

NUTRITION OMICS SYMPOSIUM

ADVANCES, APPLICATIONS, AND TRANSLATION IN NUTRITION AND EPIDEMIOLOGY

San Sebastian, June 13, 2024





8.40 - 9.00 am

9.30 - 10.00 am

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 8.30 - 8.40 am	Introduction
	Frank B. Hu
	Miguel A. Martínez-González

Precision nutrition and cardiometabolic kidney syndrome prevention and management

Frank B. Hu

Metabolomics, Mediterranean diet interventions, and 9.00 - 9.30 am prevention: Updates from PREDIMED and PREDIMED-PLUS trials

Miguel A. Martínez-González & Jordi Salas-Salvadó

Challenges of computational models of gut microbiota metabolism in the context of human nutrition

Francis Planes

10.00 - 10.30 am Host-microbiome-diet interactions in human health and disease

Rafael Valdes-Mas.

10.30 - 10.45 am

Coffee



break

10.45 - 11.05 am Dietary (poly)phenols for precision nutition

Pedro Mena

11.05 -11.25 am Unveiling the Landscape: Biomarkers in Neurodegenerative Diseases

Olga Castañer

11.25 - 11.45 am Role of HDL miRNA in CHD incidence. Customised miR-sHDL as strategy for atherosclerosis treatment

Montse Fitó

11.45 - 12.15 pm Biomarkers of food intake and novel disease -associated compounds identified using metabolomics

Clary Clish

12.15 - 1.15 pm Lunch

break



















 1.15 - 1.45 pm	Metabotyping as a precision nutrition strategy- from idea to evidence
	Rikard Lanberg
 1.45 - 2.15 pm	Nutritional Metabolomics and its Potential for Biomarker - Driven Precision Nutrition
	Clemens Wittenbecher
2.15 - 2.45 pm	Genetic determinants of metabolic profiles of multiple dietary patterns and type 2 diabetes Liming Liang
2.45 - 3.15 pm	Exploring the interplay between Lifestyle, Metabolomics, and Mortality Marta Guasch-Ferré

3.15 - 3.30 pm

Coffee

break



Miguel A. Martínez-González

 3.30 - 3.50 pm	Metabolomics and type 2 diabetes in the PREDIMED- Plus trial Miguel Ruiz -Canela
 3.50 - 4.10 pm	Urinary metabolites and cardiometabolic disease Rosa Lamuela-Raventós
 4.10-4.40 pm	Gut microbiome and type 2 diabetes in the MicroCardio Consortium
 4.40 - 5.10 pm	Metabolomics to enhance understanding of the links between diet quality and disease risk Nita Forouhi
5.10 - 5.15 pm	Final remarks Frank B. Hu

This program specifically addresses the study of nutritional epidemiology based on -OMICS sciences. It explores the underlying mechanisms and tools for predicting the risk of chronic cardiometabolic diseases and the preventive role of healthy dietary patterns. During more than 5 hours, world experts in the field will guide us through the latest advances in the field of -OMICS and their usefulness in the field of cardiometabolic prevention based on changes in dietary patterns.





The chairs



FRANK
B.HU MD,
PHD

Harvard T.H. Chan School of Public Health Harvard Medical School Brigham and Women's Hospital Boston, USA

Frank Hu, MD, MPH, PhD, is the Fredrick J. Stare Professor of Nutrition and Epidemiology and Chair of the Department of Nutrition at the Harvard T.H. Chan School of Public Health.

He is also Professor of Medicine at Harvard Medical School and Brigham and Women's Hospital. His research focuses on the epidemiology and prevention of cardiometabolic disease through diet and lifestyle; gene-environment interactions and risk of obesity and type 2 diabetes; dietary metabolomics in type 2 diabetes and cardiovascular disease; and dietary transition, metabolic phenotypes and cardiovascular disease in low- and middle-income countries.

Dr Hu is director of the Dietary Biomarker Development Center and co-director of the Obesity Epidemiology and Prevention Program at Harvard. He has published a textbook on obesity epidemiology (Oxford University Press) and more than 1000 peerreviewed papers with an H-index of 310. Dr Hu served on the 2015 Dietary Guidelines Advisory Committee, USDA/HHS. He has served on the editorial/advisory boards of The Lancet Diabetes & Endocrinology, Diabetes Care, and Clinical Chemistry. Dr Hu was elected to the National Academy of Medicine in 2015..



MIGUEL Á. MARTÍNEZ-GONZÁLEZ MD, PHD, MPH

Preventive Medicine and Public Health University of Navarra Adjunct Professor, Department of Nutrition, Harvard T.H. Chan CIBEROBN, IdiSNA Pamplona, Spain

Prof. Miguel A. Martínez-González, is a medical epidemiologist, Professor of Public Health at the University of Navarra (national qualification 2005). Adjunct Professor of Nutrition at Harvard since 2016. Head of the CIBEROBN group, he has designed and led, as Principal Investigator, large studies and cohorts that have changed medicine, such as the SUN, PREDIMED and PREDIMED-Plus projects, initiated thanks to his Advanced Research Grant from the European Research Council (ERC, 2014- 2019). These Spanish studies have provided unprecedented scientific evidence with great global impact.

Since 2013, he has achieved several projects in collaboration with Harvard-MIT, funded by the US NIH, evaluating metabolomics in the context of randomised Mediterranean diet interventions.

In 1995, he founded and developed the Department of Preventive Medicine at the University of Navarra, which is now one of the most productive in Spain.

He has published over 1000 indexed scientific articles. He is one of the most cited scientists in Spain in all fields.

He has received awards in the USA (Grace Goldsmith Award, Rankin-Skratud Lecture and Stare-Hegsted Lecture) and Spain (Dr Carles Martí Henneberg Prize, National Research Prize in Medicine Gregorio Marañón 2022).

He received a second Advanced Research Grant from the ERC in March 2023 to develop a large randomised trial ("UNATI") on alcohol.

The research speakers



JORDI SALAS-SALVADÓ | MD, PHD

universitat Rovira i Virgili, CIBERobn Professor of Nutrition

Distinguished Professor of Nutrition and Director of the Human Nutrition Unit - University Rovira i Virgili (URV) and ICREA Academia Investigator. CIBERobn Principal Investigator and Coordinator of its Nutrition Programme. He is currently Director of the Catalan Nutrition Centre (CCNIEC), President of the World Forum for Nutrition Research and Dissemination (INC), and a member of the expert panel of the Diabetes and Nutrition Study Group (DSNG) of the European Association for the Study of Diabetes (EASD).

Prof Salas' research has focused on human clinical trials to evaluate the effects of foods, dietary compounds and dietary patterns on obesity, diabetes, metabolic syndrome and cardiovascular disease. Since 2005, he has been one of the principal investigators of the PREDIMED study (n=7447 participants) and is currently the coordinator and chairman of the steering committee of the PREDIMED-Plus study (n=6874 participants), two large clinical trials for the primary prevention of cardiovascular disease and mortality. PREDIMED-Plus is a multi-collaborative project involving 30 research groups and has received national, European, Canadian and US grants. Through all these projects and collaborations, the group has developed skills in precision medicine using different OMIC methodologies, in particular metabolomics and metagenomics, which we are now implementing in epidemiological and clinical studies. He is also involved in two prospective national and international cohort studies: CORALS (children followed for 10 years) and LEDFERTYL (men of reproductive age).

He has published more than 750 scientific articles with more than 45000 citations and an SCI H-index of 100, has published 14 books and has supervised 32 PhD students. Has been named one of the world's most influential researchers by Clarivate Analytics and Standford University.



FRANCIS J. PLANES | PHD

School of Engineering - TECNUN, University of Navarra San Sebastian, Spain Professor in Computer Science and Artificial Intelligence, Biomedical Engineering and Sciences Department

Professor Francisco J. Planes is Principal Investigator in the Computational Biology Group at the School of Engineering of the University of Navarra, Tecnun. His research has focused on the development of new algorithms, mainly based on optimisation and statistical techniques, for the analysis of molecular networks in the context of high-throughput technologies ("omics" data), with various applications, but mainly in cancer and personalised nutrition.

He has participated in 15 research projects related to metabolism and health to identify novel therapeutic strategies and biomarkers. He has published more than 40 scientific articles in high-impact journals such as Nature Communications, Nature Protocols, Genome Biology, PLoS Computational Biology or Bioinformatics. In the Stance4Health project, Professor Planes has led the development of the food ranking algorithm based on gut microbiota metabolism and its application to the different cohorts of children and adults to guide nutritional interventions.



The research speakers



RAFAEL VALDÉS MAS | PHD

Weizman Institute of Science Rehovot. Israel Senior Posdoctoral Researcher

Dr. Rafael Valdes-Mas received his Ph.D. in Biomedicine and Molecular Biology from the University of Oviedo (Spain) in 2016, focusing on cancer genomics and the role of the microbiome in accelerated aging. He is currently a senior postdoctoral researcher at the Weizmann Institute (Elinav Lab), where he studies the intricate interactions between the mammalian host and its microbiome to elucidate their impact on health and disease.

His work includes characterizing the effects of probiotics on the human gut microbiome, pioneering novel phage therapies for inflammatory bowel disease, and investigating the influence of non-nutritive sweeteners on the microbiome and glycemic responses.



PEDRO MENA PHD

Department of Food and University of Parma, Italy Associate Professor in Human Nutrition

His line of research is related to the bioavailability and biological activity of plant bioactives, with a special focus on (poly)phenolic compounds and inter-individual variability. Pedro is also dedicated to the development and use of realistic experimental models to make nutritional science more robust and translatable.

He leads an ERC project on personalized nutrition with (poly)phenols (PREDICT-CARE), has been involved in several international projects (e.g. HE EIC MENTORING, H2020 PREVENTOMICS, PRIMA MED4Youth, COST Action POSITIVE, JPI HDHL FoodPhyt, etc.) and has secured funding from national (PNRR ONFOODS, FARE CARE-DIET, etc.) and private (Lavazza, Indena, etc.) initiatives. Pedro is part of an incredible research team that is growing fast and enjoys science (and food) together.



OLGA CASTAÑER | MD, PHD

Cardiovascular Risk and Nutrition Research Group Epidemiology and Public Health Program, Hospital del Mar Research Institute. CIBERESP, Spain

Miguel Servet Researcher

Specialist in Family and Community Medicine, with more than 10 years of experience in outpatient and inpatient care. She is a researcher in the Cardiovascular Risk and Nutrition Group of the Hospital del Mar Research Institute. Within the group, she participates in nutritional intervention studies, high-impact scientific and translational projects, such as PREDIMED and PREDIMEDplus, which study the beneficial effects of the Mediterranean diet in the primary prevention of cardiovascular and neurodegenerative diseases, both related to atherosclerotic pathology.

She has expertise in basic and clinical research in lipidology, studying the properties of lipoproteins in vitro in patients at high cardiovascular risk and in obese patients undergoing bariatric surgery. She has also studied the nutrigenomic effects of dietary interventions and functional foods and has collaborated with industry in the development of functional foods with cardioprotective properties.

Her current research focuses on the relationship between vascular status and chronic degenerative diseases, especially dementia. Her multidisciplinary profile facilitates the implementation of research projects ranging from mechanistic studies to translational approaches. Exploring the interrelationship between cardiovascular and neurodegenerative diseases is our current main goal.



MONTSE FITÓ | MD, PHD

Hospital del Mar Research Institute / CIBERobn Barcelona, Spain Coordinator of the Epidemiology and Public Health Program at the Hospital del Mar Research Institute in Barcelona

Dr. Montserrat Fitó is a Doctor of Medicine and a specialist in clinical analysis. She is the director of the Epidemiology and Public Health Research Program at the Hospital del Mar Research Institute in Barcelona, where she also directs the Cardiovascular Risk and Nutrition Research Group (CARIN). She also coordinates this multidisciplinary group in the Centro de Investigación Biomédica en Red (CIBER) (Physiopathology of Obesity and Nutrition - CIBEROBN) of the Carlos III Health Institute (ISCIII), a national scientific network of excellence. She also heads the Regicor (Cardiac Registry) group, which is recognized by the Government of Catalonia as a consolidated group of excellence.

M. Fitó is the Technical Director of the Regicor Group Laboratory at the IMIM. The main objective of the team is to generate knowledge in the field of cardiometabolic diseases, with special interest in preventive and translational medicine. To achieve this, we work in epidemiological studies, risk biomarker discovery and underlying molecular mechanisms. The team has focused on cardiovascular biomarkers, especially those related to lipid profile, and mechanisms leading to cardiovascular disease. The group has pioneered the use of cell line-based assays in human studies to simulate in vitro processes that occur in blood vessels, such as HDL functionality and atherogenicity of apoB-containing lipoproteins.

The team has been actively involved in PREDIMED and PREDIMEDplus, large-scale trials of Mediterranean diet interventions. We are particularly interested in the discovery of biomarkers with potential predictive value for cardio-metabolic diseases and those closely related to them (such as neurodegenerative diseases), and in the modulation of these biomarkers by lifestyle.



CLARY CLISH | PHD

Broad Institute, MIT, HARVARD University Cambridge, USA Senior Director, Metabolomics; Institute Scientist

Clary Clish is Senior Director of the Metabolomics Platform and an Investigator at the Broad Institute of MIT and Harvard. His laboratory works to develop and apply technologies for the systematic analysis of metabolites and small molecules in biological samples. His research is highly collaborative and broadly aimed at advancing our understanding of the role of metabolism in normal physiology and disease. Current projects range from dissecting metabolic dependencies in cancer to identifying early metabolic perturbations that precede disease or clinical manifestations of disease in human cohorts.

Prior to joining the Broad Institute, Clish held senior management positions in the biotechnology industry from 2001 to 2008, including Vice President of Discovery at Gene Logic Inc. and Director of Metabolite Biochemistry at Beyond Genomics Inc. From 1997-2001, Clish was a postdoctoral fellow and instructor in the laboratory of Dr. Charles Serhan at the Center for Experimental Therapeutics and Reperfusion Injury at Brigham & Women's Hospital. In the Serhan laboratory, his work focused on understanding the role of lipid mediators in acute inflammation and its resolution, including the discovery and characterization of a novel class of anti-inflammatory lipid mediators that have since been named "resolvins.

Clish received his B.Sc. in Chemistry and Biological Sciences from McGill University and his Ph.D. from Portland State University.



RIKARD LANDBERG | PHD

Division of Food and Nutrition Science, Department of Life Sciences, Chalmers University of Technology, Gothenburg, Sweden

Full Professor, Head of Division

Professor Rikard Landberg is head of the Department of Food and Nutrition Science at Chalmers University of Technology, Sweden (n=50). Landberg's multidisciplinary group (n=20) investigates the preventive role of (plant-based) foods through observational and interventional studies.

Landberg is PI of several RCTs on the role of plant foods in appetite and weight regulation and on cardiometabolic risk. To date, the team has conducted about 15 studies involving more than 1500 participants, ranging from small acute meal studies and pharmacokinetic studies to investigate the basic mechanisms of specific dietary components on human physiology, to large long-term randomized controlled trials to support EU health claims. Landberg is also leading studies to test novel OMICs-based personalized approaches for improved cardiometabolic disease prevention. In his group, metabolomics is a key technique used for discovery and validation of exposure and prediction biomarkers and for molecular phenotyping as a basis for tailored dietary strategies for personalized nutrition. Novel food intake biomarkers for whole grain intake, fish, coffee and dietary patterns have emerged and have been widely validated and implemented by the international research community.

The Landberg group uses well-established cohorts from Sweden (SIMPLER, Northern Disease and Health Study), Denmark (Danish Diet Cancer and Health - Next Generation cohort) and Europe (European Prospective Investigation into Cancer and Nutrition). Professor Landberg has authored $\sim\!205$ papers, $\sim\!10$ book chapters, $\sim\!30$ invited/keynote lectures and is the editor of one book. He has a Scopus H-index of 43. Professor Landberg is a member of the Royal Swedish Academy of Engineering Sciences, the National Committee for Nutrition and Food Science of the Royal Swedish Academy of Sciences, and a member of the Young Academy of Sweden (2018-2023).



CLEMENS WITTENBECHER | PHD

Chalmers University of Technology, Gothenburg, Sweden Assistant professor in precision medicine and diagnostics

Dr. Clemens Wittenbecher is Assistant Professor in Precision Medicine and Diagnostics at Chalmers University of Technology and a Wallenberg Data-Driven Life Science Fellow. Dr. Wittenbecher received his Ph.D. in Nutritional Epidemiology from the University of Potsdam and held research positions at the German Institute of Human Nutrition Potsdam-Rehbruecke and the Harvard School of Public Health.

Dr. Wittenbecher's research uses molecular profiling data, especially metabolomics and lipidomics, to elucidate the relationship between dietary composition and cardiometabolic disease risk. Core methods include data-driven network analysis, risk prediction, machine learning, and causal modeling approaches in prospective cohorts and dietary intervention trials. Dr. Wittenbecher's team aims to strengthen the evidence for the causal role of dietary composition in cardiometabolic disease etiology through the strategic use of omics technologies and the combination of data from different types of studies. A major research focus of his group is the impact of dietary macronutrient composition and fat quality on lipid metabolism. Other research areas include molecular subtyping of cardiometabolic diseases and integration of multi-omics and biomedical imaging data in human population studies. The primary translational goals of Dr. Wittenbecher's research are to improve the accuracy and precision of dietary quidelines and to develop novel molecular marker panels for biomarker-driven precision nutrition approaches.



LIMING LIANG | PHD

Department of Epidemiology and Biostatistics Harvard T.H Chan School of Public Health. Boston, USA Professor of Statistical Genetics Director, Program in Genetic Epiddemiology and Statistical Genetics

Dr. Liang's group focuses on developing computational and statistical tools for analyzing multi-omics data to understand the biological mechanism of disease and provide predictive models to assess future risk and individual benefit of intervention.

Specific projects include polygenic risk prediction models for complex diseases and traits applicable to multiple populations; estimation of shared genetic components between complex diseases and traits by incorporating common and rare variant data from multiple populations; Metabolomic network analysis for disease and dietary exposure using targeted and untargeted metabolites from mass spectrometry-based metabolomics data; DNA methylation signature for aging and risk for childhood diseases (obesity and asthma) and its interaction with interventions and environmental exposures; mapping of genetic variants for gene expression, methylation, metabolomics and other secondary traits (QTL mapping).

Causal inference based on robust Mendelian randomization frameworks under different genetic architectures. We are actively applying these methods in large-scale studies and unique longitudinal cohorts focusing on asthma, allergy, lung cancer, COPD, age-related macular degeneration (AMD), diabetes, heart disease and other cardiometabolic traits in subjects from European, African, Hispanic and Asian



MARTA GUASCH-FERRÉ | PHD

University of Copenhagen, Denmark Associate Professor and Group Leader

Dr. Guasch-Ferré is Associate Professor and Group Leader at the Department of Public Health and Novo Nordisk Center for Basic Metabolic Research at the University of Copenhagen, Denmark. She is Deputy Head of the Department of Epidemiology at the University of Copenhagen. She also holds an appointment as Adjunct Associate Professor in the Department of Nutrition at the Harvard T.H. Chan School of Public Health, USA.

Her research focuses on dietary and lifestyle epidemiology and prevention of type 2 diabetes (T2D) and cardiovascular disease (CVD). She has incorporated high-throughput -omics techniques, primarily metabolomics, into traditional epidemiologic analyses to gain insight into underlying mechanisms that may explain associations between dietary factors and CVD and T2D. The research group she leads aims to advance the field of precision nutrition by improving objective dietary biomarkers through the integration of -omics data and evaluating their association with cardiovascular disease using large cohort studies and clinical trials with dietary data and metabolomics.

Dr. Guasch-Ferré's research activities have resulted in numerous manuscripts (>140, H-index 40) and she has been awarded several competitive European and American grants. She received the Sandra A. Daugherty Award for Excellence in Cardiovascular Disease or Hypertension Epidemiology and Prevention from the American Heart Association (2021). She is the P.I. of an NIH-funded project entitled "Circulating plasma metabolites, lifestyle factors, and mortality risk".



MIGUEL RUIZ - CANELA| PHD, MPH

Preventive Medicine and Public Health, University of Navarra, CIBERObn, IdiSNA Director of Department of Preventive Medicine and Public Health, Pamplona, Spain

Dr. Ruiz-Canela is Professor of Preventive Medicine and Public Health at the University of Navarra, Spain. He holds a Ph.D. from the University of Navarra and a Masters in Public Health from the London School of Hygiene and Tropical Medicine.

His current research focuses on the Mediterranean diet, cardiometabolic diseases and metabolomics, and culinary medicine. He is involved in several studies including the SUN cohort and the PREDIMED-Plus study.

He coordinates the research activities between the University of Navarra and the University of Harvard in different NIH projects on metabolomics, cardiovascular diseases and diabetes within the PREDIMED study. He is PI of the PREDIMAR study on the Mediterranean diet and secondary prevention of atrial fibrillation. He is also PI in two projects on culinary medicine and chronic disease prevention. He was Visiting Scientist at the Department of Nutrition, Harvard School of Public Health (2014/2016/2018).





ROSA M LAMUELA-RAVENTÓS | PHD

University of Barcelona and CIBERObn, Spain. Full Professor

Professor at the Department of Nutrition and Bromatology of the University of Barcelona, she is the founder and director of the Polyphenols Research Group SGR 00334 2021 (polyphenolresearch.com), which is one of the Scientific Excellence Groups of the CIBEROBN.

Currently, she holds the position of Principal Investigator of the María de Maeztu Excellence Unit of the Institute of Nutrition and Food Safety of the UB, INSA-UB. For five consecutive years (2017-2021), she has been included in the list of the most influential scientists in the world (Highly Cited Researchers), published by Clarivate Analytics.

She has published more than 400 scientific articles with more than 46,000 citations, corresponding to an Hindex of 98 (Scopus). In recognition of her excellence, in 2018 she was awarded the XXV Danone Institute Award for Scientific Career "Dr. Carles Martí Henneberg".



DANIEL WANG | MD, ScD

Brigham and Women's Hospital, Harvard Medical School, Harvard T.H Chan School Of Public Health, and Broad Institute of MIT Boston, USA Assistant Professor

Dr. Daniel Wang is an Assistant Professor at Brigham and Women's Hospital, Harvard Medical School, and the Harvard T.H. Chan School of Public Health, and an Associate Member of the Broad Institute of MIT and Harvard.

His research group is interested in investigating the interaction between diet and the microbiome, understanding inter-individual variability in response to diet, and discovering novel biomarkers to predict cardiometabolic disease and Alzheimer's dementia. Dr. Wang received his ScD in nutrition and epidemiology in 2016 and completed his postdoctoral training in 2020, both at the Harvard T.H. Chan School of Public Health.





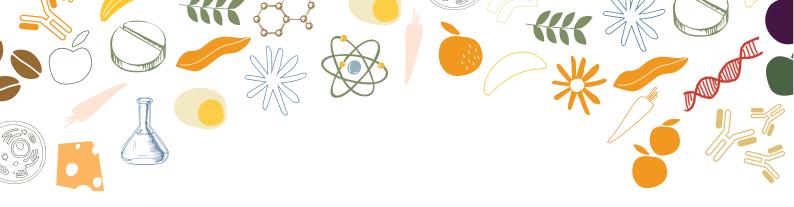
NITA GANDHI FOROUHI | PHD, MPH

University of Cambridge, UK Programme Leader, MRC Investigator, NIHR Senior Investigator

Nita G. Forouhi is a physician-scientist, Head of the Nutritional Epidemiology Programme, MRC Investigator, National Institute for Health Research (NIHR) Senior Investigator and Professor of Population Health and Nutrition at the Medical Research Council (MRC) Epidemiology Unit, University of Cambridge. She is a Public Health physician with the UK government's Office for Health Improvement and Disparities and Director of Organisational Affairs at the Cambridge School of Clinical Medicine.

Nita's research focuses on defining the link between diet, nutrition and non-communicable diseases and in informing strategies for their prevention in European and global populations. She has a particular interest in identifying nutritional biomarkers to help improve dietary precision and use them to study the links between diet and disease. She has published more than 350 scientific articles and has served on committees including National Institute for Health and Care Excellence (NICE), Public Health England, Scientific Advisory Committee on Nutrition (SACN) working group, Diabetes UK, National Obesity Expert Reference Group and International Diabetes Federation (IDF) Atlas committee. She is a keen educator and has helped with research capacity building in the UK and in global settings.

After schooling in India, she trained in the UK as a physician in Newcastle and Edinburgh qualifying with a BMedSci, MBBS and MRCP. After working as a clinician in diabetes and endocrinology, she obtained a Masters and PhD in Epidemiology at the London School of Hygiene & Tropical Medicine as a Wellcome Fellow and she specialised in Public Health Medicine in London and Cambridge.





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