



**UNIVERSITY
OF TURKU**

ABSTRACTS

**Finland-China Food and Health
Network Conference and Final
Seminar**

**Euro-Sino Collaboration FCFH
Network Symposium**

*Updated on 2 October 2024. Please note, changes



**FINLAND-CHINA
FOOD AND HEALTH NETWORK**



Day 1: Thursday, 3 October 2024

8:30 – 9:00

Registration

9:00 – 9:15

Welcoming Words

Rector Marjo Kaartinen, University of Turku

9:15 – 9:30

Opening Remarks

Professor Baoru Yang, University of Turku

9:30 – 9:45

**Dr. Hongzhi Sun, Embassy of the People's Republic of China in Finland,
First Secretary and Director of Educational Affairs**

Break

10:00 – 10:20

Euro-Sino Science Diplomacy and Responsible Collaboration

**Dr. Olli Suominen, Counsellor, Education and Science, Finnish Embassy
in Beijing**

10:20 – 10:40

**Sino-Finnish Business Collaboration – Opportunities for Further
Cooperation**



Dr. Mika Klemettinen, Trade and Innovation Consul, Head of Shanghai Office

China is among two largest economies in the world. Economic growth has been the driving factor behind China's policies in the past decades. However, China's policy towards the growth has changed. Today the drive for innovation, sustainability and more equal share of wealth are behind the policy decisions, instead of growth only. Several new industry sectors are expected to grow fast, e.g., carbon reduction, health care, industrial digitalization, and sustainable consumption. Within this new setup, China is heavily investing in the innovation area, while looking for new growth and competitiveness. This provides increasing amount of collaboration opportunities for innovative Finnish and Chinese companies and research organizations. Business Finland has established numerous frameworks to support Finland-China innovation collaboration on both national and provincial level, including Ministry of Science and Technology of China as well as Jiangsu and Zhejiang provinces and Shanghai municipality. These frameworks can help Finnish organizations to initiate forward-looking cooperation and pave the way for joint business opportunities. This presentation highlights some of the opportunities and issues to remember regarding the business-driven innovation cooperation as well as presents the available innovation cooperation frameworks, where both Finnish and Chinese organizations can apply funding for joint projects.

10:40 – 11:30

Review of Activities, Outcomes, and the Future of the Finland-China Food and Health Network



Professor Baoru Yang, University of Turku with other theme leaders of the network: Professor Marina Heinonen, University of Helsinki; Professor Marjukka Kolehmainen, University of Eastern Finland and Professor Aki Manninen, University of Oulu

11:30 – 13:00

Lunch, BioCity Mauno

13:00 – 13:40

Technical Session 1: Nutrition and Health Effects of Food

Unlocking the Power of Omega-3: How Specialized Pro-Resolving Mediators (SPM) Regulate Immunity and Inflammation for Optimal Health
Professor Jesmond Dalli, Professor in Molecular Pharmacology, Lipid Mediator Unit Director, Queen Mary University of London, UK

13:40 – 14:40

Presentations on Research Supported by FCFH Seed Funding

Survey on the Nutrition and Health Status of Middle-aged and Elderly People in Five Western Regions of China in 2023 – Nutritional concerns in 5 cities including Lhasa, Dali, and Ordos
Professor Yumei Zhang, Beijing University, China

Registration & Regulation of Special Food in China

Senior Researcher Xueying Ma, Technology Innovation Center of Special Food, State Administration for Market Regulation



Registration & Regulation of Special Food in China

The Food Safety Law of the People's Republic of China has been revised in 2015 and classified Nutraceuticals, Food for Special Medical Purposes FSMP, and infant formula food as “special food” for strict management. The sustainable development of the health industry and the upgrading of consumption concepts have driven the development of the health food industry. Under the circumstance of post-epidemic era and aging population, the development of special food industry is promising and demanded. This presentation introduced the registration & regulation of FSMP, product amount and technology Innovation in China.

The influence of anthocyanins in blueberry extract on retinal damage induced by diabetes mellitus

Associate Professor Wei Yang, Jiangnan University, China

Diabetic retinopathy (DR), caused by hyperglycemia, has been becoming the tremendous public health threaten globally. Recently, there has been a growing interest in using natural bioactive products for dietary intervention to manage the progression of DR. In the current study, the blueberry extract (BAEs) intervention significantly decreased oxidative stress and inflammation levels in the retina of STZ-induced diabetic mice by downregulating the expression of REDD1 in the choroid-retinal pigment epithelium. Cyanidin-3-O-glucoside (C3G), a primary component of BAEs, was further examined to explore potential molecular mechanisms in ARPE-19 cells. The knockout of REDD1 effectively reversed HG-induced alterations in VEGFA levels, confirming the



crucial role of REDD1 in the regulating of retinal vascular permeability factors. The C3G relieved HG-induced oxidative stress damage in ARPE-19 cells via REDD1/GSK3 β pathway and inhibited an increase in vascular permeability by downregulating VEGFA expression.

14:40 – 15:00

Coffee Break

15:00 – 16:00

Theme-Specific Discussion on Continuation Beyond 2024

18:00

Dinner, BioCity Mauno

Day 2: Friday, 4 October 2024

8:30 – 9:00

Registration

9:00 – 9:40

Technical Session 2: Sustainable Food System

A sustainable diet in a Nordic perspective

**Professor Helle Margrete Meltzer, Norwegian Institute of Public Health,
Norway**

Helle Margrete Meltzer

Former Research Director



Norwegian Institute of Public Health

Abstract to The Finland China Food and Health -network symposium.

A sustainable diet in a Nordic perspective

The terms ‘Nordic countries’ or ‘The Nordics’ include the five countries Denmark, Finland, Iceland, Norway, and Sweden. None of the Nordic countries are on track to reach the 2030 UN sustainable development goals (SDGs). Food production, processing, and consumption contribute substantially to the environmental challenges, and dietary changes/transitions consistent with the SDG goals are required. A major challenge is the high production and consumption of meat and too low consumption of fish, vegetables, and fruits. Meat production is a major source of emissions and, together with farmed fish, heavily dependent on imported feed ingredients, leaving a large land-use and water footprint in exporting countries while domestic land resources are not used optimally. A major opportunity is better alignment of food production and consumption based on local or regional production potentials, in conjunction with better and more constructive integration with the global food system while integrating novel technologies to reduce emissions and resource use.

References

- 1. Meltzer HM, Brantsæter AL, Trolle E, Eneroth H, Fogelholm M, Ydersbond TA, Birgisdottir BE. Environmental Sustainability Perspectives of the Nordic Diet. *Nutrients* 2019;11(9). doi: 10.3390/nu11092248.*
- 2. Meltzer HM, Eneroth H, Erkkola M, Trolle E, Fantke P, Helenius J, Olesen JE, Saarinen M, Maage A, Ydersbond TA. Challenges and opportunities when moving food production and consumption toward sustainable diets in the Nordics: a scoping review for Nordic Nutrition*



Recommendations 2023. Food & Nutrition Research 2024.
<https://doi.org/10.29219/fnr.v68.10489>.

3. Meltzer HM, Abel MH, Knutsen HK, Amberntsson A, Brantsæter AL, Budin-Ljøsne I, Husøy T, Iszatt N, Lund-Iversen K, Paulsen MM, Thomsen C, Torheim LE, Haug LS. *What is a sustainable diet in the Norwegian context? Scand J Public Health.* 2024 Sep 23:14034948241269763. doi: 10.1177/14034948241269763. *Online ahead of print.*

9:40 – 10:20

**Presentations on Research Supported by FCFH Seed Funding / Other
Invited Lectures**

**MediFoods: Development of novel foods from Asian-European medicine
herb**

Dr. Ye Tian, Docent, Academy Research Fellow, University of Turku

Different pre-treatments were investigated to recover the phytochemicals from Gardenia Fructus oil press cake (GFPC) to valorize the industrial side stream. Chromatographic and mass spectrometric analyses were applied to assess the efficacy of the pre-treatments in releasing phytochemicals. Among the physical treatments studied, grinding enhanced the release of iridoids and crocins to the greatest extent. Geniposidic acid, crocin I and crocin II were obtained in the maximal contents as the dominant compounds in these two critical groups. Fermentation resulted in enrichment of iridoid glycoside, especially geniposide. Enzymatic treatments enhanced the release of phenolic acids from GFPC, particularly p-coumaric acid, caffeic acid, and sinapic acid by Viscozyme. Genipin, the key precursor compound for manufacturing gardenia red and blue, was enriched by treatments with cellulase and Viscozyme. The study showed



that different pre-treatments can be selected for releasing target components from GFPC, creating value-added ingredients for various applications.

“NEWPLANT”: Impact of processing on the biochemical composition of sustainable plant-based products and their effect on microbiota and human metabolism
Doctoral Researcher Jasmin Raita, University of Turku

The “NEWPLANT” project aims to characterize the effect of various processing techniques on the biochemical composition of commercial plant-based products. Phytochemicals such as isoflavonoids can be lost during protein refinement, and fermentation can modify the bioavailability of isoflavonoids. This project also includes a clinical intervention trial with plant-based protein-rich products to study the effect of refining of the products on human metabolism, lipid profile, and plasma metabolome. Preliminary results suggest different plasma metabolite compositions in different diet groups.

10:20 – 10:30

Coffee Break

10:30 – 11:10

Presentations on Research Supported by FCFH Seed Funding / Other Invited Lectures

Adding pea protein into beef patties for a more sustainable and higher-quality meat product

Dr. Jian Lyu, University of Helsinki



The aim of this hybrid-meat project was to investigate the effects of different amount of PPI addition (0%, 25%, 50%, 75% and 100%) on protein and water properties and water-holding capacity in beef patties, and with the aim to provide a theoretical basis for improving the juiciness of hybrid meat products. Hybrid patties were made by mixing PPI-water paste (1:3) and minced beef. PPI addition enhances the water-holding capacity of the raw materials, resulting in reduced cook loss of hybrid patties. With the increased PPI addition in patties, the amount of free water increases while bound water decreases. Water loss occurs more rapidly with a higher amount of PPI addition.

Expanding use of yeast protein by fermentation bioprocessing: techno-functional and aroma characterization

Dr. Yaqin Wang, University of Helsinki

11:10 – 11:40

Theme-Specific Discussion on Continuation Beyond 2024

12:00 – 13:00

Lunch, BioCity Mauno

13:00 – 13:40

Technical Session 3: Food and Health Technologies

Research Keynote Presentation: Plant-based supplements and functional foods for joint health

Professor Ali Mobasheri, Research Unit of Health Sciences and Technology, Faculty of Medicine, University of Oulu, Oulu, Finland



*Arthritic diseases such as rheumatoid arthritis (RA), osteoarthritis (OA), and psoriatic arthritis (PsA) lead to significant disability globally. Among these musculoskeletal conditions, OA is the leading cause of global disability, characterized by cartilage degradation, inflammation, and pain. There is growing interest in plant-based supplements and natural functional foods for joint health, due to their potential to modulate inflammation and oxidative stress. Several plant-derived compounds, such as curcumin from *Curcuma longa*, boswellic acid from *Boswellia serrata*, and pycnogenol from extracts of French maritime pine bark *Pinus pinaster* have demonstrated efficacy in reducing OA symptoms through their anti-inflammatory and chondroprotective mechanisms. Curcumin, for instance, has been shown in multiple clinical trials to reduce pain and improve function by inhibiting pro-inflammatory cytokines like TNF- α and IL-1 β . *Boswellia serrata* also exhibits potent anti-inflammatory effects, decreasing cartilage degradation markers and improving physical function. Furthermore, functional foods rich in omega-3 fatty acids and polyphenols, such as those found in flaxseed and green tea, contribute to joint health by reducing oxidative damage and modulating inflammatory pathways. Emerging evidence suggests that combining these supplements with conventional treatments can enhance overall therapeutic efficacy, reduce pain and potentially reduce the oral consumption of non-steroidal anti-inflammatory drugs. Despite promising results, further clinical trials are needed to standardize dosages and confirm long-term benefits. Over the last decade we have significantly contributed to this field and some of our published work has emphasized the role of natural products in OA management. Our research has highlighted the potential of plant-based interventions as complementary therapies in joint health, offering safe and effective alternatives for patients*



seeking relief from OA symptoms, and wishing to reduce dependency on prescription medication and polypharmacy.

13:40 – 14:10

Presentations on Research Supported by FCFH Seed Funding / Other Invited Lectures

New Era of Targeted Drug Delivery

Professor Hongbo Zhang, Åbo Akademi University

Dynamic combinatorial chemistry: a sustainable technology for drug delivery against drug-resistant cancer

Senior Research Fellow Jianwei Li, University of Turku

Introduction/Purpose

Nanotechnology has provided revolutionary impacts for the traditional medication. The nanometer size is highly relevant to many biological conditions, for example 50-200 nm particles tend to accumulate in tumor tissue due to the enhanced permeability and retention (EPR) effect. Moreover, the nanoparticles can be endowed with character of smart, responsive, targeted, multi-functional and etc. However, there are also distinct challenges for target delivering drugs to tumors, due to the multiple biological barriers and complicate biological environment.

Methods

The first generation of targeted drug delivery nanomaterials are mainly based on ligand-receptor recognition. While, due to the protein corona formation, immune recognition etc, the targeting efficiency is relatively low. My research group has researchers from chemistry, material science, engineering, medicine, and biology. We have designed and synthesized nanoparticles that



have inherit biological features, to improve the tumor targeting. Those materials include engineered exosome, DNA nanoparticles, cell member coated nanoparticles and nano-in-micro composite nanoparticles for minimize invasive intratumorally injection.

Results and discussion

Our research group's efforts in developing nanomaterials with inherent biological features have yielded promising results in the targeted delivery of drugs to tumors. Through the use of engineered exosomes, DNA nanoparticles, cell membrane-coated nanoparticles, and nano-in-micro composite nanoparticles, we have been able to overcome some of the challenges associated with traditional ligand-receptor recognition-based drug delivery systems.

One significant achievement is the enhanced tumor targeting efficiency achieved by our engineered exosomes. These natural vesicles derived from cells have been modified to carry therapeutic payloads and target specific receptors on tumor cells, resulting in improved drug delivery to tumor tissues. Additionally, our DNA nanoparticles have demonstrated remarkable potential in evading immune recognition and protein corona formation, thereby enhancing their targeting efficiency and reducing off-target effects.

Furthermore, our cell membrane-coated nanoparticles have shown promising results in mimicking the biological properties of native cells, allowing for improved biocompatibility, prolonged circulation time, and enhanced tumor accumulation. Moreover, our nano-in-micro composite nanoparticles have been designed to facilitate minimally invasive intratumoral injection, providing a localized and sustained drug release within the tumor microenvironment.

Overall, our findings highlight the importance of incorporating biological principles into the design of nanomaterials for targeted drug delivery. By



harnessing the unique properties of natural biological entities, we have been able to develop innovative nanoplatforms that offer improved tumor targeting and therapeutic efficacy. These advancements hold great promise for the development of precision nanomedicine and have significant implications for future clinical applications.

Conclusions

The nanomaterials that have inherit biological features have shown great potential in tumor targeting, especially in consideration of precision nano-medication. Some of those designs also have good clinical translational potential.

14:10 – 14:20

Coffee Break

14:20 – 15:00

Presentations on Research Supported by FCFH Seed Funding / Other Invited Lectures

Exploring Machine Learning for Accurate Diagnosis of Multiple System Atrophy

Doctoral Researcher Seyed Hosseini, Turku PET Centre and University of Turku

Performance Analysis of Animal PET Scanners Using NEMA Standards

Doctoral Researcher Anting Li, Turku PET Centre and University of Turku

Positron Emission Tomography (PET) is a medical device that allows the visualization and quantification of the physiological processes (e.g. glucose metabolism) of the human body in vivo, based on the uptake and distribution



of various radiotracers. Besides its wide clinical and preclinical applications, PET holds a great potential in investigating nutrition, exercises, nutrition-related diseases and body's responses to food. An animal PET scanner was acquired through a collaboration with a Chinese university and a company. This project aims to assess and compare the performance of the animal PET scanner from multiple perspectives using the NEMA NU4-2008 standard. Once validated, we aim to explore its potential in food and health-related research.

15:00 – 15:30

Theme-Specific Discussion on Continuation Beyond 2024

15:30 – 16:00

Summary of Theme-Specific Discussions on Continuation Beyond 2024

16:00

Closing Remarks

Professor Baoru Yang, University of Turku