

## **Book of Abstracts and Bios**

Scientific Colloquium 27 "Cell culture-derived foods and food ingredients" | 11-12 May 2023, Brussels and online



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# SCIENTIFIC COLLOQUIUM 27 "CELL CULTURE-DERIVED FOODS AND FOOD INGREDIENTS"

11-12 May 2023, Brussels and online

#### SESSION 1: OPENING SESSION

Chair: Helle Katrine Knutsen – Norwegian Institute of Public Health (NIPH) (NO)



#### **BIO**

Helle Katrine Knutsen is Senior Scientist at the Norwegian Institute of Public Health. She is toxicologist with PhD from the University in Oslo in cell and molecular biology and has more than 20 years' experience in risk assessment of contaminants in food. Dr Knutsen is member of the EFSA Panel on Nutrition, Novel Foods and Food Allergens (NDA) and is chair of the EFSA NDA working group on Novel Foods since 2018. She is former member of the EFSA Panel on Contaminants (CONTAM) (2009-2018) and was CONTAM Chair 2015-2018. Her current research engagement is related to bio-monitoring of contaminants and effects of exposure to environmental contaminants on infant and child development.

#### OVERALL OBJECTIVES OF THE SCIENTIFIC COLLOQUIUM

Speaker: Guilhem De Seze - European Food Safety Authority (EFSA)





Guilhem de Seze is Head of the Risk Assessment Production (ASSESS) Department at the European Food Safety Authority (EFSA). Together with external experts from the 10 sectoral scientific panels of EFSA, the staff of the ASSESS department prepare scientific advice for decision makers in the European Union to farm to support the management of risks in the food chain, from Guilhem joined EFSA in 2016 as Head of the Scientific Evaluation of Regulated Products (REPRO) Department. Prior to joining EFSA he had been with the European Chemicals Agency (ECHA) in Helsinki since 2008. His two last positions in ECHA were Head of Unit, first for Substance Identification and Data Sharing, and then for Evaluation. Before this, Guilhem worked in the field of hazardous chemicals management in academia and in the chemical industry for over ten years. He holds a Ph.D. in Chemical Engineering from Louisiana State University, USA, specialising in mechanisms of environmental exposure to pollutants.

# INTERNATIONAL PERSPECTIVE ON CELL CULTURE DERIVED FOODS AND FOOD INGREDIENTS

Speaker: Masami Takeuchi, FAO



#### **BIO**

Dr Masami Takeuchi received a Ph.D. in food science and human nutrition from Washington State University, USA. After working in the area of nutrition for 7 years, she has been working in the area of food safety. In 2006, she joined the Food and Agriculture Organization of the United Nations (FAO) in Rome, Italy, to provide food safety scientific advice to Members as well Commission. as to the Codex Alimentarius Her main responsibility lies on food safety risk assessment that deals with emerging issues, technologies and cross-cutting issues. These activities include safety assessment of food/feed derived from biotechnologies and other new technologies including gene editing, cell-based food production and precision fermentation. She is the manager of the global database on safety assessment results of the foods derived from GMOs, entitled FAO GM Foods Platform (http://fao.org/gm-platform). She also advises FAO Members on the use and applications innovative technologies (i.e., whole genome sequencing, WGS) for better food safety



management. While she takes up various normative global initiatives on food safety, she also assists various countries and regions for their food safety capacity development.

#### **ABSTRACT**

### Global perspectives on food safety aspects of cell-based food production and precision fermentation: FAO activities

Food and Agriculture Organization of the United Nations (FAO), in collaboration with the World Health Organization (WHO) conducted the food safety hazards identification for cell-based foods through an Expert Consultation. The results of the expert consultation together with the literature synthesis on terminology, production process and regulatory frameworks as well as three country case studies have been compiled and published1. The Technical Panel found that many hazards are already well-known and they exist in the conventionally produced food. Various existing control measures and good manufacturing and hygiene practices are applicable food safety for cell-based to ensure food. The topic of precision fermentation may face some similar situations in terms of nomenclature issues and their relevance to regulatory actions. Many people may not understand exactly what the term indicates, thus some prerequisite activities may be necessary for the competent authorities to clarify in their regulatory frameworks. It is a pivotal moment for regulators to introduce cell-based food and precision fermentation to consumers in a proactive and transparent manner. Continuous engagement of the stakeholders is essential to strengthen the trust.

#### Speaker: Moez Sanaa – World Health Organization (WHO)



#### BIO

Dr. Sanaa is the Head of the Standards and Scientific Advice on Food and Nutrition (SSA) Unit at the Department of Nutrition and Food Safety, World Health Organization. He was previously the head of the Food Risk Assessment Unit at the French Agency for Food, Environmental, and Occupational Health and Safety (ANSES), where he led the work on chemical and microbiological contaminants risk assessment, as well as the safety assessment of enzymes, processing aids,

<sup>&</sup>lt;sup>1</sup> FAO & WHO. 2023. Food safety aspects of cell-based food. Rome. https://doi.org/10.4060/cc4855en





food contact materials, and GMOs. Earlier,, he was a professor at the National Veterinary School of Alfort (France), where he taught biostatistics, epidemiology, and risk analysis and oversaw various national and European research initiatives in veterinary public health. Between 2005 and 2018, he contributed significantly to the work of the European Food Safety Authority's (EFSA) on Animal Health and Animal Welfare and Biological Hazards expert panels, and he participated in several capacity building projects in food safety systems in various African, East European, and Middle East countries. He worked as a Senior Epidemiologist on Genomic Data Usage in Risk Assessment at the Food and Drug Administration Center for Food Safety and Applied Nutrition (FDA-CFSAN, Maryland, USA) to improve transatlantic collaboration (2017-2018). He was a highly active member of the EFSA Advisory Forum between 2019 and 2018 for fostering the scientific cooperation between member states, building a data ecosystem for food and ensuring the sustainability of risk assessment. safety, Moez Sanaa, who is originally from Tunisia, earned his Doctor of Veterinary Medicine from the National School of Veterinary Medicine (Tunis). He studied infectious diseases and epidemiology at the Veterinary School of Alfort (France) while earning his Master's and PhD degrees in Epidemiology and Biostatistics from the Université of Paris XI, Faculty of Medicine (France).

#### **ABSTRACT**

Driving Sustainable Food Systems Through Innovation: A Critical Role in Ensuring Safe and Healthy Food for All

#### A REGULATORY FRAMEWORK THAT ENABLES FOOD INNOVATION IN THE EU

**Speaker: Bruno Gautrais – European Commission (EC)** 



#### BIO

Bruno Gautrais is the Head of Unit in the European Commission dealing with Novel Foods and their legislation. Veterinarian by training, he is regularly involved in the discussions related to cell-based foods and their political and technical landscape in the European Union.

#### **ABSTRACT**



#### A regulatory framework that enables Food Innovation in the EU

Bruno Gautrais will present the challenges faced with the risk management and authorisation of innovative foods, and especially cell-based products, in the European Union. He will explain how the pre-marketing authorisation process, with the involvement of EFSA, ensures that consumers can trust the safety of these products and get sufficient information to make their choices.

## DEVELOPMENTS IN CELL CULTURE-DERIVED FOODS AND FOOD INGREDIENTS

Speaker: Valeria Teloni – Cellular Agriculture Europe (BE)



#### **BIO**

Dr. Valeria Teloni is a Regulatory Affairs professional at Mosa Meat in the Netherlands. A biologist by education, Valeria has several years of experience in her early career with multidisciplinary research ranging from small, low budget teams to international expeditions. In 2007, she transitioned to the private sector where she specialized in product compliance and regulatory for the IVD veterinary market. After 15 years in animal diagnostics, Valeria joined Mosa Meat as Regulatory & Compliance Expert in their mission to reshape the global food system.

#### **ABSTRACT**

#### Safety aspects of cell-cultured foods—insights from the industry

Cellular Agriculture Europe is a coalition of companies developing cell culture-derived foods as sustainable complements to conventional protein production methods. A wide range of food including beef, poultry, seafood, foie gras, eggs, dairy, and other non-food products like leather can be produced directly from animal cells. Regulatory applications for these products should follow the existing guidance applicable to novel foods. Building on the array of technologies and methods that characterise the production of cell-cultured foods, an overview of relevant safety considerations and how these can be addressed in a comprehensive safety testing strategy will be presented.

Speaker: Agnieszka Wegrzyn – EuropaBio (BE)







Agnieszka Wegrzyn (1988) is one of the founders and Chief Science and Technology Officer of EV Biotech, where she is responsible for developing short and long-term strategies for scientific and technological developments. Together with the team, Agnieszka has created a unique computational pipeline that merges biology with computational modelling and artificial intelligence (AI) to create one-of-a-kind microbial production strains, with the overall mission to shift the petrochemical industry to a greener and more sustainable alternative based on fermentation.

Agnieszka obtained her Bachelor's and Master's degrees in Biotechnology at the Jagiellonian University in Poland. Afterward, she decided to pursue a Ph.D. degree and moved to Groningen, where she studied inborn errors of metabolism in the context of computational biology and data integration. Until the end of 2022, she has continued her academic career as a postdoc at Metabolomics and Analytics Center at Leiden University.

#### **ABSTRACT**

#### State-of-the-art in precision fermentation and a potential application of models to support risk-assessment of products

In recent years, there has been a surge of interest in cell culture-derived foods and food ingredients, particularly in the area of precision fermentation. This technology offers a novel way to produce a wide range of food products, from meat and dairy alternatives to rare ingredients that are difficult to source sustainably. In this talk, I will provide an industry perspective on the state-of-the-art developments in precision fermentation, highlighting key products and sectors that are currently being explored. I will also highlight the potential use of models, including AI, in assessing the safety and risks associated with these products. Overall, I aim to provide insight into the exciting possibilities and challenges of this emerging field.

INTO BIOPROCESS DESIGN TECHNICAL INSIGHTS FOR **CULTIVATED MEAT** 

**Speaker: Marianne Ellis – University of Bath (UK)** 





Marianne Ellis, BEng, PhD, CEng, MIChemE, is a Professor of BioProcess & Tissue Engineering at the University of Bath, UK. Her research is focused on bioprocess design for tissue engineering applications. She started her career focused on the scale up of regenerative medicine and cell therapies, moved into non-animal technologies for in vitro models, and is now focused on cellular agriculture and in particular cultured meat. Marianne is co-founder and CTO of Cellular Agriculture Ltd, and a co-founder of Cellesce Ltd.

#### **ABSTRACT**

#### Technical insights into bioprocess design for cultivated meat

This talk will introduce the steps to produce cultivated meat, in its basic form as a biomass of matured muscle cells. It will then go into details on each step, with the goal of providing insights into the areas to consider when it comes to safety of the bioprocess build and operations. The talk will start with an introduction to cellular agriculture and the cultivated meat production process. It will then go through the steps in more detail, with consideration of the feedstocks, upstream processing (seed train, feed tanks, bioreactor for proliferation, differentiation, and maturation) and the downstream processing (harvest, separation and purification of the biomass as the product, water treatment and waste valorisation).

DEVELOPMENT OF HOSTS AND PRODUCTION PROCESS FOR PRECISION FERMENTATION WITH EMERGING SAFETY ASPECTS

Speaker: Nina Aro - Technical Research Centre of Finland (VTT) (FI)





Nina Aro is principal scientist and project manager at VTT Technical Research Centre of Finland Ltd. She holds a Doctor of Science degree in Biochemistry from University of Helsinki Finland. Nina has over 15 years of experience in the fields of protein production in filamentous fungi, including commercially important enzymes for food and feed applications, optimal enzyme mixtures for biomass hydrolysis and food proteins. She is interested in production host and platform development in collaboration with research and industrial partners, and motivated to contribute to the transition towards sustainable bioeconomy.

#### **ABSTRACT**

## Development of hosts and production process for precision fermentation with emerging safety aspects

Microorganisms, such as fungi and yeasts, have great potential as cell factories, but several molecular biology, synthetic biology, and "omics" tools are needed to develop the production hosts in a manner that sufficient target yields are reached with product that has adequate quality and properties. These tools include e.g. next-generation sequencing, high-throughput library screening, molecular cloning, use of CRISPR/Cas9 technology and proteomics and metabolomics. In addition to production host engineering, development of production process has significant impact on production level, quality, purity and required downstream processing. Media selection and optimization, bioprocess design and end-product formulation have an impact on the quality and safety of the end product. With relevant risk assessments, the vast biodiversity of microorganisms can be explored to create novel and safe food proteins, -lipids and -carbohydrates that can benefit human health and the environment.

The aim of the presentation is to give an overview of the different molecular methods used in host engineering and bioprocess design development and describe possible safety aspects related to the described methods and processes.

#### **CLOSE OF SESSION 1**

Speaker: Ana Afonso - European Food Safety Authority (EFSA)





Ana Afonso, is the Head of the Nutrition and Innovation in Food Unit at the European Food Safety Authority. The unit supports the work of the Panel on Nutrition, Novel Foods and Food Allergens (NDA) and the Panel on Genetically Modified Organisms (GMO), as well as their Working Groups and Scientific Networks. The GMO panel carries out the risk assessment of GMO applications and provides scientific advice in the biotechnology domain. The NDA panel deals with questions related to human nutrition, novel foods, nutrient sources, foods for special groups such as infant formulae, health claims on food products, dietary reference values, and food allergies. Ana is a veterinarian and joined EFSA in 2006 as a scientific officer in the Animal Health and Welfare Unit. She was also the Emerging Risks team leader and coordinated EFSA's foresight and emerging risks activities.

# SESSION 2: BREAK-OUT SESSIONS Cell culture-derived foods of animal or plant origin

BREAK-OUT SESSION 1: "FOOD SAFETY HAZARDS ASSOCIATED TO CELL CULTURE-DERIVED FOODS OF ANIMAL OR PLANT ORIGIN"

Chair: Jette Feveile Young - Aarhus University (DK)









Jette Feveile Young is associate professor at Institute of Food Science, Aarhus University where she since 2009 has been leading a science group on Differentiated and Biofunctional Food. She holds a M.Sc. in Food Science from University in Copenhagen and a PhD from University of Wales. She did a Post Doc at the Institute of Human Nutrition at University of Copenhagen and perused her career at Aarhus University where the research focuses around meat quality as well as studying nutritional effects of naturally occurring food components using in vitro cell based model systems. More than 20 years of research experience within meat science and in vitro cell based techniques including primary muscle cells has led to her interest in several aspects of cultured meat. She is involved in and leads several projects including a CellFood hub at Aarhus University.

# BREAK-OUT SESSION 2: "FOOD SAFETY HAZARDS ASSOCIATED TO CELL CULTURE-DERIVED FOODS OF ANIMAL OR PLANT ORIGIN"





#### **BIO**

Ramiro Alberio is Professor of Developmental Biology at the University of Nottingham, UK. He graduated as veterinarian from La Plata University (Argentina), and gained his PhD from the University of Munich (Germany) where he studied the molecular mechanisms of animal cloning. He did his first postdoctoral training with Prof. Keith Campbell (University of Nottingham, UK)





investigating epigenetic mechanisms of cell plasticity. He was awarded Marie-Curie Fellowship and later a RCUK fellowship to establish his independent research group where he focussed in investigating the principles of embryo development, with particular focus in domestic animals. He uses advanced genomic technologies to elucidate the mechanisms governing acquisition of cellular identity during embryo development. With this new knowledge his laboratory established novel livestock (sheep, cattle and pig) embryonic stem cells lines (PluiCellsTM) which have broad applications in biotechnology. His lab is developing stem cell-based approaches to generate novel food products (such as cultivated meat), as well as novel methods of genetic selection and livestock breeding. He is the Director of the Centre for Large Animal Biotechnology (CeLAB), and Deputy Research Director of the School of Biosciences.

BREAK-OUT SESSION 3: "NEW DEVELOPMENTS IN ENGINEERED MICROBIAL CELL FACTORIES: CONSIDERATIONS FOR THEIR SAFETY ASSESSMENT"

Chair: Kevin Verstrepen – KU Leuven (BE)



#### BIO

Kevin Verstrepen is professor in Genetics and Genomics at Leuven University and Group Leader in Systems Biology at VIB (Flanders Institute for Biotechnology). He serves as the director of the VIB Center for Microbiology and director of the Leuven Institute for Beer Research. His team uses yeast as a model for complex genetics and also works closely with several industrial partners to generate superior yeasts variants for biotech applications, ranging from food, beverage and feed production to biofuels, bioplastics and precision fermentation.

BREAK-OUT SESSION 4: "DEVELOPMENT NEEDS FOR THE SAFETY ASSESSMENT OF FOOD INGREDIENTS DERIVED FROM PRECISION FERMENTATION"

#### Chair: Javier Moreno - Spanish National Research Council (CSIC) (ES)



#### **BIO**

F. Javier Moreno is working at the "Instituto de Investigación en Ciencias de la Alimentación" (CIAL) belonging to the Spanish National Research Council (CSIC). Co-author of more than 140 peer-reviewed papers (Food Science & Technology, Nutrition or Biotechnology fields). His main areas of research include food biochemistry and food technology. Currently, he is the Chair of the EFSA "GMO Applications Food-Feed" Working Group and member of the EFSA GMO Panel.

#### SESSION 3: ROUND TABLE

#### REPORTING BACK FROM BREAK-OUT SESSIONS

Overall chair: Helle Katrine Knutsen - Norwegian Institute of Public Health (NIPH) (NO) <u>see Bio above</u>

**Presenters** 

Rapporteur: Ermolaos Ververis – European Food Safety Authority (EFSA)





Ermolaos Ververis is a Chemist specializing in Biochemistry, Biotechnology & Foods. He obtained his BSc and first MSc (Food Chemistry & Technology) from the Aristotle University of Thessaloniki, and a second MSc in Animal-derived Foods (University of Copenhagen/Helsinki University). He participated in various food research & development projects, within Europe and overseas. Since 2016, he has joined EFSA and under his current role as a scientific officer in the Nutrition & Food Innovation Unit, he works on the risk assessment of Novel Foods. In the team, he coordinates activities regarding insect- and cell culture-derived foods. For his Ph.D. at the School of Medicine of the National and Kapodistrian University of Athens, he investigated the public health impact of substituting red meat with novel or traditional protein sources, through the development and implementation of Risk-Benefit Assessment methods.

#### Rapporteur: Wolfgang Gelbmann – European Food Safety Authority (EFSA)



#### BIO

Doctor of Veterinary Medicine at the Veterinary University in Vienna (1996). After that he was working for about three years in biotechnology and virology at the Veterinary University in Vienna followed by four years at the Austrian Medicine Agency (now part of "AGES") assessing the safety and efficacy of medicines, including those derived from biotechnology for national and



EU authorisations, respectively. He started to work at the European Food Safety Authority (EFSA) in the Unit Biological Hazards. Since 2006, he has been working in the Nutrition Unit (after its merger with the GMO Unit, called Nutrition and Food Innovation Unit), where he contributed to health claims and other Unit's tasks, but being mainly in charge of novel food applicants and the respective guidance documents.

## Rapporteur: Estefanía Noriega Fernández – European Food Safety Authority (EFSA)



#### BIO

Estefanía Noriega Fernández is a bioprocess engineer with a MSc in integrated (quality, environment and public health) management systems and a PhD in predictive microbiology & innovative food processing (University of Oviedo, ES). She has held positions as assistant lecturer (University of Oviedo, ES), postdoctoral researcher (CIAL-CSIC, ES; KU Leuven, BE), scientific project manager (ILSI Europe, BE), senior scientist (Nofima, NO) and visiting researcher (Loughborough University, UK; Institute of Food Research, UK; University of Reading, UK; Elea GmbH, DE). She has led/participated in ca. 40 research & innovation projects, co-authored >160 peer-reviewed articles and conference abstracts, and co-directed >50 academic theses. In 2020 she joined EFSA as a scientific officer at the Novel Foods team (Nutrition & Food Innovation Unit), where she coordinates activities on precision fermentation.

Rapporteur: Gabriela Precup – European Food Safety Authority (EFSA)





Gabriela Precup is scientific officer in the Nutrition & Food Innovation Unit at EFSA, working on risk assessment of novel foods since 2019. A food scientist by training, specialized in the biochemistry and biotechnology of agro-food products, with a BSc in Food science and technology, MSc in Gastronomy, nutrition and dietetics at the University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca (UASVM, Romania). She holds a Ph.D. in Biotechnology specialised in the chemical and enzymatic production of novel carbohydrates from agro-food products. Prior to EFSA, she worked in research & development since 2016 in food waste bioconversion and probiotics (UASVM, Ro and Leibniz Institute ATB, DE) and in food policy at the Romanian Government and European Commission (DG SANTE).

# ROUND TABLE "RISK ASSESSMENT OF CELL CULTURE-DERIVED FOODS AND FOOD INGREDIENTS: PRIORITIES AND CHALLENGES"

Moderator: Carolyn Brand - Prospex bv (BE)



**BIO** 



Carolyn is a strategic consultant with over 30 years of experience in global high-tech corporations such as Rolls-Royce, as well as consulting for startups in domains such as MedTech, GreenTech, Mobility, and Sustainability. Her expertise lies in creating and implementing sustainable business practices that benefit both the environment and the bottom line. Carolyn's commitment to sustainability extends to her work with startups, helping entrepreneurs build profitable and environmentally responsible businesses.

In addition, Carolyn is skilled in facilitating productive conversations among diverse stakeholders and helping teams achieve consensus on complex issues. She is committed to empowering individuals and organisations to achieve their goals through strategic guidance and effective communication. With her wealth of knowledge and expertise, Carolyn brings valuable insights to any business event program.

#### **Discussants:**

Ramiro Alberio, University of Nottingham - see Bio above

Jette Feveile Young, Aarhus University - see Bio above

Javier Moreno, CSIC - see Bio above

Valeria Teloni, Cellular Agriculture Europe - see Bio above

Kevin Verstrepen, Ku Leuven – <u>see Bio above</u>

Agnieszka Wegrzyn, EuropaBio – <u>see Bio above</u>

Andrea Germini – European Food Safety Authority (EFSA)



#### BIO

Food scientist by training, Andrea has over 20 years of professional experience in both academic research and in the support to risk assessment activities and the coordination of scientific working groups. He holds a degree and a PhD in food science and technologies and specialised the assessment of food biomolecules and their characterisation. on Andrea joined the European Food Safety Authority in 2008 where he has been working on the

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safety assessment of innovative food products and in the support and coordination of crosscutting scientific activities.

Andrea currently leads the Novel Foods Team and coordinates the activities of the expert working group on Novel Foods. In his current role he coordinates the support to the safety assessment of Novel foods performed by the EFSA NDA Panel and interfaces in the regulatory context with the European Commission and its committees.