investigators. Susceptibility to exacerbation in chronic obstructive pulmonary disease. N Engl J Med 2010;363:1128-38.

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- AJRCCM
- Chest

Membership of national and international scientific organizations:

- Member ATS/ERS Statement on Pulmonary Rehabilitation
- Member Scientific Advisory Board German Competence network Asthma and COPD
- Member International Advisory Board Multidisciplinary Respiratory Medicine (MRM)

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Director of the Centre for Chronic Diseases, University Hospital Maastricht
- Chairman Board of Directors CIRO Horn
- Chairman department Respiratory Medicine, University Hospital Maastricht

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- Lifetime achievement award pulmonary rehabilitation ATS
- Fellow ERS

Research programme: NUTRIM Research line 4: Gene-environment interactions

Programme leader(s): Prof. FJ van Schooten
Prof. M Zeegers
For a full staff survey see appendix 1.

1. Objectives and Research Area

1.1 Vision, Mission and Objectives

The vision of the research line *Gene-environment interactions* is to use integrated, interdisciplinary, and systems approaches to gain insights in the influence of environment and diet on health and disease of an individual with his/her own genetic constitution and of the general population. The ambition is to reach the highest possible level in research and education using state of the art technologies. The mission of the research line is to identify, understand and characterize nutritional, environmental and lifestyle factors that in interaction with genetic backgrounds determine the onset of chronic diseases. The objectives of the research are to identify aetiological determinants or biomarkers that can be used to establish risk profiles and innovative prevention strategies research. The research is a molecular-driven systems biology approach based on genomics, bioinformatics, genetic and epidemiological approaches.

1.2 Research Area / Research Line(s)

The major research area within research line *Gene-environment Interactions* is the combined effects of dietary and toxic (among other environmental) exposures and genetic background on chronic diseases. The research fits within the strategic programme of the Faculty Health Medicine and Life Sciences (FHML) and the Maastricht University Medical Centre+ (MUMC+) in which prevention of disease and quality of life is an important focus.
The programme focuses on environment-diet-gene interactions in its basic and applied research into common chronic disorders. Traditionally, diseases of interest are inflammatory lung and bowel disease, metabolic syndrome, and cancer. The aim is to deliver internationally competitive translational research leading to prevention strategies in populations and improved treatment and disease management. The programme's objective is to develop and validate novel biological markers, environmental or behavioural factors that can help to determine pathological processes, with the aim to obtain early indicators to guide treatment or to protect health by adjusting diet. More recently nutrigenomics research is more focussed on health in which health is not just defined as the 'absence of disease', or 'a state of complete wellbeing (WHO definition 1948)' but more in terms of 'resilience', as 'the ability to adapt and to self-manage, in the face of social, physical, and emotional challenges'.

1.3 Strategy

The general strategy is 1) on development and application of biomarkers in prevention of diet-related chronic diseases, 2) on genetics and epidemiology of complex disorders, and 3) the use of genomics and bioinformatic approaches to identify pathways of disease, 4) on systems medicine. Because of the inherent oversampling problem in genomics approaches such biomarker development needs to be based on an understanding of the underlying system and pathway level, leading to supervised selection approaches for biomarkers.
To meet our objectives we bring together the fields of Epidemiology, Genetics, Genomics, Proteomics, Metabolomics, Bioinformatics in order to generate biochemical profiles in biological matrices as tissue biopsies, blood, urine and exhaled air. Expertise covers the major analytical research areas of the nutrition-health related domains, i.e. Genetic Epidemiology (Prof. Zeegers), Genetic Toxicology (Profs. Van Schooten, Mariman, Zeegers), Proteomics (Profs. Mariman and van Dieijen-Visser), Metabolomics in exhaled air (Prof. Van Schooten) and Bioinformatics (Prof. Evelo). We anticipate by bundling the expertise, to meet our objectives in developing and applying biomarkers for disease prediction, prevention and early diagnosis. Our

disease related research is entangled with the clinically oriented NUTRIM research lines 2 and 3. For prevention and early diagnosis intervention studies with healthy subjects we collaborate with NUTRIM research line 1.

During the last 6 years several important activities were achieved. A technology platform was developed to study volatile metabolites in breath as markers of metabolic and inflammatory diseases and nutritional interventions. Targeted proteomics were successfully applied to discover a plasma protein as a predictor of weight regain after successful dieting. Multivariate approaches, bioinformatics and systems biology tools were developed and successfully applied in many collaborative projects. We applied our technologies (markers DNA damage, genetic profiling, proteomics, metabolomics in breaths) in several populations based cohorts (Lifelines[1], NLCS[2]), in several births cohorts (MOBA[3], COPSAC[4], MEFAB[5]), in several clinical cohorts (IBS-UM, IBD-UM), and in human intervention studies.
An adjustment of the research was that because of the leaving of the toxicogenomics group to another research school, the focus is no longer on research with the goal of developing *in vitro* technologies for replacement of experimental animals in toxicology.
The coming period it is anticipated that analyses of large data-sets and modelling complex biological networks will become important and expertise has been built in multivariate biostatical expertise and machine learning. In the future this will be substantiated in interaction with the recently started Maastricht Centre for Systems Biology (MaCSBio).

[1]Lifelines; cohort of 165.000 individuals and biobank in Northern-Netherlands, [2]NLCS, Netherlands Cohort Study on Diet and Cancer in Maastricht, [3]MOBA; Norwegian Mother and Child Cohort Study, [4]COPSAC; Copenhagen Studies on Asthma in Childhood, [5]MEFAB; Maastricht Essential Fatty Acid Birth cohort.

1.4 Research environment and embedding

Our research is part of several national and international Centres of Excellence. Our multi-disciplinary approaches (Epidemiology, Genetics, Genomics, Chemistry, Biology, Clinical, Bioinformatics, and Biostatistics) in understanding the relation between lifetime dietary or environmental exposures and chronic diseases are unique in the Netherlands and highly recognized worldwide. We participate in Technological Top Institutes in the Netherlands as TI Food & Nutrition (TIFN), Netherlands Toxicogenomics Centre (NTC), Netherlands Nutrigenomics Consortium (NGC), Centre for Medical Systems Biology (CMSB), Netherlands Bioinformatics Centre (NBIC) and Netherlands Consortium for System Biology (NCSB). We have furthermore played key roles as coordinator, work package leader and senior scientist in several EU-funded programmes including ECNIS (environmental carcinogenesis; Van Schooten), NewGeneris (genotoxic risks in newborns; Kleinjans and Van Schooten), EnviroGenomarkers (biomarkers of environmental exposure; De Kok), EATRIS (infrastructure for translational research; Evelo), NuGO (nutrigenomics; Mariman, Evelo), DiOGenes (obesity and health risks; Mariman), MicroGennet (community driven knowledge base for micronutrient genomics; Evelo). In line with the overall integrated nature of many research projects, we additionally have a large number of specific collaborations with established research groups in the Netherlands, EU, Canada, Singapore, China and Australia.
The research environment was in 2014 boosted in Maastricht by the arrival of new research groups of Prof R. Heeren (Imaging Mass Spectrometry), Prof. P. Peters (Nanoscopy), and Prof. C. van Blitterswijk (Regenerative Medicine). The research arenas of these groups are connected to *personalised medicine* and fit very well with the objective of the research line, which offers unique opportunities to collaborate.

2. Resources and Facilities

2.1 Researchers

During the overall reporting period nearly 70% of the research programme was funded externally (see table 2.2) and we obtained funding for non-tenured staff from EU, NWO and from other national and international competitive granting bodies. As seen in table 2.1 the total fte staff over the years 2009 and 2010 was relatively high (59.8 and 65.3 fte). In the year 2011 the staff decreased considerably because of a reorganization within the Faculty, resulting in the transfer of staff working in the toxicogenomics group (Prof. Dr. J. Kleinjans) to another research school GROW. The direct funding for tenured research staff decreased

in 2011 from 8.3 to 4.9 fte and is at present 5.8 fte. Also the number of non-tenured staff and PhD students on contracts decreased in 2011 because of this reorganization. As a consequence in 2011 the funding of personnel depended largely on direct funding, but due to enhanced success in competitive grants the direct funding is at present 38% (Table 2.2). To reinforce the research line, incorporation of a new group Complex Genetics under leadership of Prof. Dr. M. Zeegers was realized in 2012. Prof. Dr. A Opperhuizen (honorary chair), who is director Risk assessment and Research programming (BuRo) within the new Dutch Food and Safety Authority, has joined in 2012.
Several successful FP6/7 EU projects are ending in the coming period and we will continue our efforts to get funding within EU Horizon 2020. Furthermore suitable candidates will be selected from amongst our researchers to apply for prestigious personal grants within EU (ERC and Currie fellowships) and The Netherlands (NWO). A major project financed by Top Institute Food and Nutrition (TIFN) ends in 2015 and negotiations are taking place to extend the funding period since the food industry is highly interested in continuation of the research in the development of non-invasive biomarkers of gut health. Furthermore bilateral discussions are ongoing with Friesland Campina, Danone and MeadJohnsson Nutrition for collaborative research on paediatric nutrition. A project has started in 2014 to develop lipidomic analysis for ceramides and sphingolipids in collaboration with DSM.
Recently, facilities were obtained within Enabling Technologies (initiative of DSM Resolve, Maastricht University/UMC+ and the Province of Limburg); TD-GC-MS for breath analysis, and Orbitrap LC-MSMS for proteomics and lipidomics. Further, the ET initiative facilitates multiple expensive instruments to be used for our researchers (http://www.enablingtechnologies.eu).

Table 2.1 - Research staff at research unit level

NUTRIM-RL4	2009		2010		2011		2012		2013		2014	
	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE	#	FTE
Scientific staff [1]	18	6,9	19	8,3	14	4,9	15	6,1	15	6,1	17	5,8
Post-docs [2]	11	10,6	17	15,9	2	1,5	6	4,8	5	4,0	6	4,3
PhD candidates[3]	29	28,8	27	26,4	8	7,9	7	6,9	7	6,9	11	11,0
Total res. staff	**58**	**46,3**	**63**	**50,6**	**24**	**14,3**	**28**	**17,8**	**27**	**17,0**	**34**	**21,1**
Lab Technicians	13	10,5	14	11,7	7	4,8	5	3,7	5	3,7	8	6,7
Visiting fellows	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0	0	0,0
Total staff for research	**71**	**56,79**	**77**	**62,3**	**31**	**19,1**	**33**	**21,5**	**32**	**20,7**	**42**	**27,76**
Other (admin.) staff	4	3,1	3	3,0	0	0,0	0	0,0	0	0,0	0	0,0
Total staff	**75**	**59,8**	**80**	**65,3**	**31**	**19,1**	**33**	**21,5**	**32**	**20,7**	**42**	**27,8**

- *FTE: sum of actual FTE-factors (in fulltime equivalents) labelled on NUTRIM research activities on 31-dec on any year*
- *#: number of persons active on NUTRIM Research activities on 31-dec of any year*
- *Scientific Staff: Professor, Assistant Professor and Associated Professor (direct funding)*
- *Post docs: researchers with completed PhD not belonging to Scientific staff*
- *PhD candidate: Standard PhD candidate with a contract.*
- *Lab technicians: technician, dieticians, data managers, research assistants etc.*
- *Other (admin.) staff: NUTRIM Office, personal assistants to PI's and project leaders etc.*

2.2 Research Funds

Table 2.2 - Funding at research unit level

NUTRIM RL4	2009		2010		2011		2012 *		2013		2014			
Funding:	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%	FTE	%
Direct funding (1)	13,7 fte	23%	16,4 fte	25%	11,5 fte	60%	13,8 fte	64%	12,1 fte	58%	10,6 fte	38%	72,4 fte	31%
Research grants (2)	22,4 fte	37%	26,2 fte	40%	3,8 fte	20%	3,0 fte	14%	3,0 fte	14%	3,0 fte	11%	35,3 fte	15%
Contract research (3)	22,9 fte	38%	19,9 fte	30%	3,1 fte	16%	4,6 fte	21%	4,3 fte	21%	9,7 fte	35%	112,5 fte	48%
Other (4)	0,8 fte	1%	2,8 fte	4%	0,8 fte	4%	0,1 fte	0%	1,3 fte	6%	4,5 fte	16%	12,8 fte	6%
Total funding	**59,8 fte**	**100%**	**65,3 fte**	**100%**	**19,1 fte**	**100%**	**21,5 fte**	**100%**	**20,7 fte**	**100%**	**27,8 fte**	**100%**	**233,0 fte**	**100%**
Expenditure:	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%	k€	%
Personnel costs	2834 k€	60%	2973 k€	58%	1267 k€	44%	1542 k€	72%	1373 k€	75%	1364 k€	72%	1892 k€	61%
Other costs	1914 k€	40%	2141 k€	42%	1615 k€	56%	590 k€	28%	449 k€	25%	531 k€	28%	1207 k€	39%
Total expenditure	**4748 k€**	**100%**	**5113 k€**	**100%**	**2881 k€**	**100%**	**2131 k€**	**100%**	**1822 k€**	**100%**	**1895 k€**	**100%**	**3099 k€**	**100%**

Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)
Research grants obtained in national and international scientific competition (e.g. grants from NWO, KNAW and European Research Council)
Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations
Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within NUTRIM)
* Expenditure in 2012 contains the final financial settlement of the Toxicogenomics research group leaving NUTRIM. The 2012-FTE's in the upper-part of the table do not contain any FTE's related to the Toxicogenomics anymore

3. Research Quality

Table 3.1 shows the number of publications over the years 2009-2014. The scientific output is high and consistent, with a minimum of 67 refereed publications per year. Despite the withdrawal of more than half of the total staff of research line 4 in 2011, the output has remained consistently high and even showed a rise in publications (from 76 refereed publications in 2011 to 92 in 2012 and 93 in 2013), which illustrates the high productivity and quality of the remaining staff. After 2011, the yearly production per tenured fte scientific staff is 15 papers, evidencing a good input/output ratio. The same applies to the sustained number of completed PhD theses in recent years, which is an important performance output indicator as well.
In terms of research quality, table 3.2 shows, that 23% of our publications are within the top 10% of the research field. The high research quality of research line 4 also becomes clear when looking at the mean relative impact (RI), which is an important indicator of quality. The RI is given as a decimal number that shows the relation of the measure to the world average (which is set to the value of 1).The RI of research line 4 is 1.77, which means that the publications from research line 4 have been cited 77% more often than the world average of publications in the same research field. A RI above 1.5 is considered as a very high average impact. 23% of the papers belong to the top 10% most cited publications in their field and 3% belong to the top 1% most cited publications. As a research line, we intend to sustain our high quantity and quality of research output. Furthermore, we aim to publish more often in prestigious journals, such as *Nature*, or *Science*, as this does only occur very rarely. Our strategy to pursuit this is by seeking more (inter)national collaborations since the resulting output is generally of high quality and more easily accepted in prestigious journals. Furthermore, in order to increase the visibility of our research we will intensify our existing strategy to publish scholarly reviews.

3.1 Demonstrable products - Research products for peers in science

Table 3.1 - Main categories of research output

	2009	2010	2011	2012	2013	2014	Total
Academic publications							
a. Refereed articles	**73**	**94**	**76**	**92**	**93**	**67**	**495**
a.1 Refereed articles in WoS	**70**	**91**	**73**	**84**	**87**	**62**	**467**
a.2 Refereed articles non-WoS	**2**	**3**	**3**	**6**	**6**	**5**	**25**
b. Non-refereed articles	**1**	**4**		**7**		**1**	**13**
c. Books					**1**		**1**
d.1. Refereed book chapters				**7**	**3**	**4**	**14**
d.2. Non-refereed book chapters				**2**			**2**
e. PhD Theses	**5**	**7**	**5**	**9**	**4**	**9**	**39**
f. Conference papers							
g. other products (see 3.2 / please specify)							
Total academic publications:							

NOTE: The total number of refereed articles Web of Sciences (WoS) includes full papers, letters, editorial material etc.

3.2 Demonstrable use of products - Use of research products by peers

Table 3.2 – Bibliometric analysis of research output

NUTRIM-RL4	N	C	Wavg	CPP	RI	%T10	%T1	%NC
2008	89	2846	1896	32,0	1,73	19%	2%	2%
2009	64	1995	1069	31,2	1,89	28%	3%	2%
2010	87	1828	1157	21,0	1,69	24%	1%	2%
2011	68	692	625	10,2	1,18	15%	1%	3%
2012	72	911	398	12,7	2,41	31%	7%	3%
2013	80	340	199	4,3	1,73	24%	3%	15%
Total	**460**	**8612**	**5344**	**18,7**	**1,77**	**23%**	**3%**	**5%**

NOTE: The differences between the number of records exported from NUTRIM research information system (Metis, as in table 3.1) differs from the number of records presented in the bibliometric analysis. This is mainly caused by records that were classified in WoS, as editorial material, news item, correction etc. Some records could not be retrieved (by the WUR librarian) from WoS.
N: Number of publications; C: Number of citations of these publications; Wavg ; World average number of citations for publication in same research field; CPP: Average number of citations per publication; RI: Relative Impact; %T10: Percentage of publications within the top 10% most cited publications; %T1: Percentage of publications within the top 1% most cited publications; %NC: Percentage of non-cited articles

3.3 Demonstrable marks of recognition - Marks of recognition from peers

Science awards, Scholarly prizes, Research grants awarded to individuals (see further Appendix 2, CVs)

Year	*Prize description…*	*Person*
2009	ERS/Marie Curie Joint Research Fellowship	Boots A.
2010	Humboldt Research Fellowship for Postdoctoral Researchers	Souren N.
2011	NWO TOP Grant	Mariman E.
2011	Agilent Technologies' Thought Leader Award	Evelo E.
2014	Unilever Research Price	Veith C.
2015	Niels Stensen Fellowship	Smolinska A.

Plenary/Keynote* Lectures at major conferences

Year	*Person*	*Conference*
2013	FJ van Schooten	44th Annual Meeting Environm Mutagenesis and Genomics Society (EMGS), Monterey, CA, USA
2013	R Godschalk	11th Internatl Conf on Environm Mutagens (11th ICEM), Foz do Iguassu, Brazil
2013	C Evelo	Technology track of the 21st Annual Internatl Conf on Intelligent Systems for Molecular Biology (ISMB), Berlin, Germany

Organisation of International Scientific Conferences

Year	*Person*	*Conference*
2009/10	FJ van Schooten	39th and 40th Annual Meeting European Env Mutagen Society
2012-15	M Zeegers	European Epidemiology Conference

Editorships and editorial boards (see further Appendix 2, CVs)

Person	*Editorship from… until…*
FJ van Schooten	Assoc Editor of Toxicology Research, RSC Publishing, 2012-now
ECM Mariman	Assoc Editor J of Nutrigenetics and Nutrigenomics, 2008-2011
M Zeegers	Assoc Editor for Epidemiology and Health Outcomes for BMC Urology
	Editor-in-Chief for OA Epidemiology

Memberships of academies (see further Appendix 2, CVs)

Person	*Member of… from… until…*
FJ van Schooten	Dutch Health Council, 2015
ECM Mariman	Netherlands Academy of Food Sciences, 2013-now
	Honored member of the Bulgarian Society for Cell Biology, 2012-now

Key publications

1. Kiemeney and others including Zeegers MPA. A sequence variant at 4p16.3 confers susceptibility to urinary bladder cancer. Nature Genetics 42: 415-419, 2010.
2. Kelder TAJ, Conklin BR, Evelo CTA & Pico AR. Finding the right questions: exploratory pathway analysis to enhance biological discovery in large datasets. Plos Biology 8(8), e1000472, 2010.
3. Wang P, Holst C, Andersen MR, Astrup A, Bouwman FG, van Otterdijk S, Wodzig WK, van Baak MA, Larsen TM, Jebb SA, Kafatos A, Pfeiffer AF, Martinez JA, Handjieva-Darlenska T, Kunesova M, Saris WH, Mariman EC. Blood profile of proteins and steroid hormones predicts weight change after weight loss with interactions of dietary protein level and glycemic index. PLoS One 6(2):e16773, 2011.
4. Geybels MS, van den Brandt PA, Schouten LJ, Van Schooten FJ, van Breda SG., Rayman MP, Green FR, Verhage BAJ. Selenoprotein gene variants, toenail selenium levels, and risk of advanced prostate cancer. J Natl Cancer Inst 106(3):dju003. 2014.
5. Bodelier AGL, Smolinska A, Dallinga JW, van den Heuvel T, Masclee AAM, Jonkers D, Pierik MJ, Van Schooten FJ. VOCs in exhaled air as new non-invasive marker for disease activity in Crohn's disease: A metabolomic approach. Inflammatory Bowel Diseases. In press, 2015

Key reviews

1. Mariman EC. Future nutrigenetics: in search of the missing genetic variation. J Nutrigenet Nutrigenomics 2: 257-62, 2009. Review.
2. Mariman EC, Wang P. Adipocyte extracellular matrix composition, dynamics and role in obesity. Cell Mol Life Sci 67: 1277-92. 2010. Review.
3. Dennert G, Zwahlen M, Brinkman M, Vinceti M, Zeegers MPA & Horneber M. Selenium for preventing cancer. Cochrane Database of Systematic Reviews 11: 1-128, 2011.
4. Vanhees K, Vonhögen IG, Van Schooten FJ, Godschalk RW. You are what you eat, and so are your children: the impact of micronutrients on the epigenetic programming of offspring. Cell Mol Life Sci. 71: 271-85, 2014.
5. Smolinska A, Hauschild AC, Fijten RR, Dallinga JW, Baumbach J, Van Schooten FJ. Current breathomics – a review on data pre-processing techniques and machine learning in metabolomics breath analysis. J Breath Res. 8: 027105, 2014.

Key contributions to books

1. Godschalk R. Exocyclic DNA Adducts as Biomarkers of Antioxidant Defense and Oxidative Stress. In: Biomarkers for Antioxidant Defense and Oxidative Damage: Principles and Practical Applications. Editors: Aldini A, Yeum K-J, Etsuo N, Russel, 2010.
2. Singh A & Somvansh P. Bioinformatics: A brief introduction to changing trends in modern biology. In D. Barth, K. Blum & M.A. Madigan (Eds.), OMICS: Biomedical perspectives and applications (pp. 23-39). CRC Press, 2011.
3. Van Schooten FJ, Boots AW, Smolinska A & Dallinga JW. Volatile Organic Compounds as Exhaled Biomarkers of Inflammation and Oxidative Stress in Respiratory Diseases. In Studies on Respiratory Disorders (pp. 67-84). Editors: S.K. Jindal, N.K. Ganguly, P. Barnes, R. Pawankar, S. Biswa, Springer New York. 2014.
4. Dallinga JW, Smolinska A, van Schooten FJ. Analysis of volatile organic compounds in exhaled breath by gas chromatography-mass spectrometry combined with chemometric analysis. In Mass Spectrometry in Metabolomics, Methods Mol Biol. Volume 1198, pp 251-263. Editor: D Raftery. 2014.

4. Relevance to Society

Teaching at the BSc, MSc and PhD level in the life science and health science programmes of the Faculty of Health Medicine and Life Sciences, is a core activity of the staff. The knowledge transfer of staff members to undergraduate students is intense and demanding since the teaching load of the staff is usually 50% of their time. Generally, we recruit PhD students from our Master programmes or from our (inter)national networks. As we are involved in various Centres of Excellence there are several other specific training modalities that PhD students experience during their appointment, including contact with the industry. In many cases we have international exchange and collaborations that expose the PhD students and post-docs to the outside scientific world, and vice versa. As a result PhDs find appropriate positions in academic research groups in or outside the Netherlands. For postdocs that pursuit a further scientific career we stimulate to submit proposals for personal grants in EU context and VENI grants. Further, graduates from our MSc and PhD programmes find employment in Governmental bodies, National Public Health Institute (RIVM), R&D centres of industry (food and pharma companies and DSM), and diverse positions in municipal health centres (GGDs) and hospitals (policy and clinical trial manager).

We are working on relevant and important topics for public health in terms of early detection of environmental and dietary hazards, thus contributing to disease prevention. Our results have impact on society through our presence in governmental advisory bodies. Our key scientists are active in Dutch Health Council including ad hoc committees, ZON-NWO committees (VENI, VIDI, VCI and TOP grants), EFSA and ILSI-HESI, and European Chemical Industry Council (CEFIC). Furthermore, our collaborations with clinicians lead to a focus on early diagnosis and monitoring of disease and provides important information to personalised medicine. We have visibility in newspapers, radio and television, and have regular contact with

patient organisations. We also use more modern forms of outreach such as community engagement through wikis (most notably WikiPwathways) and activity on social media (Facebook and Twitter http://twitter.com/#!/ToxicologyUM).

Considering the vast expertise in the research line we are focused on concepts of personalised health and stimulate the use of results directly into patents and spin off in terms of starting companies. Diagnostics and therapeutics are increasingly developed side by side in integrated ways by corporations and non-profit organizations. Diagnostic technologies are used to target drugs to patients for their benefit but also to stratify patients. Diverse stratifying platforms are present within the research line making use of metabolomics (VOCs platform), proteomics (Maastricht Proteomics Centre), Bioinformatics (BiGCaT), and Genetics initiatives (Genetic Prevention Centre). Commercial spin-offs are Healthpotential (http://www.healthpotential.eu/en/) giving personalised health advice based on DNA and life style, and Xair Diagnostics BV (http://www.lifesciencesatwork.nl/profile/xair-diagnostics/) that develops diagnostics based on breath analysis. Valorisation is also achieved through the collaborating within several Dutch governmental and public private initiatives including the National Genomics Initiative and national Top Institutes including Top Institute Food & Nutrition (TIFN). Furthermore, researchers are active in several (inter)national institutions and the research finds directly its ways into organizations as Netherlands Food and Consumer Product Safety Authority, Netherlands Health Council. This relates to societal valorisation leading to input for risk assessment, regulation and legislation of chemicals and ingredients in food and environment.

Specific examples of demonstrable products of groups within the research line

- In the search for noninvasive biomarkers a methodology platform has been developed to analyse thousands of volatile chemicals (VOCs) in exhaled breath using GC-MS followed by multi-factorial analysis. Bio-statistical expertise and software suited to handle large datasets have been developed. We identified several sets of VOCs biomarkers indicative for severity of bowel diseases which are the basis for further clinical validation and valorisation.
- In the obesity research field, adipocyte-stress was proposed as a biological explanation for the high incidence of weight regain after weight loss. It adds a whole new dimension to the understanding of the growing problem of overweight and obesity worldwide. Additionally, the plasma protein ACE was uncovered by targeted proteomics and multivariate analysis as a risk predictor for weight regain, and will be a marker in personalised weight loss programmes for identifying subjects with increased risk.
- WikiPathways grew into one of the core international resources for biological pathways and the accompanying, much used, pathway tool PathVisio was extended with capacities to support more integrative systems biology approaches. We play a key role in systems biology interoperable projects like the ISA project (published in Nature Genetics) and the IMI Open PHACTS IMI project on semantic web knowledge approaches for pharma and biology in general. Our Identifier resolution solutions were adopted and expended Open PHACTS as an element in their core system.

4.1 Demonstrable products - Research products for societal target groups

Table 4.1 - Main categories of output for societal target groups (table format facultative)

Societal relevance: demonstrable products 2009-2014
Trained numerous (>100) MSc trainees and 39 PhD students that have found employment in food, academia and in governmental and non-governmental institutes, hospitals and industry. Contributed to numerous MSc and PhD training courses on toxicology, epidemiology, genomics and bioinformatics. Numerous presentations to general audiences about toxicology/nutrition/genetic susceptibility - Yearly Kidz University (12 yr olds), high school classes, patient organizations, non-academic associations.

4.2 Demonstrable use of products - Use of research products by societal groups

Societal relevance output: demonstrable use of research products 2009 - 2014
The Dutch Association of Stomach, Liver, and Intestinal Diseases used our breath research in their campaign in raise money for research; in 2012 a flyer was distributed to many households in The Netherlands. Developed a VOCs analysis pipeline and database that is implemented for profiling analyses and is available to collaborating partners nationally and internationally. Filed 7 patents in 2010 based on Breath analysis research in 2009.

4.3 Demonstrable marks of recognition - Marks of recognition by societal groups

Societal relevance output: demonstrable marks of recognition 2009 - 2014
Member of Dutch Health Council and several adhoc committees to advice Government on health issues. Dutch government pressed grant (NWO) to further commercially develop the exhaled air VOCs technology in 2010. Dutch Cancer Society project on genetic risks of colorectal cancer was adopted by Ride for the Roses 2010. The Joop Roels Impact Award 2013 for breath research in TIFN project 'Validation of biomarkers'. Food industry prize to recognise the best scientists and scientific achievements and to highlight the societal and industrial impact of research. Frequent appearances in national, regional and popular magazines (e.g. Volkskrant, NRC, Telegraaf, Trouw, Limburger, Spits, Quest, and many more...) Numerous appearances on television and radio; regional, national and international.

5. Viability

5.1 Benchmark

The researchers within the research line compete internationally and can be considered as leaders within their specific fields. Since the research is based on a trans-disciplinary approach and involves genetic epidemiology, genetic toxicology, metabolomics, proteomics and bioinformatics, the benchmark groups are rather heterogeneous in their background.

- Complex Genetics and Epidemiology; Genetic, Molecular and Cancer Epidemiology Group, Spanish National Research Centre (Prof. Malats). This group is comparable to our research line in relation to bladder cancer and genetic epidemiology.
- Genetic toxicology; Analytical and Environmental Sciences Division, MRC-PHE Centre for Environment & Health, King's College London (Prof. Phillips/Dr. Arlt). This group is comparable to our research line in relation to the research in DNA damage and repair. Collaborations are ongoing regarding inflammation and its influence on chemical carcinogenesis in the colon and lung.
- VOCs metabolomics; Breath Research Institute of the University of Innsbruck (Dr. Fillipiak/Prof. Amann). This group is internationally regarded as the leading group in the field and is constantly developing new approaches to analyse metabolites in breath that can be used as biomarkers of disease. We are comparable to this group and collaborate in attempts to apply for grants in Horizon 2020 on personalised medicine.
- Proteomics; Biomedical Research Institute of the University of Hasselt, Belgium (Prof. Noben). This group is performing proteomics with complementary technology in mass spectrometry. Therefore, we perform at about the same level, but in practice we complement each other, resulting in co-authorships on publications.
- Bioinformatics; The Donnelly Centre of the University of Toronto, Ontario (Prof Bader). One of the leading groups in the field of pathway and network biology, tool development and data structuring. We

compare to this group and collaborate in PathwayCommons databases using semantic web approaches to structure pathway and network data in a common language (BioPAX).

In comparison to these benchmark groups, we perform at a similar level and mutual interactions are present. To consolidate and strengthen our position we are continuing the integration of our expertise in the arena of epidemiology, proteomics, metabolism and bioinformatics. Our collaborative strategy is based on approaching the major health problems from different angles. We are highly equipped to do so, together with the incorporation of strategies that are able to group heterogeneous patient groups (or diseases) on molecular profiles that group individuals/patients on common characteristics, leading to alternative phenotyping. This is a perfect basis for personalised medical applications or tailored dietary advices. The focus on personalised medicine of granting agencies including Horizon2020 gives us an advantage in applying for funding. Our strategic involvement in governmental bodies, connections to food industry and partnering in public-private collaborations together with the appointment of two new chair holders provide a perfect environment for sustained success in the field of gene-environment-nutrition interaction. The viability of the research line is also exemplified by the strength of the research staff that maintained a high level of scientific output notwithstanding the departure of two-third of research input due to the departure of toxicogenomics and epidemiology to another research school.

5.2 SWOT-analysis

Strengths
- Internationally acknowledged and competitive expertise in Molecular Epidemiology, Biomarkers research, Nutrigenomics, Proteomics and Bioinformatics at the fundamental and applied level.
- The integration of excellent technical and intellectual expertise to study comprehensively mechanisms behind dietary influences on health, genetic predisposition and toxicology.
- Studying nutrition and health using both in vitro and in vivo: (primary) cell cultures, experimental animal models, as well as translational, aetiological and randomised intervention studies in humans.
- Strong alignment with FHML/MUMC+ research strategies in relation to prevention and quality of health.
- Our international network and research collaborations (open source and open data approach based).

Weaknesses
- We depend greatly on advanced analytical equipment and there is no general budget available for expensive equipment.
- The difficulty of recruiting excellent national and international researchers to Maastricht University
- Lack of success in obtaining personal grants at the top level (VIDI-VICI).

Opportunities
- Systems Biology tools are powerful avenues to unravel relations between environment, diet, genetic susceptibility in maintaining health and onset of disease.
- Applications of omics-biomarkers to be applied in population studies, diseased groups and in dietary intervention studies.
- Growing interest of food industry in personalised nutrition and health and offers possibilities for commercial valorisation
- Excellent possibilities for interaction with the clinic.
- A core-point for multivariate statistical analysis and machine learning.

Threats
- Critical mass of the research line has decreased (in relation to the other research lines) and may influence effectiveness in relation to (inter)national competitors.
- Reduction of national research funds and as a consequence difficulty in obtaining research funding.

6. Reflection and future strategy

6.1 Reference to previous assessments

In the previous assessment (VLAG-Nutrim external review 2009) the research line was judged for scientific quality very good (4), productivity very good (4), relevance very good (4), and for vitality and feasibility excellent (5). This indicates that we are performing high quality research and that there is still space for improvement. The committee reported that the quality of the scientific research is high and the group is leading in their fields of bioinformatics, proteomics, toxicogenomics, biomarkers of DNA damage and repair. It was concluded that the societal relevance may seem somewhat limited for the mostly basic research, but all the research results are foreseen to become utmost applicable for the identification, understanding and characterization of nutritional, environmental and lifestyle factors in the onset of chronic diseases. To accommodate this societal point and to realize that our scientific results will be used for regulatory and governmental purposes an honorary position is created for Prof Dr. A Opperhuizen who is director Risk assessment and Research programming (BuRo) within the Netherlands Food and Consumer Product Safety Authority. Already three collaborative PhD students have started dealing with lifetime exposures in relation to disease risks and how to implement the findings in health policy and legislation (1. the risks and benefits of dietary supplements in elderly, 2. smoking behaviour and topography in relation to carcinogenic compounds in tobacco, 3. in utero dietary exposures and epigenetic changes later in life).
During the midterm review in 2012 NUTRIM was structured with 3 horizontal research lines (research line 1,2 and 3) and 1 vertical line (research line 4). The idea behind this is that research line 4 has the core techniques, methodological approaches and facilities that are of importance to study research questions in the other research lines. However it was recommended to regard the research line as a free standing horizontal line in the structural diagram since the research line has its own individual research questions to answer. Indeed a parallel orientation is preferred and within this position collaborations are sought with the other more clinical research lines.
The toxicogenomics programme focusing on alternatives for animal testing did not follow the policy direction of NUTRIM towards more clinical translational research. Therefore this programme was transferred to GROW in which this type of research is better placed. At the same time this change also encountered the remark in the assessment that the research line was rather broad in disciplines.

6.2 Viability and future strategy

In 2014 co-leadership was introduced by appointing Prof Maurice Zeegers as vice- leader of the research line for reasons of rejuvenation and to share responsibilities. Every half year, PIs and representative staff members of the research line meet to discuss managerial issues of organisational, financial or scientific nature. This discussion platform not only serves for streamlining new developments, but also functions as an intermediate between the directory and the researchers. With the complete research line we have bimonthly research meetings in which a short update is given by the research line leader on developments within the organisation followed by a research presentation from involved researchers. Within the participating departments weekly scientific meetings with representative of all levels of personnel, plenary meetings on research and education, and journal clubs (with PhD students) are organized. Interactions between staff members, both in the research line and in the departments, are further strengthened via the educational responsibilities. All senior staff members are encouraged to come up with new ideas and submit research grants and to be responsible for their own research funding. Important interactions are achieved within the department's yearly lab trips, summer BBQ and winter Xmas parties.

Because of our scientific competences in Toxicology, Epidemiology, Genetics, Cell Biology, Bioinformatics we have many collaborations and joined projects with clinical groups, both on the national and the international level. We will continue our transdisciplinary approach in relation to gene-diet-environment interactions using the complete experimental set-up from cell culture experiments, experimental animals to human intervention studies and clinical situations. Within the Genetics and Metabolomics research the expansion of Biostatistics of handling large datasets will have special attention and we are building a core-unit on multivariate analysis. The Complex Genetics research will further extend its focus to systems

medicine, genetics and epidemiology of complex disorders, personalised prevention and personalised medicine. We intend to study inflammatory processes in order to better understand the natural history of pulmonary and colonic diseases including carcinogenicity. Our methodologies can be of great help in diagnosis, directing treatment, and to elucidate dietary protective mechanisms in high risk groups. In the coming years, research on dietary phytochemicals and their health promoting activities will focus on new molecular mechanisms and the risk-benefits of these compounds, including prenatal exposures.
The research line has excellent prospects because of 1) the relevance and strategic position of the research topics, 2) the multidisciplinary and excellence of the tenured staff, 3) the (inter)national network and high level of research quality.

Appendix 1 - Research staff at research unit level

Funding:

1= Direct funding by the University (research staff, lab technicians (supporting staff) and PhD students)

2 = Research grants obtained in national and

3 = Research contracts for specific research projects obtained from external organisations, such as industry, governmental ministries, European Commission, charity organisations

4= Funds that do not fit into the other categories (especially projects funded by reserves held by research groups within NUTRIM)

FTE: fte's employed at 31-dec of any year

		2009	2010	2011	2012	2013	2014
Staff		FTE	FTE	FTE	FTE	FTE	FTE
Full professors	**Funding**	**2,10**	**1,75**	**1,30**	**2,10**	**2,10**	**2,75**
Bekers O.	1	0,00	0,00	0,00	0,00	0,00	0,05
Dieijen-Visser M	1	0,05	0,05	0,05	0,05	0,05	0,05
Evelo C.	1	0,00	0,00	0,00	0,00	0,00	0,80
Kleinjans J	1	0,45	0,45	0,00	0,00	0,00	0,00
Mariman E	1	0,75	0,50	0,50	0,50	0,50	0,50
Ramaekers FCS	1	0,10	0,00	0,00	0,00	0,00	0,00
Schooten FJ	1	0,55	0,55	0,55	0,55	0,55	0,55
Zeegers, MPA	1	0,20	0,20	0,20	1,00	1,00	0,80
Associate professors	**Funding**	**1,25**	**2,25**	**1,15**	**1,15**	**1,15**	**0,15**
Delft van JHM	1	0,45	0,45	0,00	0,00	0,00	0,00
Evelo C.	1	0,00	1,00	0,80	0,80	0,80	0,00
Kok de T	1	0,45	0,45	0,00	0,00	0,00	0,00
Menheere P	1	0,05	0,05	0,05	0,05	0,05	0,05
Wodzig K	1	0,30	0,30	0,30	0,30	0,30	0,10
Assistant professors	**Funding**	**3,50**	**4,31**	**2,41**	**3,51**	**3,51**	**3,56**
Boer de D.	1	0,00	0,00	0,05	0,05	0,05	0,05
Bons J.	1	0,00	0,00	0,00	0,00	0,00	0,05
Boots AW	1	0,00	0,00	0,00	0,40	0,40	0,40
Briede JJ	1	0,45	0,45	0,00	0,00	0,00	0,00
Chiu R.	1	0,50	0,50	0,00	0,00	0,00	0,00
Coort S.	1	0,00	0,00	0,50	0,50	0,50	0,50
Dallinga J	1	0,20	0,46	0,46	0,46	0,46	0,46
Damoiseaux J.	1	0,00	0,00	0,00	0,00	0,00	0,05
Eijssen L.	1	0,00	1,00	0,00	0,00	0,00	0,00
Gielen M	1	0,70	0,40	0,40	0,40	0,40	0,40
Godschalk, R	1	0,45	0,45	0,45	0,45	0,45	0,45
Lindsey P	1	0,20	0,05	0,05	0,05	0,05	0,00
Renes JW	1	0,50	0,50	0,50	0,50	0,50	0,50
Tilburg van J	1	0,50	0,50	0,00	0,00	0,00	0,00
Willighagen E.	1	0,00	0,00	0,00	0,70	0,70	0,70
Post-docs	**Funding**	**10,60**	**15,85**	**1,50**	**4,10**	**3,30**	**3,60**
Boorsma A	2	0,80	0,80	0,00	0,00	0,00	0,00
Boots AW	3	0,00	0,00	0,00	0,10	0,10	0,10
Boots AW	3	0,00	0,00	0,00	0,00	0,20	0,20
Breda van S	3	1,00	1,00	0,00	0,00	0,00	0,00
Coort S.	1	0,00	0,80	0,00	0,00	0,00	0,00
Eijssen L.	1	0,00	0,00	0,70	0,70	0,00	0,00
Eijssen L.	3	0,00	0,00	0,00	0,00	0,70	0,70
Hebels D	3	0,00	1,00	0,00	0,00	0,00	0,00
Iersel van M	2	0,00	1,00	0,00	0,00	0,00	0,00
Jennen D.	1	1,00	0,65	0,00	0,00	0,00	0,00
Kutmon M.	9	0,00	0,00	0,00	0,00	0,00	0,75
Leeuwen van DM	3	1,00	1,00	0,00	0,00	0,00	0,00
Lizarraga Lopez D.	2	1,00	1,00	0,00	0,00	0,00	0,00
Mathijs K	3	0,00	1,00	0,00	0,00	0,00	0,00

Saito J.	*3*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Smolinska A.	*3*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*
Timmermans L.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Tsamou M.	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Tsamou M.	*3*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Vanhees K.	*3*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*
Vettorazzi Armental A.	*3*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Wang P	*1*	*0,00*	*0,80*	*0,80*	*1,00*	*0,00*	*0,00*
Wang P	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Wesselius A.	*1*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*
Wesselius A.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,80*
Willighagen E.	*3*	*0,00*	*0,00*	*0,00*	*0,30*	*0,30*	*0,05*
PhD Students		***28,80***	***26,40***	***7,90***	***6,90***	***6,90***	***11,00***
Berkel van J	*1*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Hebels D	*1*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Rosenow A.	*1*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*
Veith C.	*1*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,75*
Wesselius A.	*1*	*0,00*	*0,00*	*0,00*	*1,00*	*0,00*	*0,00*
Dutta A.	*2*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*
Hettne K.M.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Hof v.d. W.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Janssen S	*2*	*0,00*	*0,60*	*0,00*	*0,00*	*0,00*	*0,00*
Katika M.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Kelder T.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Kesteren van P	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Magkoufopoulou C.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Rieswijk L.	*2*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Roumans N.	*2*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*
Schmeits P.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Shao J.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Summeren van A.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Theunissen P.T.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
van Kol - Janssen S	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Veen v.d. J.	*2*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Verhallen D	*2*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Verhallen D.	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Vink R.	*2*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*
Baranska A.	*3*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*
Doedée A.	*3*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Fijten R.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*
Hermsen S.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Hochstenbach K.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Iersel van M	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Jetten M.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Jong de H.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Linschooten J.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Park - van der Zee M.	*3*	*0,80*	*0,80*	*0,00*	*0,00*	*0,00*	*0,00*
Pauwels C.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Rosenow A.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Schults M.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Smeets B.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Stewart K.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Tonk I.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Urlings M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Vanhees K.	*3*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Veith C.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,25*
Verhofstad N	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Waagmeester A.	*3*	*0,00*	*0,00*	*0,90*	*0,90*	*0,90*	*0,00*
Wilde de J	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Adriaens M.	*9*	*1,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*

Cirillo E.	*9*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Deferme L.	*9*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Kutmon M.	*9*	*0,00*	*1,00*	*1,00*	*1,00*	*1,00*	*0,00*
Total scientific staff		***46,25***	***50,56***	***14,26***	***17,76***	***16,96***	***21,06***
Support staff		***10,54***	***11,74***	***4,84***	***3,74***	***3,74***	***6,70***
Melius J.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Bouwman FG	*1*	*0,8*	*0,80*	*0,80*	*0,80*	*0,80*	*0,80*
Elizalde Vilalta M.	*1*	*0,00*	*0,00*	*0,25*	*0,00*	*0,00*	*0,00*
Henfling MER	*1*	*0,10*	*0,10*	*0,10*	*0,00*	*0,00*	*0,00*
Herwijnen van M.	*1*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Maas L.	*1*	*1,00*	*1,00*	*1,00*	*1,00*	*1,00*	*1,00*
Moonen E.	*1*	*0,54*	*0,54*	*0,54*	*0,54*	*0,54*	*0,54*
Pachen DMFA	*1*	*0,40*	*0,40*	*0,40*	*0,40*	*0,40*	*0,40*
Ajvazova S.	*2*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Elizalde Vilalta M.	*2*	*0,00*	*1,00*	*0,75*	*0,00*	*0,00*	*0,00*
John C.	*2*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Luijk J.	*2*	*0,00*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*
Claessen S.	*3*	*0,90*	*0,90*	*0,00*	*0,00*	*0,00*	*0,00*
Schulpen S.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Sthijns M.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*1,00*
Timmermans L.	*3*	*0,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
da Silva Nunes N.	*1*	*0,00*	*0,00*	*0,00*	*1,00*	*1,00*	*1,00*
Mohren R	*4*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,50*
John C.	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Beckers L.	*2*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Bilican A.	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Gottschalk WHR	*3*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Moonen E.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,46*
Gaj S	*2*	*0,80*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Other Staff		***3,05***	***3,00***	***0,00***	***0,00***	***0,00***	***0,00***
Schlooz R	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Beek van de H.	*3*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Reijnders R	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Engelen-Janssen RAM	*1*	*0,05*	*0,00*	*0,00*	*0,00*	*0,00*	*0,00*
Melman A.	*3*	*1,00*	*1,00*	*0,00*	*0,00*	*0,00*	*0,00*
Total staff		***59,84***	***65,30***	***19,10***	***21,50***	***20,70***	***27,76***

Appendix 2 – Mini Curricula

Name: Frederik-Jan van Schooten
E-mail: F.vanschooten@maastrichtuniversity.nl
URL:

GENERAL INFORMATION
Date of birth: 06-02-1958
Current position: Professor
Fields of Expertise: Genetic Toxicology

QUALIFICATIONS:

- Masters in Medical Biology, Main subjects Immunology, Microbiology & Molecular Toxicology, Free University, Amsterdam, The Netherlands, 1985
- PhD in Natural Sciences, Leiden University, Leiden, The Netherlands, 1991

SCIENTIFIC CAREER:

1985-1991	Staff member, Dept Molecular Carcinogenesis, Netherlands Cancer Institute, Amsterdam
1991-2001	Associate Professor, Dept Health Risk Analysis and Toxicology, Maastricht University
2001-now	Full Professor, Dept Toxicology, Maastricht University
1999-2012	Head Dept Health Risk & Toxicology, FHML, Maastricht University
2007-2010	Head Dept Bio-informatics, FHML, Maastricht University
2011-2013	Head Dept Methodology & Statistics, FHML, Maastricht University
2005-2008	Vice-dean of Faculty Health Medicine and Life Science, Maastricht University
2000-now	Leader Research Line Gene-Environment Interactions, NUTRIM

OUTPUT:
Publications:

- Number of publications in international refereed scientific journals according to WoS: 190
- Contributions to books: 10
- Number of citations according to GoogleScholar: 6148 ; H-index: 47

Patents: 7 applications
Supervision of PhD theses: 20 completed
Scientific teaching: 50% of time in undergraduate programmes related to molecular biology, genetics, environmental chemistry, pharmacology, toxicology

Three key publications 2009 – 2014:

- Schults MA, Timmermans L, Godschalk RW, Theys J, Wouters BG, Van Schooten FJ, Chiu RK. Diminished carcinogen detoxification is a novel mechanism for hypoxia-inducible factor 1-mediated genetic instability. J Biol Chem 285: 14558-64, 2010.
- Verdam FJ, Dallinga JW, Driessen A, De Jonge C, Moonen EJ, Van Berkel JB, Luijk J, Bouvy ND, Buurman WA, Rensen SS, Greve JW, Van Schooten FJ. Non-alcoholic steatohepatitis; a non-invasive diagnosis by analysis of exhaled breath. J Hepatol. 58: 543-8, 2013.
- Geybels MS, van den Brandt PA, Schouten LJ, Van Schooten FJ, van Breda SG., Rayman MP, Green FR, Verhage BAJ. Selenoprotein gene variants, toenail selenium levels, and risk of advanced prostate cancer. J Natl Cancer Inst 106:dju003, 2014.

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals

- Associate Editor for Toxicology Research (2012 ->) (RSC publishing; handling all manuscripts, review process and making final decisions, time around 0.5 day/week)
- Editorial Board of Mutation Research–Reviews (2015 ->)
- Editorial Board of Journal of Breath Research (2015 ->)
- Editorial Board Member Mutagenesis (2005 - 2013)

Membership of national and international scientific organizations:

- Dutch councilor European Environmental Mutagen Society (2005 - 2012)
- Member of the Advisory Board Postgraduate Education in Toxicology (PET) (2011 ->)
- Member of American Ass Cancer Res, Eur Env Mutagen Soc, Eur Resp Soc

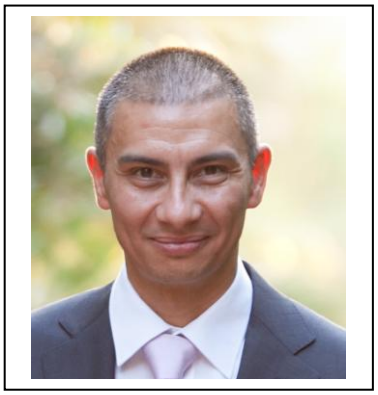
RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Member of Dutch Health Council committees 'Risk groups', 'Prenatal Exposures to Chemicals' and 'Trend Analysis Biotechnology' (2008 ->)
- General Member of Dutch Health Council (2015 ->)
- Advisor of diverse Appointment and Promotions committees in NL, Denmark, UK, USA.

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- TIFN grant (2011-2015). Project Validation of Biomarkers of Gut Health. Top Institute Food and Nutrition Theme Gastro-intestinal Health. PIs: C Wijmenga and FJ van Schooten. Total Amount: € 4.448.833. Amount FJ van Schooten: €1.021.776.
- ZonMW NGI preseed grant 93610001 (2010-2013). XAir Diagnostics; a metabolomic approach in exhaled air for diagnosis and monitoring of inflammatory diseases. PI: FJ van Schooten. Amount: €250.000. Personnel: research assistant.
- Dutch Cancer Society KWF UM 2009-4556 (2010-2014). Oxidative stress, selenium status, genetic variation and the risk of advanced prostate cancer. PIs: PA van den Brandt, BAJ Verhagen, FJ van Schooten. Amount: €480.000.
- NUTRIM financed grant (2010-2013). Metabolomics of volatile organic compounds to monitor inflammatory bowel diseases and pulmonary infections. PI: FJ van Schooten. Amount: €250.000.
- Dutch Cancer Society KWF UM 2009-4281 (2009-2013). Energy balance and risk of colorectal cancer: the role of genetic variation and methylation of insulin-related genes. PIs: M.P. Weijenberg, M van Engeland, FJ van Schooten. (project adopted by Ride for the Roses 2010). Amount: €430.000.
- EU-FP6-FOOD-CT-2005-513943 (2005-2010) and EU-FP7-KBBE-2010-4266198 (2011-2015). Network of Excellence ECNIS; Environmental cancer risk, nutrition and individual susceptibility. Coordinator K Rydszynski (PL). Amount PI FJ van Schooten: €560.000.
- EU-FP6-FOOD-CT-2005-016320-2 (2005-2010). Integrated Project NewGeneris: Newborns and Genotoxic exposure risks: development and application of biomarkers of dietary exposure to genotoxic and immunotoxic chemicals and of biomarkers of early effects, using mother-child birth cohorts and biobanks. Coordinator J Kleinjans (NL). Amount PI FJ van Schooten: €350.000.

Name: Prof. Dr. Maurice Zeegers
E-mail: m.zeegers@maastrichtuniversity.nl
URL: http://www.maastrichtuniversity.nl/web/Profile/m.zeegers.htm



GENERAL INFORMATION
Date of birth: 11-04-1972
Current position: Professor
Fields of Expertise: Complex Genetics and Epidemiology

QUALIFICATIONS:
- Bc. Occupational Therapy (1994)
- MSc. Health Promotion (1997)
- MSc. Epidemiology (1998)
- PhD. Health, Medicine and Life Sciences (2001)
- MSc. Genetic Epidemiology (2002)

SCIENTIFIC CAREER:
1993 Occupational Therapist
1997 PhD Student (Maastricht University)
2001 Assistant Professor (Maastricht University)
2004 Reader and Head of Unit (Birmingham University, UK)
2006 Professor and Head of Unit (Birmingham University, UK)
2013 Professor and Head of Department Complex Genetics (Maastricht University)

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: 181
- Contributions to books: 5 Chapters, Author of Leerboek Epidemiologie
- Number of citations according to WoS: 7135 ; H-index: 49

Patents: none
Supervision of PhD theses: 23
Scientific teaching: 20% in Epidemiology, Genetics & Statistics (under and postgraduate).

Three key publications 2009 – 2014:
- Kiemeney, L.A., et al., A sequence variant at 4p16.3 confers susceptibility to urinary bladder cancer. Nat Genet, 2010. 42(5): p. 415-9.
- Touwslager, R.N.H., et al., Genetic and environmental factors in associations between infant growth and adult cardiometabolic risk profile in twins. American Journal of Clinical Nutrition, 2013. 98(4): p. 994-1001.
- Vinceti, M., et al., Selenium for preventing cancer. Cochrane Database Syst Rev, 2014. 3(3).

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- Editor in Chief of the journal OA Epidemiology
- Associate Editor for Epidemiology and Health Outcomes for BMC Urology
- Editorial Board member of the International Journal of Occupational and Environmental Medicine

Membership of national and international scientific organizations:
- President of the Netherlands Epidemiology Society
- Vice-president of the European Epidemiology Federation
- Founding chair of the International Association for Law and Epidemiology

RELEVANT JOB-RELATED SOCIAL POSITIONS:
- Director of HealthPotential®, a personalised genetics company in a partnership between the department of Complex Genetics of FHML and Maastricht University
- Executive board member of the cluster of Genetics & Cell Biology at Maastricht University
- Vice-chair of Research Line Gene-Environment Interactions, NUTRIM

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS:

- Cancer Research UK 2005-2010, A5738 (previous Chief Investigator, joint-PI with KK Cheng). Bladder cancer recurrence and progression, £1,900,000
- Medical Research Council 2008-2012, G0800808 (PI for Genetic Epidemiology and Complex Genetics, CI: C Billingham). Midland Hub for Trials Methodology Research at University of Birmingham, £3,311,502
- Maastricht University, Luik 3, 2013-2017 (co-PI with A. Schols). Eatwell combats Globesity, € 1,490,000
- European Chemical Industry Council, LRI Innovative Science Award, 2014, LRI-Q3-UM (PI). Research Integrity: Selective citation in science based decision-making. € 1,000,000

Name: Edwin C.M. Mariman
E-mail: e.mariman@maastrichtuniversity.nl
URL:

GENERAL INFORMATION
Date of birth: 24-02-1955
Current position: Professor
Fields of Expertise: Functional Genetics

QUALIFICATIONS:
- Bachelor in Chemistry, University of Nijmegen, 'cum laude', 1976
- Master in Chemistry, University of Nijmegen, 'cum laude, 1979
- PhD in Mathematics and Natural Sciences, University of Nijmegen, 1983
- Basic Qualification in Education
- Integrated Management 1996

SCIENTIFIC CAREER:
- Assistant Professor, Human Genetics, University of Nijmegen, 1990
- Head of Molecular Research Division, Human Genetics, University of Nijmegen, 1990
- Head of DNA-Diagnostics Section, Clinical Genetics Centre, Academic hospital Nijmegen, 1995
- Associate Professor, Human Genetics, University of Nijmegen, 2000
- Full Professor of Functional Genetics, Maastricht University, 2001

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals according to WoS: **242**
- Contributions to books: **2**
- Number of citations according to WoS: 7946 ; H-index: 46

Patents: 1 application
Supervision of PhD theses: 18 completed
Scientific teaching: 50% of time in undergraduate programs, this year: coordinator of two courses and, in addition, member of the organizing team for 3 courses.

Three key publications 2009 – 2014:
- Jans A, Konings E, Goossens GH, Bouwman FG, Moors CC, Boekschoten MV, Afman LA, Müller M, Mariman EC, Blaak EE. PUFAs acutely affect triacylglycerol-derived skeletal muscle fatty acid uptake and increase postprandial insulin sensitivity. Am J Clin Nutr. 95(4):825-36, 2012.
- Circulating ACE is a predictor of weight loss maintenance not only in overweight and obese women, but also in men. Wang P, Holst C, Wodzig WK, Andersen MR, Astrup A, van Baak MA, Larsen TM, Jebb SA, Kafatos A, Pfeiffer AF, Martinez JA, Handjieva-Darlenska T, Kunesova M, Viguerie N, Langin D, Saris WH, Mariman EC; Diogenes consortium. Int J Obes (Lond). 36(12):1545-51,2012.
- Rosenow A, Noben JP, Jocken J, Kallendrusch S, Fischer-Posovszky P, Mariman EC, Renes J. Resveratrol-induced changes of the human adipocyte secretion profile. J Proteome Res. 11(9):4733-43, 2012.

RELEVANT SCIENTIFIC SERVICES:
Membership of editorial boards of international scientific journals:
- Editorial Board of Genes & Nutrition
- Editorial Board of Journal of Nutrigenetics and Nutrigenomics
- Editorial Board of World Journal of Diabetes

Membership of national and international scientific organizations:
- European Network of Excellence NuGO
- European Association for the Study of Diabetes
- International Society of Nutrigenetics and Nutrigenomics

RELEVANT JOB-RELATED SOCIAL POSITIONS:

- Steering Committee member of Concor, the organisation for the research on cor vitiae in the Netherlands
- Member of the National Academy for Food Sciences
- Member of the scientific advisory committee for NWO-TOP grants

MAJOR SCIENTIFIC AWARDS / PRIZES / GRANTS (as principal coordinator):

- NutriGenomics Consortium (2006-2010). Research on early genomics markers for response of skeletal muscle to a high fat diet. PhD position, €350.000.
- NGC Toxicogenomics (2008-2012). Proteomics research on in vitro liver toxicity testing. PhD position. €320.000.
- NUTRIM financed grant (2010-2013). Development of multiplex proteomics biomarker assays for complete biological pathways. Postdoc position. €280.000.
- NWO TOP grant (2011-2016). An adipocyte-driven model for weight regain after weight loss. 2PhD, 1 dietician. €675.000.
- Enabling Technology (2014-2016). Ceramide analysis in the context of Alzheimer disease. Part-time technician. €263.000.

Name: Otto Bekers
E-mail: O.Bekers@mumc.nl
URL:

GENERAL INFORMATION
Date of birth: 18-08-1961
Current position: Professor
Fields of Expertise: Clinical Chemistry

QUALIFICATIONS:
- Bachelor Analytical Chemistry, 1983
- Master in Pharmacy, 1987
- PhD degree, 1991
- Clinical Chemist, 1996
- Registrated auditor Council of Accreditation, 2005
- Avicienna Leadership program, 2014

SCIENTIFIC CAREER:

1997-2012	Staff member, Department of Clinical Chemistry, University Hospital Maastricht
2012-2014	Acting Head, Central Diagnostic Laboratory, Maastricht University Medical Center
2014-now	Head Central Diagnostic Laboratory, Maastricht University Hospital Maastricht
2014-now	Extraordinary professor of Clinical Chemistry

OUTPUT:
Publications:
- Number of publications in international refereed scientific journals: 115
- Number of citations according to GoogleScholar: 1555 ; H-index: 21

Supervision of PhD theses: 2 completed
Scientific teaching: teaching Clinical Chemistry in master degree FHML

Three key publications 2010 – 2014:
- Wijnen PA, Bekers O, Drent M. Relationship between drug-induced interstitial lung diseases and cytochrome P450 polymorphisms. Curr Opin Pulm Med. 2010;16:496-502.
- van Wijk S, Jacobs L, Eurlings LW, van Kimmenade R, Lemmers R, Broos P, Bekers O, Prins MH, Crijns HJ, Pinto YM, van Dieijen-Visser MP, Brunner-La Rocca HP. Troponin T measurements by high-sensivity vs conventional assays for risk stratification in acute dyspnea. Clin Chem 2012;58:284-92.
- Cornelis T, van der Sande FM, Eloot S, Cardinaels E, Bekers O, Damoiseaux J, Leunissen KM, Kooman JP. Acute Hemodynamic response and uremic toxin removal in conventional and extended hemodialysis and hemofiltration: a randomized crossover study. Am J Kidney Dis. 2014;64:247-56.

Work experience

1994-2004	Secretary/treasurer of the committee Management education Residents Clinical Chemists by the Dutch Association for Clinical Chemistry and Laboratory Medicine
1998-2000	Member of the Board for Quality azM
1997-2001	Chair KRAM-platform Laboratories azM
1997-2007	Member of the board and froem 2001 chair of the Beckman Synchron group Netherlands
2000-2009	Member of the committee Accreditation of the Dutch Association for Clinical Chemistry and Laboratory Medicine
2002-2009	Secretary of the Clinical Chemist Region Limburg
2004-2014	Member of the committee Medical Laboratory education of the Dutch Association for Clinical Chemistry and Laboratory Medicine
2009-2015	On behalf of the NVKC, representative in the National field consultation Domain Applied Sciences (DAS)
2008-now	Member of the working field committee Biology and Medical Laboratory education of the Graduate School Zuyd Heerlen

1997-now	Next to various department and general hospital committees, member staff convent MUMC+ and chair of the Automation council Laboratories
2014-now	Member Management Team RVE Imaging & Laboratories
2014-now	Head Central Diagnostic Laboratory and Professor in Clinical Chemistry