

On the transition towards a sustainable diet: assessing the safety of novel proteins produced by cellular agriculture

OBJECTIVE

Contributing to the transition towards a safe and sustainable diet. Our research project aims to investigate the safety of novel proteins derived from cellular agriculture, a revolutionary and innovative technology that allows to meet future food protein needs using sustainable alternatives to traditional animal farming. Our project focuses on assessing the potential toxicological risks associated with these proteins, including allergenicity, anti-nutritional effects, genotoxicity, endocrine disruption and digestibility. Additionally, we aim to understand the legislative requirements for the safety assessment of these novel proteins and their production methods to ensure they meet regulatory standards and can be safely integrated into the market.

METHODOLOGY

- Combining a multifaceted approach combining in vitro, in silico and in vivo models. Special attention will be given to the potential application of New Approach Methodologies (NAMs) and animal-free methods.
- Advanced in silico tools will be used to predict allergenicity of the novel proteins. These predictions are validated through immunological assays.
- Digestibility is examined through static and dynamic simulated gastrointestinal digestion models, followed by absorption studies using cell cultures to mimic human intestinal processes.
- Standardized in vitro bioassays will be employed to study ensuring comprehensive evaluation of potential DNA damage and endocrine disruption to evaluate the presence of potential hormonally active agents.
- Throughout the project, we will engage with regulatory experts to align our research with current legislative frameworks and safety assessment guidelines.

KEY FINDINGS

- Preliminary data from digestibility studies reveal that these proteins are efficiently broken down during gastrointestinal digestion, indicating their suitability as a nutritional source.
- Review of regulatory requirements will provide valuable insights into the legislative landscape, helping to shape our safety assessment protocols and ensuring compliance with food safety standards.
- By focusing on a multifaceted approach, we will contribute to the transition towards the integration of safe and sustainable protein sources in our diet.

SCIENTIFIC AND/OR SOCIETAL IMPACT

This research has significant scientific and societal implications. Scientifically, it advances our understanding of the safety profile of novel proteins derived from cellular agriculture, contributing to the broader field of food safety and toxicology. Our findings provide a robust framework for assessing the safety of similar biotechnological innovations in the future. Societally, this project supports the development of sustainable food systems by validating the safety of alternative protein sources, thereby reducing reliance on traditional animal agriculture. This transition not only promotes environmental sustainability but also addresses ethical concerns related to animal welfare. Ultimately, our research aims to facilitate the acceptance and integration of cellular agriculture products into the market, ensuring they are safe for consumers and beneficial for society at large.

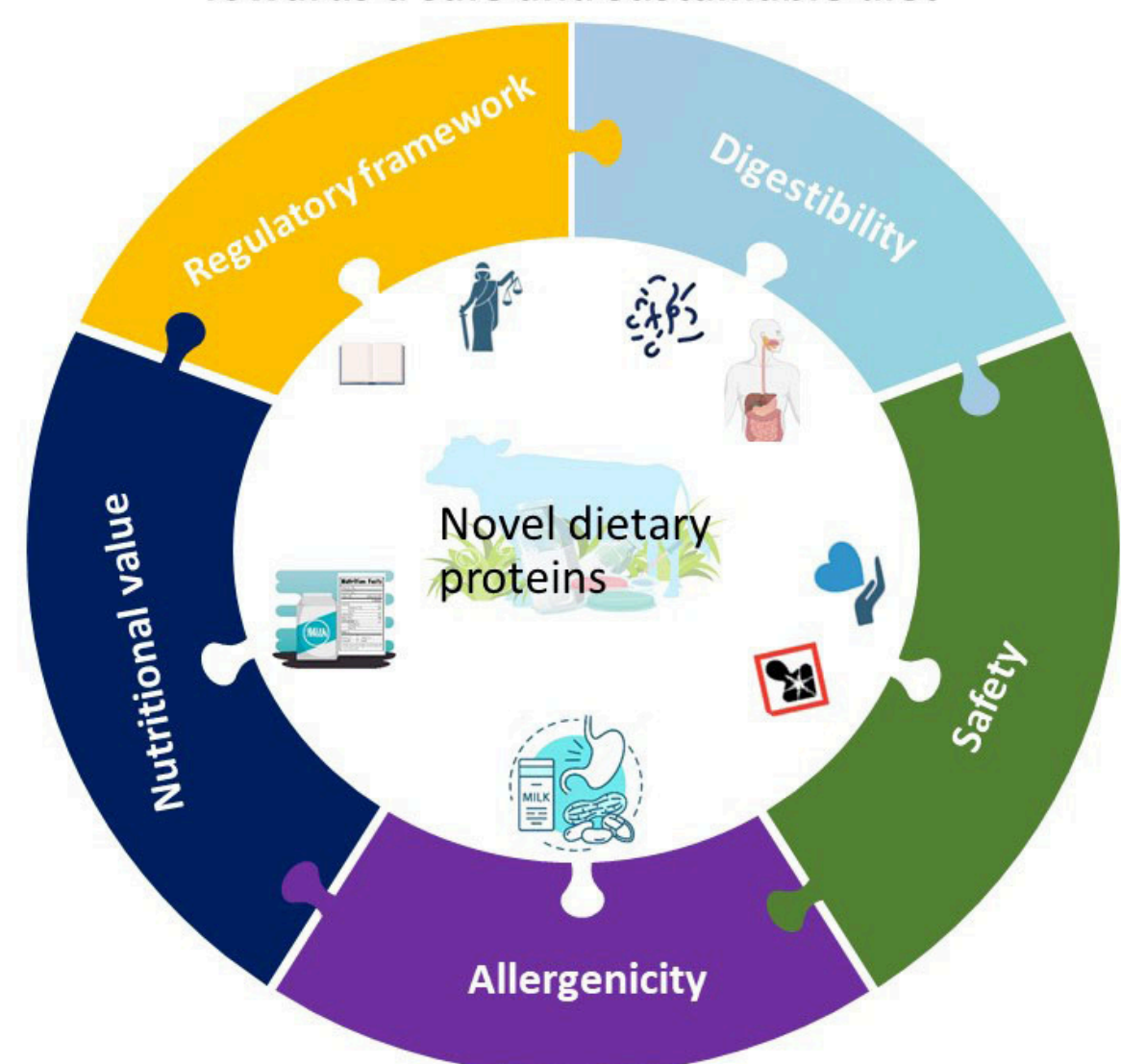
MORE INFORMATION New Food Collective: www.nextfoodcollective.nl/protein-transition/protein-transition-20

Who's Involved

Dr. Misha Vrolijk (PI),
Involved researchers: Prof. Dr. Frederik Jan van Schooten, Dr. Alie de Boer (FSE), Dr. Miriam Urlings (FSE), Drs. Vaios Fytsilis.

NUTRIM Dept. of Pharmacology and Toxicology

Towards a safe and sustainable diet



Maastricht University



Maastricht UMC+