institute imdea food

Precision Nutrition and Health

two thousand and twenty one

20 21

annual report

words from the director...

Director

Guillermo Reglero
Director, IMDEA Food Institute
June 2022

La respuesta a la alimentación tiene un fuerte carácter personal

"Filling the gaps" [The complete sequence of a human genome. Science. 31 Mar 2022]. Acaba de conocerse que se ha resuelto la secuenciación de las regiones del genoma humano que no habían podido abordarse desde la publicación del código genético en 2001, debido a limitaciones técnicas ya superadas ahora.

En los últimos 20 años, del conocimiento del código genético se está derivando una infinidad de avances en Bioquímica, Biología Molecular y Biomedicina con gran trascendencia para la vida. En la mayoría de ellos se presentan evidencias de que la respuesta de los organismos a los factores ambientales es individual.

Ya se ha demostrado específicamente que la respuesta a la alimentación, que es un factor ambiental de primer orden, tiene un fuerte carácter personal. De hecho, la ciencia de la Nutrición es una de las disciplinas más intensamente impulsadas por la genómica, hasta el puno de dar lugar a una "nueva nutrición".

Nadie discute que las personas somos distintas. Hasta ahora, esta observación se centraba exclusivamente en los aspectos físicos y en los psicológicos. Por ejemplo, hace mucho tiempo que mercados

La nueva nutrición consiste en estrategias dietéticas y productos alimentarios diseñados atendiendo al genoma y el metagenoma

como el textil se han adaptado a la individualidad con tallas, o ropa "Taylor-made". Sin embargo, la nutrición personalizada todavía no está implantada a nivel general.

Solo muy recientemente, se han comenzado a promover acciones para acercar esta nueva nutrición a la sociedad. La más reciente y destacada puede ser los "NIH awards $170 million for precision nutrition study", convocados en enero de 2022 dentro del "Strategic Plan for NIH Nutrition Research 2020-2030" del National Institutes of Health de los EEUU.

Desde su creación en 2006, IMDEA Alimentación decidió posicionar su línea científica en la nueva nutrición. Bien como "nutrición estratificada" dirigida a grupos de individuos con características compartidas; como "nutrición personalizada" indicada individualmente; o bien como "nutrición de precisión" específica para un propósito concreto *[Ordovás et al. BMJ 2018],* la base del proyecto del Instituto es hacer de la alimentación una herramienta de bienestar y salud.

La nueva nutrición consiste en estrategias dietéticas y productos alimentarios diseñados atendiendo al genoma y el metagenoma, con el fin de actuar de manera precisa sobre determinados aspectos del metabolismo, el sistema inmune, la regulación hormonal o el biorritmo, y así alcanzar objetivos concretos en contextos fisiológicos específicos. La nueva nutrición, al igual que la nutrición clásica, estudia los procesos bioquímicos y fisiológicos del organismo en cuanto al uso de los alimentos para mantener o mejorar la vida, pero teniendo en cuenta que la respuesta específica de cada persona puede ser diferente.

En 15 años de actividad, IMDEA Alimentación ha configurado una organización orientada a llevar a la sociedad, a través de administraciones públicas y empresas, una nutrición efectiva, basada en el conjunto de investigaciones científicas que ha venido realizando en este tiempo.

En el momento de redactar estas líneas, Web of Science (Clarivate Analytics), que reúne las principales bases de datos internacionales de publicaciones científicas, contiene más de 1.500 artículos de investigación de IMDEA Alimentación, citados más de 26.000 veces por otros autores a nivel mundial. Siendo éste un número relevante, más importante aún es que contienen descubrimientos que aproximan a la realidad el uso de la alimentación como herramienta efectiva de mantenimiento y recuperación de la salud.

el Instituto IMDEA Alimentación promueve una acción estratégica para impulsar la nueva nutrición hacia el mercado

Sobre esta base científica, el Instituto IMDEA Alimentación promueve una acción estratégica para impulsar la nueva nutrición hacia el mercado. Un consorcio de centros de investigación, universidades, asociaciones empresariales e industrias está detrás de esta estrategia que se ha denominado INNOHEALTHFOOD.

También se trata de "Filling the gaps". De tender puentes entre la investigación y la industria para facilitar la llegada de la nueva nutrición a la sociedad.

words from the director...

INNOHEALTHFOOD consiste en una plataforma de información y modelización, basada en tecnologías de inteligencia artificial y construida con datos (big data) genómicos, metagenómicos, nutricionales, de estilo de vida y estado salud. La plataforma de modelización se complementa con una estructura de consejo científico-técnico para dar soporte a las empresas en sus diseños y desarrollos de nutrición estratificada, nutrición personalizada o nutrición de precisión.

INNOHEALTHFOOD consiste en una plataforma de información y modelización, basada en tecnologías de inteligencia artificial y construida con datos (big data)

En los próximos meses, INNOHEALTHFOOD tiene que llevar a cabo un programa de captación masiva de datos. Al no contar en España con un programa análogo al de los NIH, se requieren actores que apoyen el proyecto desde el convencimiento de que la nutrición personalizada encierra valor añadido y bienestar.

La memoria 2021 que les presentamos a continuación, contiene la actividad de IMDEA Alimentación en este ejercicio. Continuando la tendencia creciente de los últimos años, se han publicado 232 artículos originales de investigación y se han captado más de 3 millones de euros de financiación externa en programas competitivos, cifra que ya supera claramente a la financiación basal, rebasando la ratio 1:1, lo cual supone un gran desafío para el Instituto en los próximos ejercicios ya que su dependencia de la financiación competitiva es muy elevada.

Para finalizar, vuelvo a hacer referencia a los 15 años de vida que los Institutos IMDEA han alcanzado en 2021. Partiendo de cero, pero canalizando recursos del sistema madrileño de I+D+I y en conexión con las universidades, se han constituido en la Comunidad de Madrid siete nodos de investigación e innovación en las áreas científico-técnicas que en la actualidad están impulsando la transformación del mundo y que deben conducir a la humanidad a un futuro mejor.

El medio ambiente, a través del estudio y la gestión del agua; los nuevos materiales para la seguridad y el bienestar, impulsados por la nanociencia y otras ciencias modernas; las tecnologías

de la información y comunicación que han revolucionado la vida en la tierra; las nuevas fuentes y estrategias de uso de la energía; y la nutrición individualizada que impulsa la prevención, el tratamiento y la recuperación de la salud, mediante la alimentación, son las líneas en las que trabajan los Institutos IMDEA, atrayendo a la Comunidad de Madrid talento y colaboraciones para trabajar aquí con proyección a todo el mundo.

'Filling the gaps' *[The complete sequence of a human genome. Science. 31 Mar 2022]*. It was just announced that the sequencing of the regions of the human genome that could not be done since the genetic code was published in 2001 due to technical limitations that have since been overcome has been resolved.

In the last 20 years, knowledge of the genetic code has led to countless breakthroughs in biochemistry, molecular biology and biomedicine with far-reaching significance for life. Most of them reveal evidence that organisms show an individual response to environmental factors.

It has already been clearly documented that the response to food, which is a major environmental factor, is strongly personalised. In fact, nutritional science is one of the disciplines most strongly driven by genomics, to the point of giving rise to a 'new nutrition'.

The response to food is strongly personalised

No one disputes that people are different from each other. Until now, this observation has focused exclusively on physical and psychological aspects. For example, the textile industry has long since adapted to individuality with sizes or tailor-made clothing. However, personalised nutrition has not yet been widely implemented.

Only very recently have actions to bring this new nutrition closer to the general public started to be promoted. The most recent and outstanding may be the 'NIH

awards $170 million for precision nutrition study', organised in January 2022 within the 'Strategic Plan for NIH Nutrition Research 2020–2030' of the US National Institutes of Health.

Since its creation in 2006, *IMDEA Food* decided to position its scientific line in new nutrition. Whether as 'stratified nutrition' aimed at groups of individuals with related characteristics, as 'personalised nutrition' tailored to each individual or as 'precision nutrition' specific for a particular purpose *[Ordovás et al. BMJ 2018]*, the basis of the Institute's project is to make food a tool to achieve wellbeing and health.

New nutrition consists of dietary strategies and food products designed with the genome and metagenome in mind

New nutrition consists of dietary strategies and food products designed with the genome and metagenome in mind to precisely target specific aspects of metabolism, the immune system, hormone regulation or biorhythms to achieve specific goals in specific physiological contexts. New nutrition, like classic nutrition, studies the biochemical and physiological processes of the organism in terms of the use of food to sustain or enhance life but taking into account the fact that each person's specific response may differ.

In its 15 years of activity, *IMDEA Food* has built an organisation aimed at bringing effective nutrition to society, through public administrations and companies, based on the scientific research it has been carrying out.

At the time of writing, Web of Science (Clarivate Analytics), which brings together the main international databases of scientific publications, contains more than 1,500 research articles by *IMDEA Food* which have been cited more than 26,000 times by other authors worldwide. While this is a significant number, even more significant is that they contain findings that bring the use of food as an effective tool for maintaining and recovering health closer to reality.

IMDEA Food Institute is promoting a strategic action to drive new nutrition to market

On this scientific basis, the *IMDEA Food* Institute is promoting a strategic action to drive new nutrition to market. A consortium of research centres, universities, business associations and industries is behind this strategy, which has been named *INNOHEALTHFOOD*.

words from the director...

It is also about 'Filling the gaps': building bridges between research and industry to help new nutrition touch down in society.

INNOHEALTHFOOD consists of an information and modelling platform based on artificial intelligence technologies and built with genomic, metagenomic, nutritional, lifestyle and health status data (big data). The modelling platform is complemented by a scientific and technical advice structure to support companies in their designs and developments of stratified nutrition, personalised nutrition or precision nutrition.

In the coming months, *INNOHEALTHFOOD* has to carry out a massive data collection programme. As Spain does not have a programme like the NIH's, actors are needed to support the project based on the conviction that personalised nutrition adds value and wellbeing.

INNOHEALTHFOOD consists of an information and modelling platform based on artificial intelligence technologies and built with genomic, metagenomic, nutritional, lifestyle and health status data (big data)

The 2021 report, which we present below, contains *IMDEA Food*'s activity for this year. In line with the growing trend of recent years, 232 original research articles have been published and more than three million euros of external funding has been attracted in competitive programmes, a figure that already clearly outpaces the baseline funding, exceeding the 1:1 ratio, which will be a major challenge for the Institute in coming years as its dependence on competitive funding is very high.

Finally, I would like to refer once again to the *IMDEA* Institutes turning 15 in 2021. Starting from scratch, but channelling resources from Madrid's R&D&I system and in connection with the universities, seven research and innovation nodes have been set up in the Community of Madrid in the scientific and technical areas that are currently driving world transformation and that must lead humanity to a better future.

The environment through the study and management of water, new materials for safety and wellbeing driven by nanoscience and other modern sciences, information and communication technologies that have brought about a revolution in life on earth, new sources and strategies for energy use and individualised nutrition that drives prevention, treatment and health collection through food, are the lines in which *IMDEA* Institutes are working, attracting talent and collaborations to the Community of Madrid to work here but to have an impact worldwide.

editor
IMDEA Food Institute

layout
www.loveodesign.es

D.L.
M-16961-2022

contents

about us

The IMDEA Food Institute, one of the seven Madrid Institutes for Advanced Studies (IMDEA), is a public research centre founded in 2007 by Madrid's regional government. The goal of the Institute is to generate science of excellence in the field of food on which to support solutions to social problems and to contribute to a knowledge-based economic model capable of generating high added value.

mission

The mission of the IMDEA Food Institute is to generate scientific knowledge of excellence in the field of food, to improve the quality of life of the population and to contribute to the development of an economic model based on the creation of value from knowledge-based innovation.

The Institute's hallmark is the study of the relationship between genes and nutrients with special emphasis on the prevention and treatment of chronic diseases through precision nutrition.

vision

IMDEA Food advances its lines of research through the strategies and tools of nutritional genomics, in fields such as cancer, ageing, obesity and cardiometabolic diseases.

IMDEA Food organizes its activities around three strategic axes:

science

Advancing scientific knowledge in the area of food and health, with a special focus on the prevention of chronic diseases.

industry

Contributing towards the economic development and competitiveness of the food industry via the design and validation of nutritional strategies and food products of proven effectiveness in the prevention and treatment of chronic diseases.

society

Contributing towards the reduction of healthcare costs and improving the wellbeing of the population through the study of the relationship between diet and health, the execution of communication programmes, and via the dissemination of nutrition advice.

Research Programmes

- Precision Nutrition and Aging
- Precision Nutrition and Cancer
- Precision Nutrition and Obesity
- Precision Nutrition and Cardiometabolic Health
- Childhood Precision Nutrition

Research Platforms

- Platform for Clinical Trials in Nutrition and Health. GENYAL + P4H
- Innovation, Communication and Education Unit

people

The core strength of the Institute is its international **research team, consisting of talented researchers from 12 different nationalities**, which carries out new scientific discoveries in Food Science, and foster the development of emerging technologies.

97 researchers
55 Ph.D., **35** no Ph.D. & **7** technicians

12 different nationalities

15 research groups

10 people in management

laboratory

The facilities of IMDEA Food Institute

The building and laboratories of IMDEA Food Institute are located at the Cantoblanco University Hospital, next to the Universidad Autónoma de Madrid campus, with which the Institute collaborates closely.

4.595 m^2 area

2 symmetrical areas of 5 floors each

100 researchers of maximum capacity

6 research labs

human resources

97 Researchers

15 Research Groups

39 Spanish Ph.D.

16 Foreign Ph.D.

scientific results

232 Scientific Papers

7 Scientific Papers about COVID-19

66 Invited Talks

21 Theses since 2008

19 Ongoing Theses

technology transfer

13
Contracts with Companies

2
Spin-Off-EBT

38
Clinical Nutrigenomics Interventions

projects and fellowships

+2,500
Clinical Nutrigenomic Volunteers Cohort

18
National Projects

37
R&D Grants

21
R&D International Projects

our structure

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NATAC BIOTECH S.L. Spain
Dr. José Carlos Quintela Fernández. Scientific General Director

ASEACAM
Food Industries Association of Madrid Community. Mr. Ricardo Otero. President.

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Spain

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University of Copenhagen. Department of Biology. Denmark

Dr. Eva Hernando
Department of Pathology. NYU Grossman School of Medicine New York. EEUU

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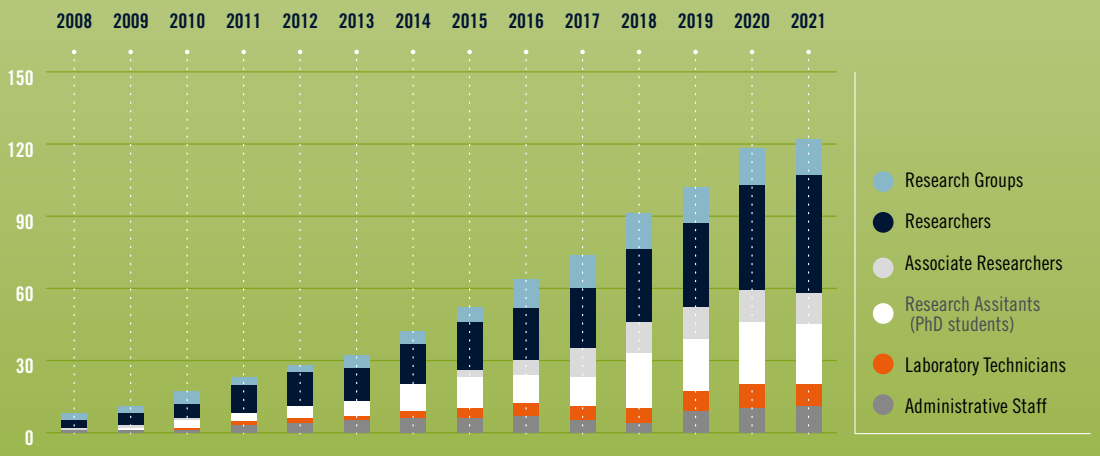
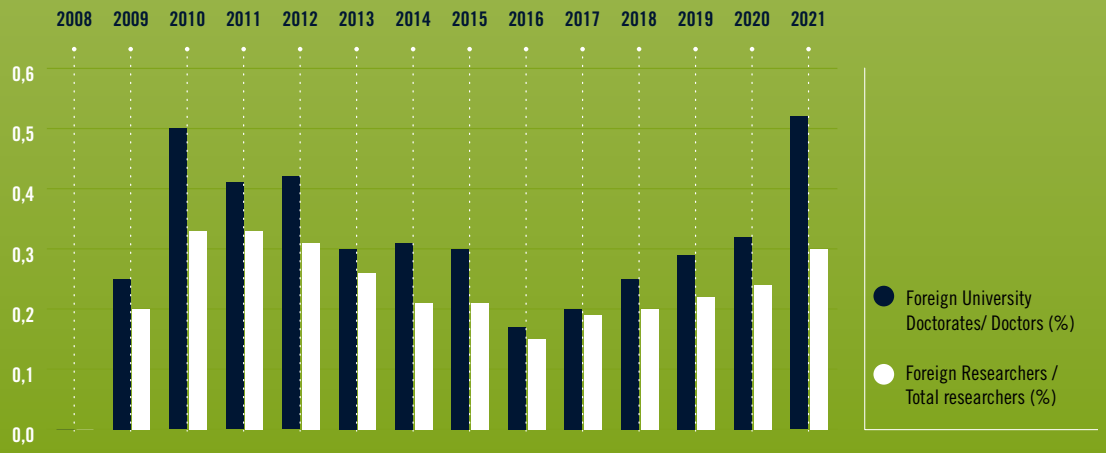
Dr. María Puy Portillo Baquerano
Professor. Basque Country University (UPV/EHU) and CIBEROBN member.

in figures

human resources



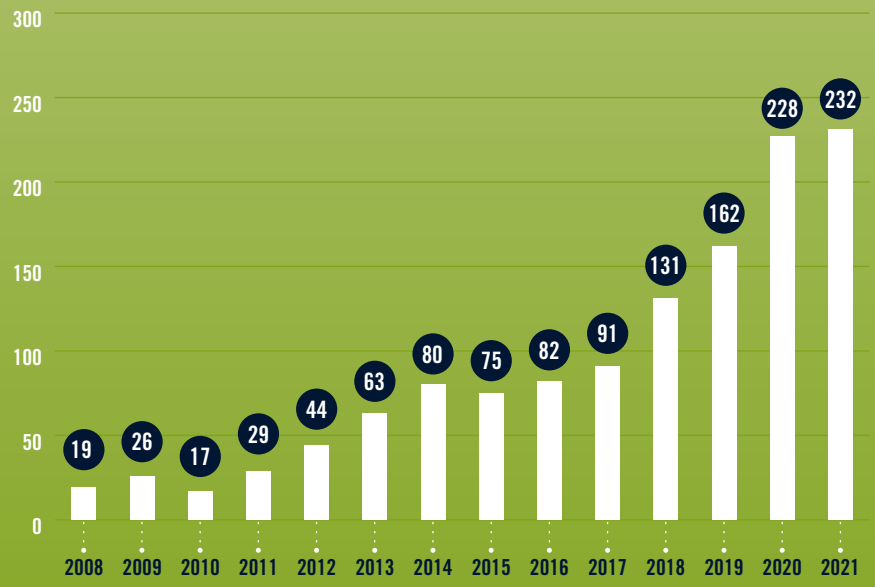


Technology and knowledge transfer to society through talent transfer

21 Defended Ph.D. Theses since 2008

19 On going Ph.D. Theses

scientific results



	TOTAL 2020	TOTAL 2021	2021 vs 2020
Nº Publicaciones totales 2021	228	**232**	1,8%
Nº Publicaciones Q1 JCR	154	**189**	22,7%
% Q1 JCR	68%	**81%**	**+ 13,9**

66 Keynote/ invited talks

2021

technology transfer

The Institute has a portfolio of six patents, four of which have been granted and two have been internationally licensed. Two patents have been also transferred to the company CANAAN through the granting of an exclusive license with the right to sublicense, develop, use and market the international patent PCT/ ES2017/070263 and the Spanish priority patent number P201131733. Two products derived from the invention P201830740 have been licensed to the company YNSADIET.

Also, IMDEA Food, participates in two EBT (technology - based company) PRECISION FORHEALTH, S.L. (P4H) constituted in February 2018 and FORCHRONIC S.L. constituted in March 2019. Finally, the following shows the companies that have been collaborating with the centre during 2020, the agreements agreed with International Universities and Research Institutes, as well as the different scientific and technological international partnerships that IMDEA Alimentación has:

Companies which had active collaboration with IMDEA Food during 2021

P4H Precision ForHealth
Grupo AN
LEITAT managing technologies
PEPSICO
Bio Sabor S.A.T.
abp Food Group
BGG Your natural partner
JOHN DEERE
MASPEX

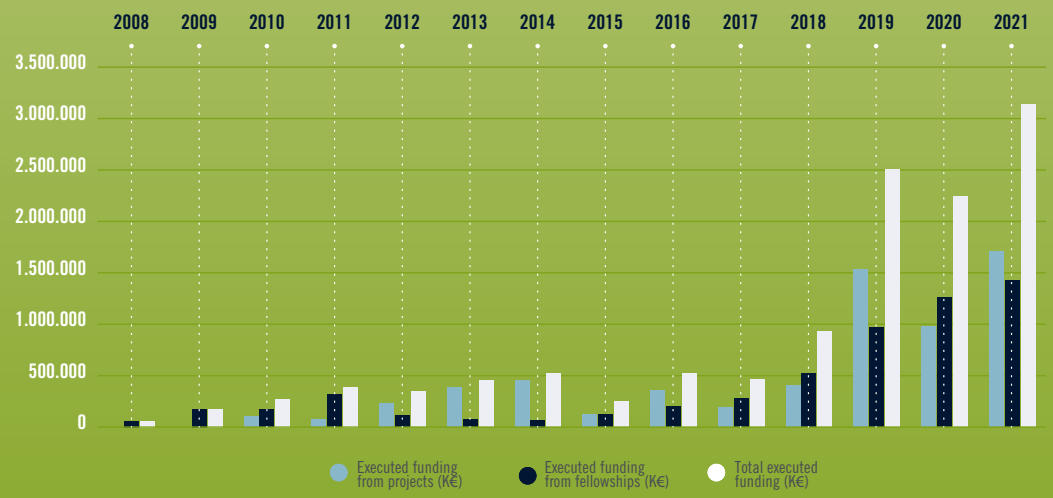
International joint Ph.D. supervision agreements

EPFL
CEU Universidad San Pablo
ETH zürich
UNIVERSIDAD DE MURCIA
KU LEUVEN
UNIVERSITÀ DEGLI STUDI DI TORINO
QUEEN'S UNIVERSITY BELFAST
UNIVERSITY OF CAMBRIDGE
Technical University of Munich TUM
UNIVERSITY OF WARSAW
TECHNION Israel Institute of Technology
UNIVERSITY OF HOHENHEIM
UAM Universidad Autónoma de Madrid
University of Reading
UNIVERSIDAD DE CHILE
ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Scientific/Technological international partnership

eit Food
CONACYT
FNS - Cloud
CREAS
LifeTime
cnio Centro Nacional de Investigaciones Oncológicas
METABOLON
GILEAD
CEBAS
TRANSBIONET
Hospital Universitario Infanta Sofía
ILSI International Life Sciences Institute
Hospital Universitario La Paz
IMIBIC
Hospital Universitario Ramón y Cajal
VTT
Parc Sanitari Pere Virgili
DANA-FARBER CANCER INSTITUTE
CSIC
eit Health
GBT
MATIS BEAUTY EXPERT

projects and fellowships



21 International projects

18 National Projects

7 Regional Projects

13 Contracts with industry

97 R&D Researchers

social networks

10.844 reached people

11.430 views

340.900 impressions

2.931 followers

3.187 reached people

IMDEA Food in the media

130 Media Impacts

For further details see Annex page 170

21/6/22, 20:19 Lo que a ti te sienta bien, a mí me hace engordar | Nutrición | Buenavida | EL PAÍS

EL PAÍS

SUSCRÍBETE

Buenavida

SALUD · NUTRICIÓN · EJERCICIO FÍSICO · BIENESTAR · PSICOLOGÍA · MEDIO AMBIENTE · GASTRONOMÍA · LA DESPENSA

Lo que a ti te sienta bien, a mí me hace engordar

O cómo la nutrición de precisión apunta a convertirse en ese jaque a la obesidad que tanto se nos resiste

WESTEN

una herramienta determinante en
ién cuando se trata de alimentación y
extraño escuchar en ocasiones a
an seguir una dieta saludable pero que,
s de acabar con los kilos de más. Pues bien,
go la denominada **genética del metabolismo**,
zule de nuestro organismo que, sin embargo,
r determinante a la hora de ser capaces de
dable a largo plazo, ya que «**su seguimiento ha**
r a mejorar la salud y a lograr una pérdida de
veces mayor que sin un plan dietético no
egún el ADN», confirma Dani **Sorcnellas**, genetista y
personalizadas, y la genética es una manera de
las, implica una **mayor adherencia a las**
aciones nutricionales que una persona recibe, lo que **eleva**

21/6/22, 19:56 Nutrición inteligente y personalizada, una tendencia al alza | elEconomista.es

elEconomista.es

Salud

Nutrición inteligente y personalizada, una tendencia al alza

elEconomista
8:00 - 30/06/2021

research

IMDEA Food focuses its scientific project on Precision Nutrition. The development of products and therapies for various chronic diseases is based on new scientific knowledge of the molecular mechanisms that give rise to different physiological processes. The identification of therapeutic targets that can be modulated by the nutrients is key for the food to reach the therapeutic character attributed to it in the current scientific context. IMDEA Food traces its lines of research through the strategies and tools of nutritional genomics, in fields such as cancer, ageing, obesity and cardiometabolic diseases.

The Institute's organizational structure is based on five thematic research programmes with the common denominator of precision nutrition. Each of the Programmes are divided into Groups, whose leaders are senior researchers. This structure is completed with two Technology and Technology Transfer Platforms.

The scientific staff is distributed in the five Research Programmes led by a principal researcher and focused on lines of strategic interest within the field of Nutrition, Food and Health. All of them carry out applied scientific research, fundraising for projects, scientific publications and transfer of results.

research programmes

Precision Nutrition and Aging Programme

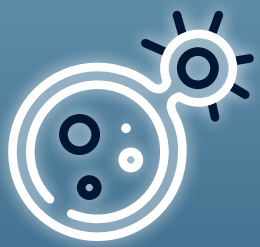
Dr. Manuel Serrano

Metabolic Syndrome Research Group
Dr. Pablo Fernández

Nutritional Interventions Research Group
Dr. Rafael de Cabo

Hepatic Regenerative Medicine Research Group
Dr. Manuel Fernández Rojo

Posttranscriptional regulation of metabolic diseases Research Group
Dr. Cristina Ramírez



Precision Nutrition and Cancer Programme

Dr. Ana Ramírez de Molina

Molecular Oncology Research Group
Dr. Ana Ramírez de Molina

Clinical Oncology Research Group
Dr. Enrique Casado and Dr. Jaime Feliú

Molecular Immunonutrition Research Group
Dr. Moisés LaParra

Computational Biology Research Group
Dr. Enrique Carrillo de Santa Pau

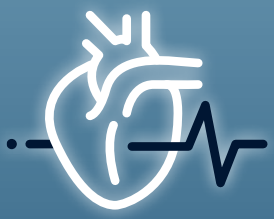
Precision Nutrition and Obesity Programme

Dr. Jose María Ordovás

Nutritional Genomics and Epigenomics Research Group
Dr. Jose María Ordovás

Cardiovascular Nutritional Epidemiology Research Group
Dr. Fernando Rodríguez Artalejo

Nutritional Control of the Epigenome Research Group
Dr. Lidia Daimiel



Precision Nutrition and Cardiometabolic Health Programme

Dr. Alfredo Martínez

Cardiometabolic Nutrition Research Group
Dr. Alfredo Martínez

Bioactive Ingredients Food Research Group
Dr. Francesco Visioli

Epigenetics of Lipid Metabolism Research Group
Dr. Alberto Dávalos

Childhood Precision Nutrition Programme

Dr. Jesús Argente / Dr. Julie Chowen

Childhood Obesity Research Group
Dr. Jesús Argente and Dr. Julie Chowen

research platforms

Innovation, Communication and Education Unit

Dr. Guillermo Reglero

Innovation & Business Creation
Dr. Ana Ramírez de Molina

Education
Dr. María Jesús Latasa

Communication
Sara Castillo

Platform for Clinical Trials in Nutrition and Health. GENYAL

Dr. Ana Ramírez de Molina

Nutrition and Clinical Trials Unit

Nutritional Genomics and Health
Dr. Maria Isabel Espinosa

Biostatistics and Bioinformatics Unit
Dr. Gonzalo Colmenarejo

GENYAL Lab
Dr. Susana Molina

facilities

IMDEA Food headquarters are located in the old main building of the Cantoblanco Hospital since beginning of 2014. The building, ceded to the Institute by Regional Government of Madrid, is an excellent space in which to undertake scientific research.

It is located next to the Cantoblanco Campus of the Autonomous University of Madrid with which the Institute has strong cooperative ties within the grounds of the Cantoblanco University Hospital.

The building occupies an area of 4.595 m^2 and is divided into two symmetrical main sections of five stories each that can house up to 100 researchers. It is equipped with laboratories of molecular and cellular biology P2, genomics and instrumental analysis, as well as facilities for clinical trials in humans.

The project for completing the Institute's Insfraestructures in the west wing of the building includes the construction of new research areas (including new laboratories and experimental animal facilities) provided with advanced technical and scientific equipment.

Currently the building is equipped with research laboratories, all of which are fitted with advanced scientific-technical hardware.

Laboratory 1. Cell Culture Laboratory (Biosafety Level 2)

This Biosafety Level 2 laboratory allows research to be undertaken on a wide range of moderate risk agents. It is routinely used in experimentation on, and the maintenance of, cell cultures. It is equipped with incubators for maintaining cells under optimum growth conditions, laminar flow cabinets for working in sterile conditions, plus all the basic equipment needed for work on cell cultures, such as microscopes, water baths, centrifuges and cell counters. It also has a fluorescence microscope and a nucleoflector system, which are required in certain experiments. It has the latest equipments for analysis of metabolic activity (SeaHorse and Seahorse HS Mini), along with a fluorescence microscope and a nucleofector, an apparatus with micro-electric biosensors for cellular assays with real-time results (xCELLigence System) and a multiplex analyzer with Luminex technology.

Laboratory 2. Genomics Laboratory

The Genomics Laboratory contains equipment required for genetic, genomic, transcriptomic and epigenetic analyses, etc. It is fitted with all the basic equipment required, such as thermocyclers for performing conventional PCR work, an ABI PRISM HT 7900 apparatus for realtime PCR, plus equipment for gene expression and high-performance genotyping analysis, such as the latest generation QuantStudio™ apparatus. The versatility of these systems allows analyses to be performed in different formats depending on the number of samples to be tested, from 96-well plates to chips capable of performing up to 3.072 genotyping reactions. These devices have different applications, such as digital PCR, DNA fragment analysis, gene expression/ gene quantification analysis, allele discrimination using TaqMan probes, and the detection of SNPs and mutations, etc. Recently, an Illumina iScan equipment has been acquired for use in DNA methylation assays, as well as whole-genome and population genotyping studies, and CNV detection. The laboratory has a designated clean area for processing and extracting nucleic acids from samples originating from clinical trials. The Genomic Laboratory GENYALLab is member of REDLAB, the laboratories network of the Community of Madrid, under the registration number 440.

Laboratory 3. Biochemical Instrumental Techniques Laboratory

This multifunctional laboratory is fitted with a range of small apparatuses for the preparation of reagents and solutions, plus more specific equipment for use in biochemical and molecular biological investigations, such as plate readers, a luminometer, a NanoDrop 2000 spectrophotometer, a SpeedVac sample concentrator, an HPLC apparatus, and a Flow cytometer (FACSCelesta SORP).

This laboratory is divided into different areas where different techniques, such as Western blotting and agarose gel separations, and microbiological techniques for the cultivation and handling of bacteria, can be followed.

Laboratory 4. General Biochemistry and Molecular Biology Laboratory

This is where the different research Groups undertake their normal laboratory work. Each Group has its own space equipped with benches and all the reagents and materials required for its research line. Predoctoral students and those undertaking laboratory experience also work in these areas. Fume cupboards are available for handling volatile compounds, there are cupboards for the storage of flammable products and acids etc., and freezers for preserving samples and reagents. The IMDEA Food installations also have a cold room, a freezing room, a dark room, a zone with several ultrafreezers for sample storage and a cryopreservation tank.

programme

Precision Nutrition and Aging

Programme Director

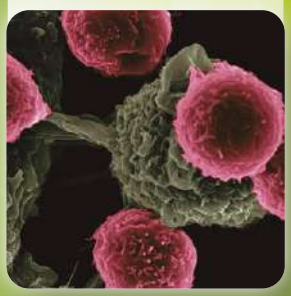
Dr. Manuel Serrano

Director of the Precision Nutrition and Aging Programme and Chair of the Ageing & Metabolism Programme, Institute for Research in Biomedicine (IRB)

Ph.D. in Biochemistry and Molecular Biology. His work is focused in Ageing, metabolism, cellular senescence, cellular reprogramming, fibrotic diseases, cancer.

Goal and vision

The Precision Nutrition and Aging Program at IMDEA Food focuses on the multifaceted connections between nutrition and the aging process. Our program takes advantage of multiple models of age-related metabolic diseases, including cardiovascular disease, non-alcoholic fatty liver disease, obesity, neurodegenerative diseases, hepatic regeneration or diabetes. We are also studying how different nutritional interventions slow down the aging process and delay age-related diseases, such as calorie restriction, intermittent fasting or different fasting-mimicking bioactive products. Finally, our research is focused on the molecular mechanisms that regulate metabolic pathologies and aging-delaying interventions, ranging from mitochondrial function, miRNA expression, insulin signaling, senescence or exosome production and function. Together, we cover a wide range of molecular approaches to fight aging through nutrition.



Metabolic Syndrome

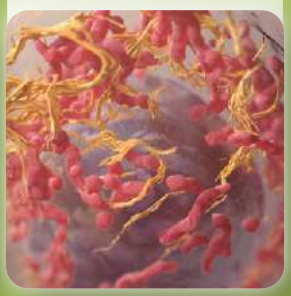
Group Leader

Dr. Pablo J. Fernández

Hepatic Regenerative Medicine Laboratory

Group Leader

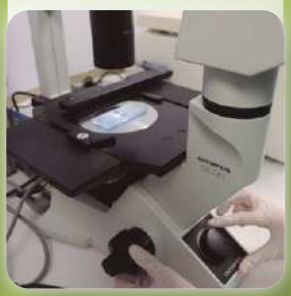
Dr. Manuel Fernández



Posttranscriptional Regulation Of Metabolic Diseases

Group Leader

Dra. Cristina Ramírez



Nutritional Interventions

Group Leader

Dr. Rafael de Cabo

Research groups

research group

Metabolic Syndrome

Group Leader

Dr. Pablo J. Fernández
Metabolic Syndrome Group Leader

Ph.D. in Molecular Biology in the Autonoma University of Madrid. My work is focused on Nutritional interventions that delay aging, more precisely on intermittent fasting (IF). IF elicits unique metabolic responses affecting insulin, PI3K and mTOR signaling, mitochondrial function, autophagy, senescence and redox homeostasis. In my group, we search for compounds that mimic fasting by eliciting these molecular responses, and study their mechanisms of action. We also investigate on the potential applications of intermittent fasting or fasting mimicking strategies, as the enhancement of chemotherapy in cancer patients or the prevention or treatment of obesity, diabetes or other age-associated diseases.

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Objetives

- Molecular and physiological mechanisms of intermittent fasting in mice and humans.
- Fasting-mimicking bioactive compounds against age-related diseases: PI3K-inhibitors, mitohormetics, senolytics, NAD+ and NADPH boosters.
- Short-term fasting during chemotherapy administration: reduction of toxicity and enhancement of the anti-tumor immune response.
- Sirtuins in cancer: roles of Sirt3 and Sirt1 in liver and lung carcinogenesis.

Projects in Focus

Characterization of the molecular mechanisms of short-term fasting as an enhancer of chemotherapy (AYUQUIM).

Principal Investigator: Dr. Pablo J. Fernández-Marcos
Funded by: Spanish Ministry of Economy, Industry and Competitiveness. Call: 2017 R&D&I Projects Ref: SAF2017-85766-R
Duration: 01/01/2018 - 30/09/2021

Sirtuins as biomarkers and targets in cancer: Sirt1 and Sirt3 in lung and liver Carcinogénesis (SIRTBIO).

Principal Investigator: Dr. Pablo J. Fernández-Marcos.
Funded by: Spanish Association Against Cancer (AECC). Call: LAB AECC 2018 Ref: LABAE18008FERN.
Duration: 01/10/2018 - 31/03/2022

Crosstalks between metabolism, aging and cancer.

Principal Investigator: Dr. Pablo J. Fernández-Marcos.
Funded by: Spanish Ministry of Science, Innovation and Universities. Call: Ramón y Cajal Grants. Ref: RYC-2017-22335.
Duration: 01/02/2019 - 31/01/2024

Discovery and characterization of food bioactive compounds modulating the Pentose Phosphate Pathway against non-alcoholic fatty liver disease (Food-PPP-NAFLD).

Principal Investigator: Dr. Ildefonso Rodriguez Ramiro and Dr. Pablo J. Fernandez-Marcos
Funded by: European Commission. Horizon 2020, Research and Innovation Framework Programme. Call: H2020-MSCA-IF-2018. MSCA Individual Fellowships Actions. Ref: GA.832741
Duration: 01/10/2019 - 30/09/2021

Characterization of the molecular mechanisms of short-term fasting against cancer and metabolic syndrome (FASTMET).

Principal Investigator: Dr. Pablo J. Fernández-Marcos
Funded by: Spanish Ministry of Science and Innovation. Call: 2019 R&D&I Projects. Social Research Challenges. Ref: PID2020-114077RB-I00.
Duration: 01/09/2021 - 31/08/2024

Researchers

Dr. Marta Barradas Solas
Postdoctoral Researcher
Ph.D. in Chemistry

Dr. Cristina Pantoja Castro
Postdoctoral Researcher
Ph.D. in Biochemistry

Dr. Adrián Plaza
Postdoctoral Researcher
Ph.D. in Pharmacy

Arantzazu Sierra Ramírez
Ph.D. student
BSc in Biology

Andrés Pastor Fernández
Ph.D. student
BSc in Biotechnology

Jose Luis López
Technician

Head of Research Line

Dr. Ildefonso Rodríguez-Ramiro
Head of Research Line on the Gut-Liver Axis Metabolism and Senior Researcher IF-MARIE CURIE Fellow

PhD in Biochemistry and Molecular Biology by the University Complutense of Madrid. I am dedicated to study novel nutritional strategies to prevent diseases with a high prevalence in the current society. My major research interest focuses on the molecular mechanisms underlying the impact of bioactive compounds from the diet on the prevention of metabolic diseases in the gut-liver axis.

ORCID number: 0000-0002-7845-3734
Scopus Author ID: 36971062700

Objectives

- Discovery of Bioactive Compounds targeting metabolic syndrome.
- Characterization of novel metabolic pathways to treat non-alcoholic fatty liver disease (NAFLD).
- Dissecting the role of the gut on NAFLD progression.

Project in Focus

Discovery and characterization of food bioactive compounds modulating the Pentose Phosphate Pathway against non-alcoholic fatty liver disease (Food-PPP-NAFLD).

Principal Investigator: Dr. Ildefonso Rodríguez Ramiro and Dr. Pablo J. Fernández-Marcos.
Funded by: European Commission. Horizon 2020, Research and Innovation Framework Programme. Call: H2020-MSCA-IF-2018. MSCA Individual Fellowships Actions. Ref: GA. No. 832741
Duration: 01/10/2019 - 30/09/2021
Amount: 172.930 €.

research group

Hepatic Regenerative Medicine Laboratory

Group Leader

Dr. Manuel A. Fernández-Rojo
Hepatic Regenerative Medicine Laboratory Group Leader

Ph.D. in Biology. His work is focused in Application of regenerative medicine against chronic liver diseases and cancer, metabolic disorders and aging-related diseases.

Objetives

- Development of novel strategies to promote the regeneration of damaged liver linked to chronic liver diseases, metabolic disorders and infection.
- Restoring the regenerative capacity of the aged liver.
- Molecular mechanisms driving the inhibition of liver cancer.
- Characterizing signaling axis regulating mitochondrial function in health and disease.

Projects in Focus

Diet modifications to improve liver regeneration and reduce liver cancer

Ref. 2016-T1/BIO-1854
Principal Investigator: Dr. Manuel A. Fernández-Rojo
Duration: 10/04/2017-09/04/2021
Funded by: Community of Madrid Call: Grants for the implementation of contracts "Talent Attraction" Modality 1

Ref. 2020-5A/BIO-19724
Duration: 10/04/2021-09/04/2022
Funded by: Community of Madrid Call: Grants for the implementation of contracts "Talent Attraction" Modality 1- Talent Fifth year

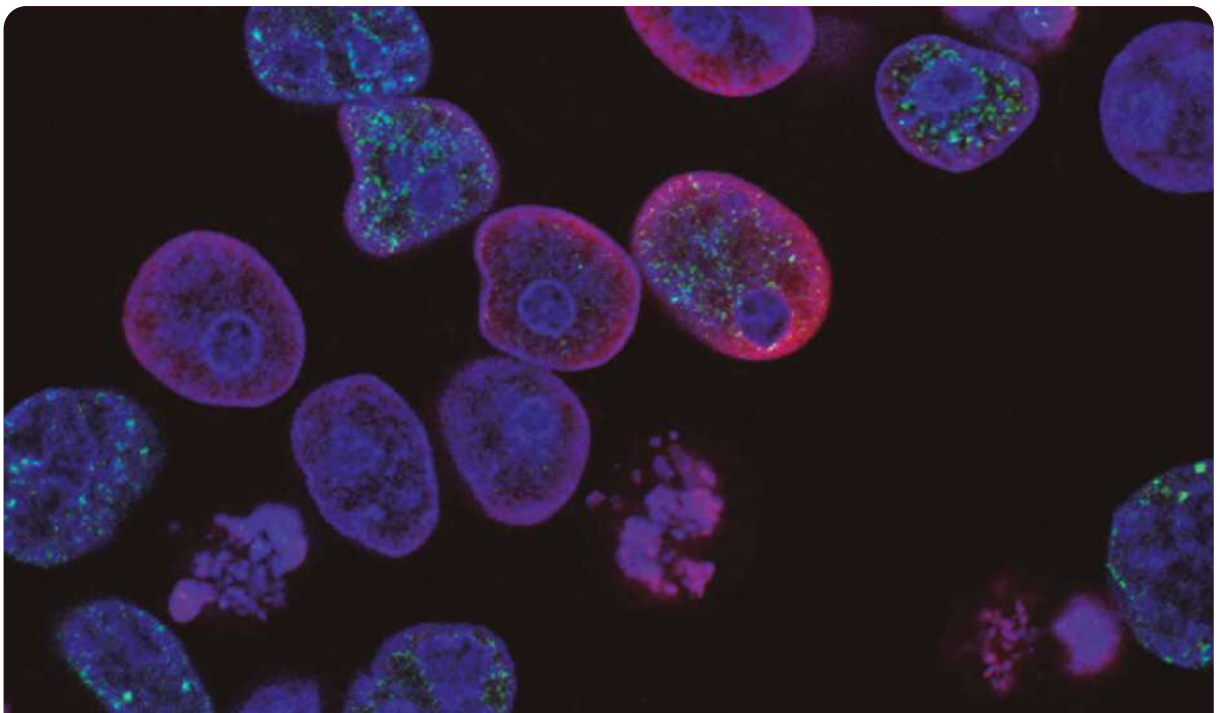
Ref. PEJD-2019-POST/BMD-14722
Principal Investigator: Luis Vicente Herrera Marcos
Duration: 01/06/2020-31/05/2022
Funded by: Community of Madrid Call: Youth Employment Program (PEJ) 2019

Researchers

Dr. Luis Herrera
Postdoctoral Researcher
Ph.D. in Biochemistry and Molecular Biology

Dr. Maite Martínez Uña
Postdoctoral Researcher
Ph.D. in Molecular Biology and Biomedicine

Yaiza López Mancheño
Predoctoral researcher



Head of Research Line

Dr. Maria Ikonomopoulou

Head of Research Line in Translational Venomics Group

Doctor of Philosophy (PhD): Biomedical Sciences, The University of Queensland, Australia

Dr. Maria Ikonomopoulou is a Senior Research TALENTO Fellow (Program of excellence in research by the Madrid Government) and Head of the Translational Venomics Group at IMDEA-Food Institute in Madrid. She is an Honorary Associate Professor in the Institute for Molecular Bioscience at the University of Queensland, Co-ordinator of the Stakeholder Engagement Committee and in the Core Management of the COST Action CA19144 EUVEN – European Venom Network as well as member of STRATAGEM (Solid Cancer network) (EU-COST Action) CA17104 and supporter of STEMM WOMEN in Australia. She is On Deck Longevity Biotech Fellow, belonging to a community of ambitious founders, operators, and investors looking to build, join, and invest in revolutionary longevity biotechnology startups and also member of the Australia Spain Business Association. She has international research experience in biology and biotechnology in Australia, Spain, Greece, Ireland and Malaysia and has been successfully collaborating with the industry for over ten years. Dr. Ikonomopoulou is a former Marie Curie "AMAROUT" Fellow. She holds a BSc (Hons) in Agricultural Technology from the Technological Educational Institute in Western Macedonia in Greece and part of her degree was conducted in the Biotechnology Department at the Teagasc-Moorepark Research Centre in Ireland (Leonardo Da Vinci EU Program). She has a MSc in Zoology from the University of Tasmania (2003) and a PhD in Biomedical Sciences from the University of Queensland (2009) (UQ & APAI Fellowships) in Australia. She has held postdoctoral positions at the University of Queensland and QIMR Berghofer.

Objectives

Our group's work is focused on the biodiscovery, pharmacological characterisation, and optimisation of animal venom compounds for their therapeutic potentials and applications as anticancer, senolytic and anti-aging drug candidates. We utilise interdisciplinary approaches, including molecular, cell biology, state-of-the-art venomics, animal models of cancer and metabolic disorders as well as medicinal chemistry and Structural Relationship Activity, aiming to discover new & safe venom-based anti-aging therapies.

Project in Focus

European Venom Network (EUVEN)

The overarching aim of the EUVEN COST Action is to foster venom investigation at the European level. The Action will identify priority targets and promising innovative approaches, develop best practice pipelines ensuring consistency across Europe and providing international standards in venom research.

Principal Investigator: Dr. Maria Ikonomopoulou (Stakeholder Engagement Coordinator & Core Management Committee)
Duration: 06/10/2020-05/10/2024
Funded by: H2020 (COST) Call: COST Actions Ref. CA19144
Web: https://www.cost.eu/cost-action/european-venom-network/

New diagnostic and therapeutic tools against multidrug resistant tumours (STRATAGEM)

STRATAGEM will build the first multidisciplinary network – to include academic laboratories, research institutes, and small and medium enterprises (SMEs), with a wide range of high-level and non-overlapping expertise – that will aim to improve both the diagnosis and therapy of multidrug resistant (MDR) solid tumours.
Principal Investigator: Dr. Maria Ikonomopoulou
Duration: 11/09/2018-10/09/2022 Funded by: H2020 (COST) Call: COST Actions Ref. CA17104
Web: https://stratagem-cost.eu/

Venom-compounds with senolytic activity for the treatment of aging- and metabolic-related disorders

Principal Investigator: Dr. Maria Ikonomopoulou
Duration: 01/02/2019-28/02/2023
Funded by: Community of Madrid Call: Grants for the implementation of contracts "Talent Attraction" Modality 1 Ref. 2018-T1/BIO-11262

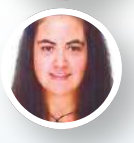
Ref. PEJ-2020-AI/BIO-17904

Principal Investigator: Dr. Maria Ikonomopoulou
Duration: 01/04/2021-31/03/2024
Funded by: Community of Madrid Call: Youth Employment Program (PEJ) 2020

Personnel

Dr. Javier Moral Sanz
Postdoctoral researcher

Isabel Fernández Carrasco
Research Assistant



Ana Vela
Research Assistant
PEJ-2020-AI/BIO-17904

Rachael Ryan
PhD student, Griffith University, Australia, Co-supervision

Sabela Fernández Vila
PhD student, Santiago de Compostela University, Co-supervision
PEJ-2020-AI/BIO-17904

Claudia Camarero
Master student (TFM-UAM)

Irrati Torre
Master student (TFM-UAM)

research group

Posttranscriptional Regulation of Metabolic Diseases

Group Leader

Dra. Cristina Ramírez
Posttranscriptional Regulation of Metabolic Diseases Group Leader

Ph.D. in Molecular Biology and Cellular. Her work is focused in Molecular Basis of the Regulation of Aging related-metabolic diseases by microRNAs and RNA binding proteins: Non-coding RNAs and RNA Binding Proteins in Aging; Posttranscriptional Regulators as molecular link between Diabetes, Obesity and Alzheimer's Disease. Targets of Insulin Resistance, Mitochondrial dysfunction and Autophagy; Role of non-coding RNAs and RNA Binding Proteins in the regulation of glucose homeostasis and their implication in Diabetes, Metabolic Syndrome and Obesity. Potential effect of Aging on endothelial dysfunction and Atherosclerosis: Role of Caveolin-1.

Objetives

- Posttranscriptional Regulators as molecular links between diabetes, obesity and Alzheimer's disease. Targets of insulin resistance, mitochondrial dysfunction, autophagy.
- Role of non-coding RNAs and RNA binding proteins in the regulation of glucose homeostasis and their implication in diabetes, metabolic syndrome and obesity.
- Non-coding RNAs and RNA binding proteins in aging.
- Potential effect of aging on endothelial dysfunction and atherosclerosis. Role of Caveolin-1.

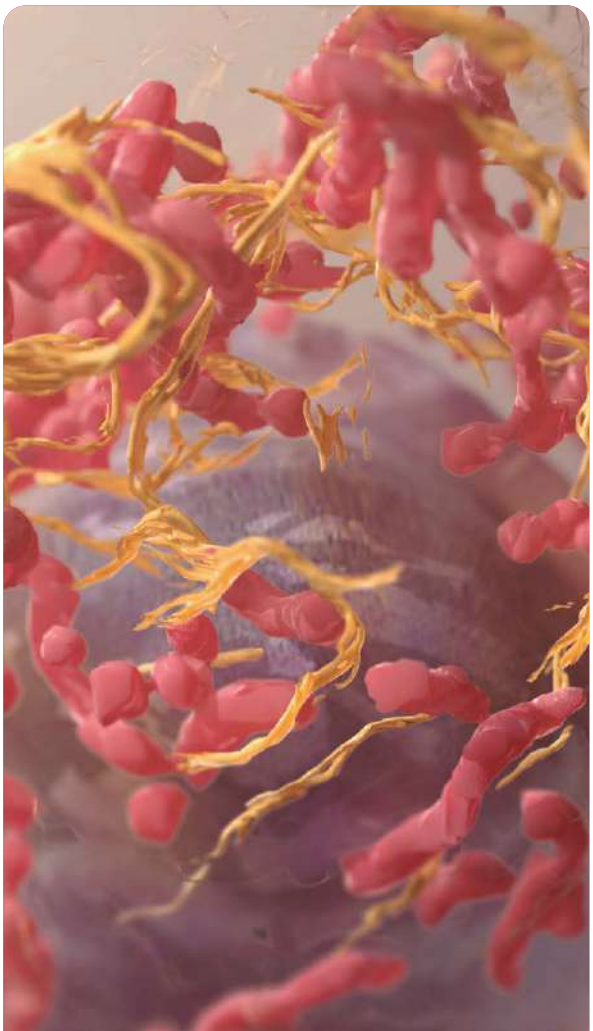
Projects in Focus

New posttranscriptional regulators as a molecular link between diabetes, obesity and Alzheimer's disease

Principal Investigator: Dr. Cristina Ramírez Hidalgo
Duration: 01/01/2019-30/09/2022
Funded by: Spanish Ministry of Science, Innovation and Universities Call: RTI 2018 Ref: RTI2018-095061-B-I00

Role of Neuroendocrine MIR-7 in the regulation of insulin signaling brain: Implications in diabetes and Alzeheimer´s Disease

Principal Investigator: Dr. Cristina Ramírez Hidalgo
Duration: 09/04/2018- 08/04/2022
Funded by: Community of Madrid Call: Call: Grants for the implementation of contracts "Talent Attraction" Modality 1 Ref: 2017-T1/BMD-5333



Researchers

Yolanda Martín Martín
Predoctoral researcher

Dr. Virginia Pardo Marqués
Posdoctoral Researcher
Ph.D. in Biology

Mario Fernández de Frutos
Predoctoral researcher

Dr. Ana Pérez García
Postdoctoral researcher
Ph.D in Biomedicine

Marta Torrecilla
Predoctoral researcher

research group

Nutritional Interventions

Group Leader

Dr. Rafael de Cabo

Nutritional Intervention Group Leader.

Ph.D. in Nutrition. His work is focused in Interventions for Healthy Aging Based on Manipulations of Energy Intake. Nutritional Strategies to Maintain Redox Homeostasis.

Objetives

- Development of Viable Interventions to preserve function until late in life.
- Study of Daily Eating Patterns to modulate energy demand and cellular energetic metabolism.
- Characterization of circulating factors in the aging process.

Publications

Diet composition influences the metabolic benefits of short cycles of very low caloric intake. Diaz-Ruiz A, Rhinesmith T, Pomatto-Watson LCD, Price NL, Eshaghi F, Ehrlich MR, Moats JM, Carpenter M, Rudderow A, Brandhorst S, Mattison JA, Aon MA, Bernier M, Longo VD, de Cabo R. **Nat Commun.** 2021 Nov 9;12(1):6463. doi: 10.1038/s41467-021-26654-5.

Daily caloric restriction limits tumor growth more effectively than caloric cycling regardless of dietary composition. Pomatto-Watson LCD, Bodogai M, Bosompra O, Kato J, Wong S, Carpenter M, Duregon E, Chowdhury D, Krishna P, Ng S, Ragonnaud E, Salgado R, Gonzalez Ericsson P, Diaz-Ruiz A, Bernier M, Price NL, Biragyn A, Longo VD, de Cabo R. **Nat Commun.** 2021 Oct 27;12(1):6201. doi: 10.1038/s41467-021-26431-4.

Head of Research Line

Dr. Alberto Diaz-Ruiz

Senior Researcher and Head of Research Line in Aging, Longevity and Cancer

Ph.D. in Sciences (University of Cordoba, Spain) and D.V.M. (University Complutense of Madrid, Spain). I am a M. Sc. Veterinary Medicine specialized in the fields of metabolism, aging and cancer. I integrate whole-body physiological approaches with omics to characterize age-driven changes in physical, behavioral, and metabolic performances. My research focuses on the effects of nutritional interventions and fasting-mediated strategies on lifespan, healthspan and cancer in mice and humans. I am devoted to study the impact of fine-tuning our daily eating patterns to our energetic demands for the enhancement of health and longevity.

The Complete List of Published Work can be found in the following link: https://www.ncbi.nlm.nih.gov/myncbi/alberto.diaz-ruiz%20ruiz.1/bibliography/public/

ORCID: 0000-0002-0488-4216

Objectives

- Microbiome-based approaches to promote healthy aging.
- Anti-aging interventions in obesity context.
- Aging and Cancer as Interrelated processes
- Molecular Signatures of Premature Aging Models

Projects in Focus

Altered splicing process in chronic liver disease progression of hepatocarcinogenesis: novel source for diagnostic, prognostic and therapeutic

Principal Investigator: Dr. Alberto Díaz-Ruiz
Duration: 01/01/2021-31/12/2023
Funded by: Institute of Health Carlos III (ISCIII)

From Aging Biology to Sustainable Interventions: a microbiome-based approach (ABSIMA)

Principal Investigator: Dr. Alberto Díaz-Ruiz
Duration: 01/06/2020-31/05/2024
Funded by: Spanish Ministry of Science, Innovation and Universities Call: PID 2019 Ref: PID2019-106893RA-I00

Alternative strategies to extend longevity and improve quality of life: fasting cycles 4:10

Principal Investigator: Dr. Alberto Díaz-Ruiz
Duration: 2019-2022
Funded by: Community of Madrid Call: Talent Attraction Program Mod 1. Recruitment of experienced PhD. Ref: 2018-T1/BMD11966

Unraveling the role of several plant extracts as potential treatment against obesity, type 2 diabetes and aging.

Principal Investigator: Dr. Alberto Díaz-Ruiz
Duration: 2019-2021
Funded by: Sponsored Research Agreement with private company (Biosabor, Almería, Spain)

Impact of extracelular matrix remodeling in adipocyte plasticity in human obesity

Principal Investigator: Dr. Alberto Díaz-Ruiz
Duration: 2019-2021
Funded by: Junta de Andalucía

Ref. PEJD-2019-PRE/BMD-17041

Principal Investigator: Dr. Alberto Díaz-Ruiz
Duration: 2019-2021
Funded by: Community of Madrid Call: Youth Employment Program (PEJ). Research Assistants Recruitment (AI).

Ref. PEj-2019-TL/BMD-15706

Principal Investigator: Dr. Alberto Díaz-Ruiz
Duration: 2019-2021
Funded by: Community of Madrid Call: Youth Employment Program (PEJ). Lab technician Recruitment (TL).

Personnel

Juan Luis López Cánovas
Postdoctoral Researcher

PhD in Biomedicine
2018-T1/BMD-11966

María Castejon de Mariscal
PhD Student. Co-supervision

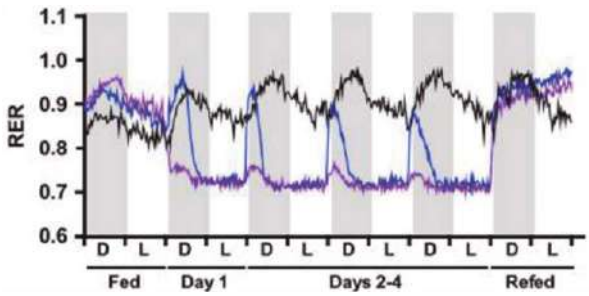
PEJD-2019-PRE/BMD-17041

Lorena Blanco Calcerrada
Lab technician

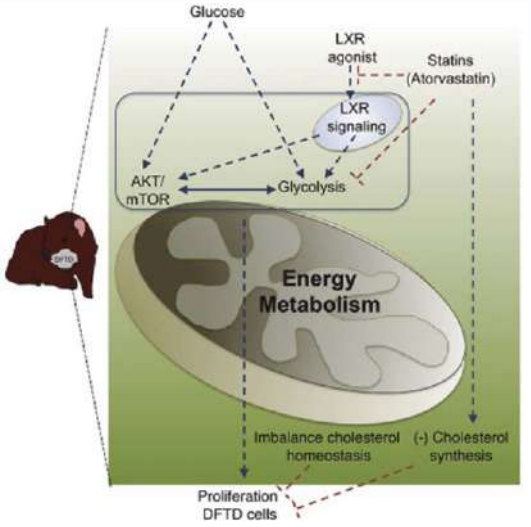
PEJ-2019-TL/BMD-15706

Scientific highlights

The Precision Nutrition and Aging Department has been extremely productive during 2021, with more than 15 articles published in high-impact journals as Nature Communications, Journal of Cachexia, Sarcopenia and Muscle or Cell Reports. We focus these scientific Highlights on two articles. In the first one, we found that short bouts of very low-calorie diets (33-50% of normal calorie intake) in mice, in cycles of 4:10 days during 5 months, improved body composition, physical performance, glucose homeostasis and metabolic flexibility, and induced a beneficial metabolomic reprograming. The graph shows the respiratory exchange rate during the 4 days period in low calorie diet. The graph represents the metabolic flexibility of mice following different diets:black line represents standard chow diet-fed mice; blue line represents very low calorie-fed mice; and purple line represents mice on fasting-mimicking diet. Notice the increased flexibility in the very low calorie- feed mice, compared with the other groups.). However, when these bouts of low-calorie diet were given in an obesogenic context, lowering the calorie intake did not prevent obesity nor did it elicit any long-lasting metabolic memory. These results highlight the importance of diet composition in mediating the metabolic benefits of short cycles of very low-calorie diets.



In a second work, we found a metabolic window of opportunity for an incurable disease that is leading to extinction of the Tasmanian devil, a rare mammalian species in East Asia: the devil facial tumor disease (DFTD). We found that cholesterol homeostasis and carbohydrate energy metabolism sustain proliferation of DFTD in a cell type-specific manner. In particular, the liver-X nuclear receptor-β (LXRβ), a major cholesterol cellular sensor, and its natural ligand 24S-hydroxycholesterol promote the proliferation of DFTD cells via a metabolic switch toward aerobic glycolysis. These findings opened a therapeutical opportunity: treatment of DFTD cells with the FDA-approved statin atorvastatin, an inhibitor of cholesterol synthesis, disrupted DFTD cellular metabolism and prevented tumor growth in an *in vivo* xenograft mouse model. In conclusion, we show that intervention against cholesterol homeostasis and carbohydrate-dependent energy metabolism by atorvastatin constitutes a feasible biochemical treatment against DFTD, which may assist in the conservation of the Tasmanian devil.



References

Nat Commun. 2021 Nov 9;12(1):6463. doi: 10.1038/s41467-021-26654-5.

programme

Precision Nutrition and Cancer

Programme Director

Dr. Ana Ramírez de Molina

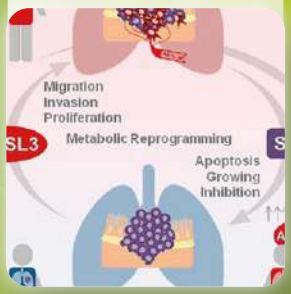
Deputy Director of IMDEA Food. Director of the Precision Nutrition and Cancer Programme

Ph.D. in Molecular Biology. The research of Dr. Ramirez de Molina focuses on improving the quality of life of cancer patients through the design of precision nutrition products and strategies to improve tumor treatment and prognosis, as well as nutritional strategies to enhance immune system decline. She is focused on studying the relationship between precision nutrition, metabolism and cancer. Her group develop multidisciplinary research focused on: exploring metabolic reprogramming as a biomarker and therapeutic target in cancer; the study of the relationship between lifestyle factors (nutrition, physical activity), genetics (individual susceptibility), the consequent global metabolic state (healthy/unhealthy), its relationship with chronic inflammation and the immune response, and the development, progression, and response to treatment of patients with cancer. In this sense, they try to develop a nutrimetabolic score that defines worse development in cancer through metabolic, nutritional and genetic factors, especially important in colon cancer in young people (Early-onset colon cancer EOCRC) (<50). She is also interested in the development of precision products that stimulate, for example, the immune response. In this respect, she is also involved in several collaborations with hospitals such as the Hospital Infanta Sofia, where different clinical trials are carried out on patients from the medical oncology service to prevent infections and improve the quality of life of cancer patients. She is also involved in the development and application of digital systems and mhealth platforms to allow the exchange of key data about clinical prognosis (patient's symptoms, genetics, lifestyle nutrition factos...) between oncologists and patients, which are improving medical decision-making and optimizing cancer treatment. In short, her main objective is to include precision nutrition into personalized medicine through the analysis of personal characteristics, genetic susceptibility and physiological conditions, microbiome, etc. to define personalized nutritional strategies to be effective in promoting health through molecular nutrition.

Goal and vision

The programme of Precision Nutrition and Cancer aims to better understand the interplay of nutrients, metabolism, immunity, and cancer, providing the scientific bases to develop precision nutritional strategies with therapeutic effects on cancer patients.

In the era of Personalized Medicine and taking into account the strong relationship between nutrition and cancer, precision nutrition has to be part of the integral management of cancer patients. Essential events in cancer development and progression such as genetics, metabolism and immunity are strongly influenced by environmental factors, affecting signalling pathways controlling cell function and treatment response. In this programme, we combine molecular and cellular oncology techniques, computational biology approaches and clinical trials to further understand how metabolism and immunity are affected by genetic and life-style factors, aiming to develop therapeutic interventions and precision nutritional products focused on improving the response to treatments and quality of life of cancer patients.



Molecular Oncology Research Group

Group Leader

Dr. Ana Ramírez de Molina

Clinical Oncology Research Group

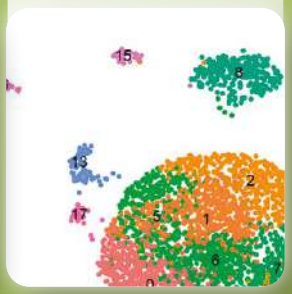
Group Leader

Dr. Enrique Casado
Dr. Jaime Feliú

Molecular Immunonutrition Research Group

Group Leader

Dr. Moisés Laparra



Computational Biology Research Group

Group Leader

Dr. Enrique Carrillo de Santa Pau

Research groups

research group

Molecular Oncology

Group Leader

Dr. Ana Ramírez de Molina

Deputy Director of IMDEA Food.
Director of the Precision Nutrition and Cancer Programme

Ph.D. in Molecular Biology

Coordinator at IMDEA Food and Universidad Autónoma de Madrid (UAM) of the European program EIT Food, a consortium of 70 European partners developed to promote healthy and sustainable food in Europe based on scientific knowledge.

Promoter of P4H (Precision For-Health, 2018) and FORCHRONIC (2019), knowledge-based start-ups of IMDEA Alimentación and UAM.

She has received the Young Researchers MSD Award, the

International John Kinney Award and the distinction on March 8 of the Community of Madrid as an outstanding woman in Science.

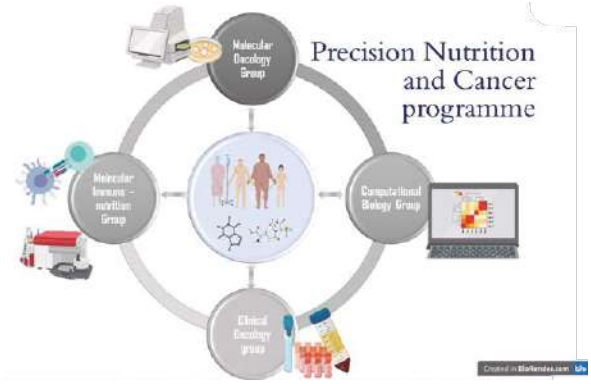
Objetives

The group is currently focused on three research topics:

1. **Lipid metabolism alterations in cancer:** identification of new biomarkers and therapeutic targets in diet-related tumors such as colon or pancreatic cancer. We are especially interested in identifying metabolic profiles associated to the disease progression together with treatment response and analysing their role from in-vitro cell systems to organoids and cancer patients. These analyses are mainly focused on the identification of metabolic pathways and distinctive oncometabolites that may constitute novel markers and targets for the development of future cancer precision therapies. Besides, alterations of lipid metabolism at the local level and at the systemic level promote the development of a low degree of chronic inflammation and immune system dysfunction, with strong impact in patient clinical prognosis.

2. Metabolic reprogramming analysis in cancer and its relationship with other associated diseases such as obesity, diabetes and metabolic syndrome. We are especially interested in the relationship between genetics, nutritional and metabolic status in order to determine a **nutri-metabolic score of cancer risk** mainly based on life-style factors, genetic susceptibility and lipid profile.

3. **Precision nutrition strategies in cancer treatment.** Analysis of the activity and mechanism of action of bioactive compounds and targeted nutritional strategies as effective dietary supplements approaches in the treatment of cancer and associated metabolic disorders. The objective is to establish the scientific basis for the development of precision nutrition strategies in oncology by including or avoiding specific products due to their effect on specific cancer signalling pathways.



Projects in Focus

NUTRISION-CM

Precision nutritional strategies to reactivate the impaired immune system as a resulta of age, obesity or chemotherapy

This project aims to design Precision Nutritional strategies to slow down the decline of the immune system as a consequence of age, obesity or chemotherapeutic treatments in collaboration with the Immunometabolism and Inflammation Lab at CBM.

Coordinator Group Principal Investigator: Dr. Ana Ramírez de Molina (IMDEA Food)
No coordinator Group Principal Investigators: Dr. Elisa Carrasco and Dr. Maria Mittelbrum (CBM_UAM_CSIC)
Duration: 01/07/2021-30/06/2024
Funded by: Community of Madrid Call: 2020 R&D Sinergy Grants Ref: Y2020/BIO-6350

Nutritional strategies and bioactive compounds to target lipid metabolism alterations in cancer: Platform of Patient derived Paired Organoids for Precision Nutrition.

The constitution of a Platform of Patient derived Paired Organoids in collaboration with the Medical Oncology Service of Infanta Sofía Hospital is being constituted within this project for the analysis of lipid metabolism alterations in cancer and identification of the most appropriate molecular nutritional approach for its specific metabolic alteration.

Principal Investigator: Dr. Ana Ramírez de Molina
Duration: 03/04/2019 – 31/12/2022
Funded by: Ramon Areces Foundation Call:2018 Research in Life and Matter Sciences Ref: CIVP19A5937
Partner: Infanta Sofía University Hospital

FORDISCOVERY

Development of precision food formulations for colon cancer treatment

This project aims to contribute to the improvement of cancer treatment through precision nutritional products developed for specific groups of patients according to their metabolic alterations. It develops and demonstrates the efficacy of precision nutritional formulations by using computational models to identify the most appropriate bioactive compounds for each type of patient according to their metabolic alterations, as well as in vitro systems, and clinical trials to demonstrate their effectiveness.

Principal Investigator: Dr. Ana Mª Ramírez de Molina
Duration: 01/06/2020 – 31/05/2023
Funded by: Spanish Ministry of Science, Innovation and Universities Call: PID 2019 Ref: PID2019-110183RB-C21
Partner: Infanta Sofía University Hospital

OnCOVinf Project - ALIBIRD2020-CM

This project arises from the urgent need to carry out actions in the field of research aimed at combating the effects of the COVID-19 infection. Cancer patients undergoing antitumor treatment are at high risk of developing infections, more accentuated in the current situation due to COVID-19 pandemic. Within the frame of ALIBIBIRD-2020 (Precision nutrition approaches for cancer patients), we are conducting this randomized, double-blind, placebo-controlled clinical trial for the evaluation of a precision immune-enhancing nutritional supplement in

the prevention of infections during the Covid-19 pandemic in cancer patients receiving antitumor treatment.

Principal Investigators: Dr. Ana Ramírez de Molina (ONCOGENOM) and Dr. Enrique Casado (HUIS)
Partner: Infanta Sofía University Hospital
Duration: 01/01/2019-30/04/2023
Funded by: Community of Madrid and co-funded by EU Structural Funds ERDF/ ESF, "A way to make Europe"/"Investing in your future").Call: Technologies 2018, R&D Activities among Research Groups of Comunidad de Madrid Ref: S2018/BAA-4343
Web: https://alibird.org/2020-CM/consorcio-alibird2020-cm-continuamos-avanzando/

Early Onset Colorectal Cancer (EOCRC): Nutri-metabolic score biomarker of cancer development and progression

Analysis of the relationship between lifestyle factors (nutrition, physical activity), genetics (individual susceptibility), the consequent global metabolic state (healthy/unhealthy), and relationship with chronic inflammation and the immune response, as well as the development, progression, and response to treatment of patients with cancer, with special focus on early onset CRC (population under 50). Development of a Nutri-metabolic score related to metabolic health as a new integrative biomarker of cancer development and progression of diet related tumors, mainly focused on colorectal cancer, lung and pancreatic cancer.

Principal Investigator: Dr. Ana Ramírez de Molina
Main colaborator EOCRC: Dr. José Perea (IBSAL)
Funded by: Community of Madrid Ref: S2018/BAA-4343 & H2020 COST Action Ref. CA17118
Partners: HUIS, HULP, IBSAL

Evaluation of non-invasive markers of thermogenesis as predictive factors for the development of cachexia in cancer patients

Previous results from our laboratory highlight that the evaluation of thermogenesis activation markers in plasma cancer patients has great potential as an effective tool for the stratification of patients at high risk of developing cachexia during the tumoral process. In this future project, the application of selected non-invasive molecular biomarkers associated with the development of cachexia will promote the application of early precision nutritional interventions, which would delay and avoid the patient's functional impairment and mortality associated with cancer cachexia.

Principal Investigator: Dr. Ana Ramírez de Molina
Main colaborators: Dr. Jaime Feliú, Dr. Enrique Casado
Partners: Infanta Sofía University Hospital, La Paz University Hospital

Researchers

Dr. Marta Gómez de Cedrón
Postdoctoral Researcher
Ph.D. in Science

Dr. Lara P. Fernández Álvarez
Postdoctoral Researcher
Ph.D. in Biochemistry, Molecular Biology and Biomedicine

Dr. María José Barrero
Postdoctoral Researcher
Ph.D. in Biology

Dr. Cristina María Fernández
Postdoctoral Researcher
Ph.D. in Biomedical Research and Nutritionist

Dr. Silvia Cruz Gil
Postdoctoral researcher and senior program technician
Ph.D. in Biology

Macarena Palacios
Lab technician

Precision Nutrition and Cancer Lab

The Precision Nutrition and Cancer laboratory is a multidisciplinary group coordinated by Dr. Ana Ramírez de Molina, working on the identification and application of personalized molecular nutrition strategies to improve response to treatments and quality of life of cancer patients.

This multidisciplinary Lab includes:

- Molecular Oncology Group.
- Clinical Oncology Group.
- GENYAL Platform of Clinical Trials in nutrition and Health. Nutritional Genomics and Health Unit.
- Industrial doctorate program for the development of bioactive products for precision nutrition applications.

These groups constitute a multidisciplinary alliance working in coordination and continuous collaboration with the mission of establishing a network of knowledge and work that encompasses a multitasking team to develop precision nutrition strategies for cancer patients.

The scope of action goes from the study and identification of molecular and metabolic alterations in cancer patients, and the analysis of in vitro mechanisms of action of the different nutritional strategies and bioactive products targeting these alterations, towards the application of identified personalized nutritional strategies in humans, including clinical trials in both, healthy volunteers and cancer patients.

Finally, to promote transfer of knowledge to society, we count on the participation of two spin-off companies of IMDEA Food and Universidad Autónoma de Madrid, Precision For Health (P4H), focused on personalized nutrigenetic advice, and Forchronic focused on the development of specific bioactive formulations for precision nutrition. Furthermore, the Industrial doctorate program for the development of bioactive products works in this group within the frame of an applied research in this area in collaboration with different companies interested in the development of personalized nutrition for disease prevention and treatment.

This group is included in ALIBIRD2020-CM Project: “Precision nutrition therapeutic formulations for cancer”.

Head of Research Line

Dr. María E. Rodríguez García-Rendueles
Senior researcher and Head of Research Line in Thyroid Cancer.

Ph.D in Endocrinology by Santiago de Compostela University.

My work is focused in Investigate thyroid tumorigenesis and tumor progression by using multidisciplinary genetic, biochemical, and cell biological approaches to understand the functional consequences of the key drivers of the disease. Focusing on identifying potential targets and new approaches based on this dependency on new therapies.

Objectives

- Study the role of HIPPO pathway in thyroid tumorigenesis and progression.
- Study mechanisms of drug resistance.
- Determine the players ant their role in tumor microenvironment.

Projects in Focus

YAP in thyroid cancer: role in tumorogenesis and progression of the disease and its implication in drug response

Principal Investigator: Dr. María E. Rodríguez García-Rendueles
Duration: 01/09/2020 -31/08/2024
Funded by: Community of Madrid Call: Grants for the implementation of contracts "Talent Attraction" Modality Ref. 2019-T1-BMD-13039

Personnel

Carmen Mazaríos Gárgoles
Research Assistant

Carlos Rodríguez Ponte
Research Assistant
2019-T1-BMD-13039

Clinical Oncology

Group Leader

Dr. Enrique Casado

Clinical Oncology Group Leader. Head of Medical Oncology Service and Precision Oncology Laboratory, Infanta Sofía University Hospital

Ph.D. in Medicine. His work is focused in Precision Oncology and Nutrition.

Dr. Jaime Feliú

Clinical Oncology Group Leader. Head of Medical Oncology Service, La Paz University Hospital

Ph.D in Medicine. His work is focused in Colon and pancreatic cancer, tumor biomarkers, epigenetics and genetics of cancer.

Objectives

Our Clinical Oncology Group, with the Precision Oncology Laboratory (POL) in Hospital Universitario Infanta Sofía, is focused on translational research in lifestyle habits and related targeted interventions that can impact on cancer outcome, and on patients and survivors quality of life. In 2021 an structured pathway to engage cancer patients in physical activity and exercise programs has been set up with these goals, with a multidisciplinary team -including qualified exercise professionals, rehabilitation, oncologists, psychologists nurses and nutrition experts- and a net of local community exercise and sport resources. Main tumors of interest are lung, breast, and gastrointestinal cancer, with an anticipated new specific focus on neuroendocrine tumors based on center experience that has resulted in the second national center gaining european certificate as Center of Excellence (ENETs-CoE). Also to these objectives, engineers have been incorporated to build Real World Data and clinical management resources.

- Clinical trials and application of molecular nutrition strategies for improvement of response to treatments and quality of life of cancer patients.
- Identification of molecular biomarkers of cancer prognosis and treatment response.
- Development of electronic tools for clinical management and research.

Precision Nutrition and Cancer

Projects in Focus

OnCOVinf Project - ALIBIRD2020-CM

This project arises from the urgent need to carry out actions in the field of research aimed at combating the effects of the COVID-19 infection. Cancer patients undergoing antitumor treatment are at high risk of developing infections, more accentuated in the current situation due to COVID-19 pandemic.

Within the frame of ALIBIBIRD-2020 (Precision nutrition approaches for cancer patients), we are conducting this randomized, double-blind, placebo-controlled clinical trial for the evaluation of a precision immune-enhancing nutritional supplement in the prevention of infections during the Covid-19 pandemic in cancer patients receiving antitumor treatment. As secondary objectives effects on metabolic, inflammatory and immune axis are being evaluated.

Principal Investigators: Dr. Enrique Casado (HUIS) and Dr. Ana Ramírez de Molina (IMDEA Food)
Duration: 01/01/2020-31/12/2022
Funded by: Community of Madrid and co-funded by EU Structural Funds ERDF/ ESF, "A way to make Europe"/"Investing in your future").Call: Technologies 2018, R&D Activities among Research Groups of Comunidad de Madrid Ref: S2018/BAA-4343
Partner: Infanta Sofía University Hospital (HUIS)

mHealth platform for the personalized follow up of cancer patients - ALIBIRD2020-CM Project

Within the frame of ALIBIBIRD2020-CM (Precision nutrition approaches for cancer patients), we are developing a platform with a dual application to cancer patients and oncologists to monitor patient reported outcomes, treatment response and life style of cancer patients, as well as automatic customized clinical advice based on inputs and specific disease, with a special focus on nutrigenetics, diet, physical activity and microbiome.

Principal Investigators: Dr. Enrique Casado (HUIS) and Dr. Maria Sereno (HUIS)
Duration: 01/01/2020-31/12/2022
Funded by: Community of Madrid and co-funded by EU Structural Funds ERDF/ ESF, "A way to make Europe"/"Investing in your future").Call: Technologies 2018, R&D Activities among Research Groups of Comunidad de Madrid Ref: S2018/BAA-4343
Partners: Infanta Sofía University Hospital (HUIS), GBT (UPM), ALIMENTA (CSIC), ONCOGENOM & GENYAL LAB (IMDEA Food), INGREEN (UAM).
Web: https://www.healthtech.upm.es/es/plataforma-mhealth-alibird/

Clinical-pathological and molecular characterization of long-term survivors with advanced non-small cell lung cancer

Long-term survivors (LS) of non-small cell lung cancer (NSCLC) without driver alterations, displaying an overall survival (OS) of more than 3 years, comprise around 10% of cases in several series treated with chemotherapy.

There are classical prognosis factors for these cases, but more data are required in the literature. We conduct a multi-center study to perform a clinical-pathological and molecular characterization of these patients.

Principal Investigator: Dr. María Sereno
Duration: 2019-2021
Partners: Infanta Sofía University Hospital, Ramón y Cajal University Hospital, San Carlos University Hospital, Gregorio Marañón
University Hospital, 12 de Octubre University Hospital, Alcorcón Foundation Hospital, Príncipe de Asturias University Hospital, La Paz University Hospital and Torrejón University Hospital

Study for the evaluation of a short fast on chemotherapy toxicity and efficacy.

This is an open randomized clinical trial comparing a short duration fast of 48 hours around chemotherapy prescription, versus no fast, in colorectal cancer patients, evaluating clinical toxicity and quality of life, as well as p21 induction –together other target genes- and immune cell populations.

Principal Investigator: Dr. Francisco Zambrana and Dr. Pablo J Fernández
Date: 2020-2022
Funded by: Community of Madrid and EU Funds (S2018/BAA-4343)
Partner: Infanta Sofía University Hospital, La Paz University Hospital, IMDEA Food

Researchers

Dr. María Sereno Moyano
Postdoctoral Researcher
Ph.D. in Medicine

Dr. César Gómez Raposo
Postdoctoral Researcher
Ph.D. in Medicine

Dr. Ana María Jimenez Gordo
Postdoctoral Researcher
Ph.D. in Medicine

Dr. Francisco Zambrana Tevar
Clinical Researcher

Dr. Daniela Ionescu
MD Clinical Immunologist
Internal Medicine

Juan Moreno Rubio
Postdoctoral Researcher
Ph.D. in Molecular Biology

Dr. Beatriz Tabarés
Clinical Pharmacologist
PhD in Pharmacogenomics

Marta Villarino Sanz
Cancer Nutritionist
PhD in Nutrition

Beatriz Garrido Rubio
Study Coordinator

research group

Molecular Immunonutrition

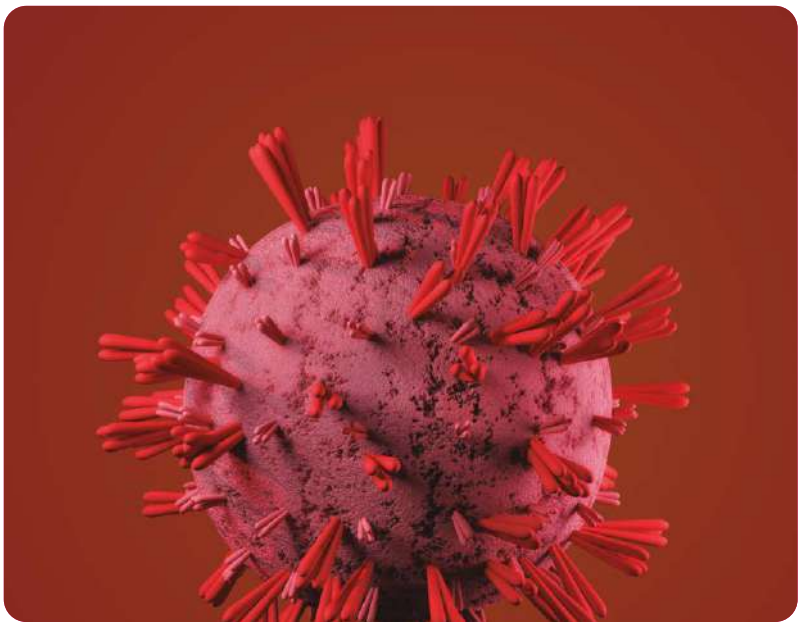
Group Leader

Dr. José Moisés Laparra
Molecular Immunonutrition
Group Leader

PhD in Pharmacy (University of Valencia), innate immune biology/ macrophages/hepatocarcinoma/ seeds, Identified serine-type protease inhibitors able to interact with the innate immune 'Toll-like' receptor to reduce the hepatocarcinoma severity

Objetives

- Identify innate immune sugnals that stem at intestinal level and enable a selective functional differentiation of immune effector cells such as monocyte-derived macrophages
- Metabolic reprogramming to generate lipid metabolites that exert key functions in controlling the response.
- Immunonutritional-based precision intervention strategies to a selective and driven modulation of innate immune responses preventing/treating the risk for severity of liver-related diseases and antitumoral response(s). Projects in Focus



Projects in Focus

Food4IMNUt
Understanding the dynamic interaction of enhanced food formulations with immunonutritional benefits in the prevention and onset of liver dysfunction

Distorted nutritional habits due to an altered food supply and preferences, together with sedentary lifestyle represent major causes of the dramatic increase of non-communicable chronic diseases (NCCD) worldwide (i.e., obesity, type 2 diabetes, metabolic syndrome). Research efforts suggest that the composition of the food, irrespective of calorie count, and its influence on and interaction with the gut microbiota, and finally their crosstalk with the hosts intestinal immune system may be even more important determinants of intestinal, liver, immune and metabolic health. NCCD are accompanied by a low-grade inflammatory condition, which results from the infiltration of immune cells, such as T cells, B cells, and macrophages, into adipose and liver tissues. It has been recently demonstrated that immune mediators such as innate lymphoid cells of intestinal origin, but not from white adipose tissue are key effectors for the induction of diet-induced obesity. The production of foods with an added value to shape lipid homeostasis through an adequate innate immune control will pave the way towards the development of nutritional intervention strategies with preventive and/or therapeutic potential in NCCD that should be preferable to the classical pharmacological approach. To this end, the proposal takes advantage of preclinical models to determine the influence of food ingredients on immune function and the onset and severity of NCCD. Human intervention studies, as gold standard in nutrition, will be used to define the immunonutritional pattern in normal weight and in obese.

Principal Investigator: Dr.Moisés La Parra
Duration: 01/06/2020 – 31/05/2023
Funded by: Spanish Ministry of Science, Innovation and Universities Call: PID 2019 Ref: PDI2019-10765RB-C22.

Nutrition responsiveness of the immune system to recover the immunocompetence and physiology during acute kidney disease.

The proposal is also based on the hypothesis that developing immunonutritional recommendations and interventions targeting the immune system can provide cost-effective measures to reduce the socio-economic burden of the high prevalence of kidney injury (KI) in patients suffering of metabolic disorders. This project will contribute, i) to emphasise direct evidence of benefit to humans in circumstances consistent with the food administration and consumption pattern, ii) to define markers, which are of proven validity, of endpoint effects, and iii) to ensure that the magnitude and character of effects are biologically meaningful. The latter will fulfil a knowledge gap to overcome the usually fragmented approach promoting a muldidisciplinary approach in order to provide added value to foods with a preventive and/or therapeutic utilisation improving coadjuvant nutrition precision strategies.

research group

Computational Biology

Group Leader

Dr. Enrique Carrillo de Santa Pau

Computational Biology Group Leader

PhD. in Molecular Biology and Biochemistry, Complutense University of Madrid (2007); MSc in Bioinformatics and Computational Biology (2010), Complutense University of Madrid; MSc in Applied Statistics, UNED university (2014); Executive Education Program: "Accelerate: Building Business from Science and Technology", IE Business school (2017). His work is focused in developing and applying integrative bioinformatic and computational approaches to study the variability and individual responses to food or bioactives, and its relationship to complex diseases like cancer, obesity, and other metabolic disorders. The main research interest is establishing precision personalized nutrition strategies based on individual molecular backgrounds with particular emphasis in genetic, epigenetic, metabolic and microbiota profiles.

Objetives

Our overall aim is to understand the molecular crosstalk between food nutrients/diets and cells in the development and management of non-communicable diseases. We apply high performance analysis tools to integrate different data sources from genes, environment, lifestyle, or microbiology to move forward in the development of precision nutrition strategies based on individual molecular background. The group is currently focused in four topics:

- Development of **computational strategies** to aggregate different sources of information from food consumption, biochemical, phenotypical, digital and omics data, with the aim to **understand the complex molecular relationships between food and diseases.** We develop tools to explore food/drug interactions in Food Nutrition Security Cloud (FNS-Cloud): Cloud solution facilitates access to food and nutrition information (H2020-EU.3.2.2.3, Grant agreement ID: 863059. Funded under: (2019-2023)), integrative analysis to provide better tools for nutritional advice in **Artificial Intelligence for non-communicable disease** prevention across personalized nutrition (AI-4Food; Comunidad de Madrid Y2020/TCS-6654) and create standards to **ensure interoperability with food data** in ELIXIR Food & Nutrition community.

- Understand the **human metabolism** variability with epigenomic and transcriptomic large datasets to evaluate the benefits of nutrients and food supplements in cancer patients and healthy subjects **for personalized nutrition strategies** in complex diseases. We participate in "Chronic Disease Control through VERY effective nutritional FORmulae" (FORDISCOVERY-PID2019-110183RB-C21) and the Spanish Infrastructure of Precision Medicine (IMPaCT).

- **Characterization of microbiome disruption** in complex diseases like colorectal cancer, obesity or celiac disease and study the **effects of bioactive compounds in microbiome modulation** for a healthy gut. We lead the project "Profiling host-microbiome interactions in non-responding Celiac Disease symptoms persistence" ESCMID (2020-2021). Participation in "From Aging Biology to Sustainable Interventions: a microbiome-based anti-aging approach" (PID2019-106893RA-100) and COST Action CA18131 ("Statistical and machine learning techniques in human microbiome studies") (2018-2022).

- Bring the science and knowledge generated in our group closed to the citizens. We lead the projects "Picture your microbes: A **co-creation participatory action** to empower citizens on nutritional health decisions" (2021) funded by EIT-FOOD and participates in **Open Life Science** program (OLS), to strengthen the relationship between scientists and the civil society. In addition, we develop games to stress the importance of having a healthy diet for a healthy gut #Bichindario (https://bichindario.imdeafoodgamers.com/).

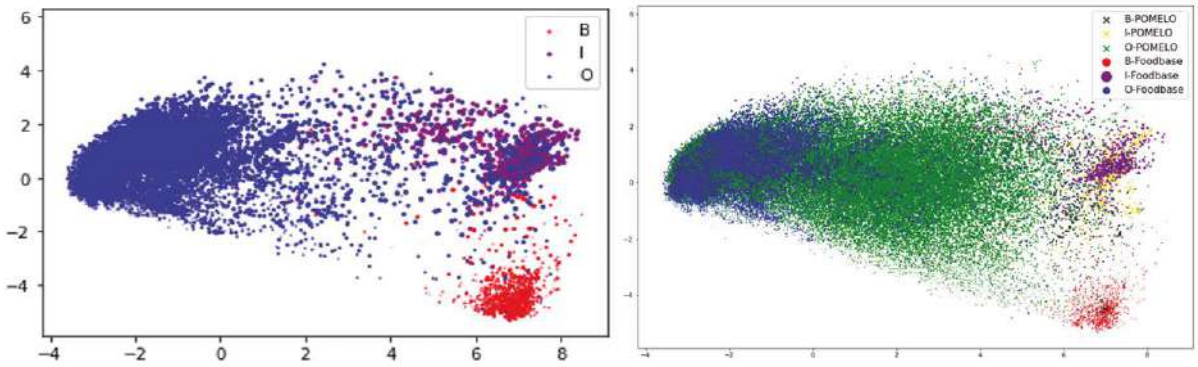


Fig1. Principal Component Analysis for the evaluation of Long Short-Term Memory Network (LSTM) for food entity recognition in scientific texts.

Projects in Focus

FNSCloud
Food Nutrition and Security Cloud

Existing FNS resources (data, knowledge, and tools) for health and agri-food sciences are fragmented, lack critical mass, and access by user communities is 'unevenly' distributed. This means data are not readily found, accessible, interoperable, or reusable, and existing services focus on clinical, molecular, or biological sciences. FNS-Cloud will launch a first-generation 'food cloud', federating existing and emerging datasets and develop new services to support re-use by researchers. The Computational Biology Group in IMDEA Food Institute lead a demonstrator with the aim to create a friendly-user tool to explore putative food-drug interactions from public resources. We apply natural language processing and other bioinformatic techniques to extract and combine information for food/drug interactions from 334 molecular experiments and 2500 scientific documents.

Principal Investigator: Dr. Enrique Carrillo de Santa Pau
Duration: 01/10/2019-30/09/2023
Funded by: European Union´s Horizon 2020 Research and Innovation Programme. Call: H2020-SFS-2019-1 Sustainable Food Security Ref: GA No. 863059
Web: https://fns-cloud.eu

#PictureYourMicrobes

There is a lack of knowledge for the public about gut microbiome implications on health and the ability of diet and lifestyle to change it, impacting the well-being and preventing the development of NCDs. #PictureYourMicrobes is a co-creation and participatory action research project that connects science and photography to empower citizens in nutritional health decisions. The project's main objective is to raise awareness among citizens with risk factors for developing non-communicable diseases (NCDs), particularly people living with overweight or obesity, about the importance of caring for the bacterial communities (microbiome) that live in our bodies. We conducted a photovoice project with self-tracking citizen science tools (self-reported nutritional questionnaires and stool sample collection for microbial profiling). After contextualising and critically analysing the photographs and their reflections, we published a photobook (https://bit.ly/3LrUHEF). Participants developed policy recommendations as a form of community-based solutions to improve gut microbiome health and increase their knowledge of gut microbiome health. Visit the project in https://pictureyourmicrobes.wixsite.com/website

Principal Investigator: Dr. Laura J. Marcos-Zambrano
Duration: 01/04/2021-31/10/2021
Funded by: EIT Food. Call: POC Ref. POC 47
Web: https://pictureyourmicrobes.wixsite.com/website

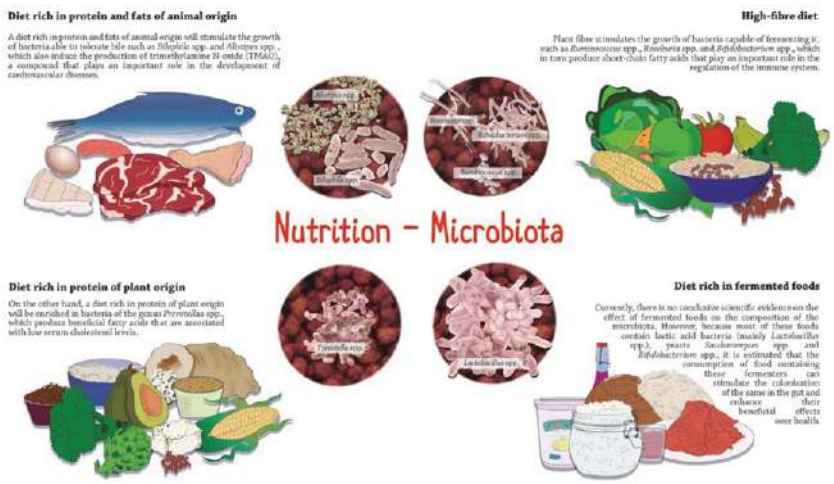


Fig. Infographics explaining the direct relationship between diet and gut microbiota.

Researchers

Dr. Teresa Laguna Lobo
Postdoctoral Researcher

PhD in Immunology & MSc in Omics Data Analysis.

Dr. Laura Judith Marcos Zambrano
Postdoctoral Researcher / Juan de la Cierva Incorporación

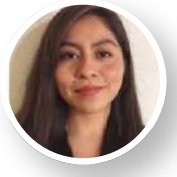
PhD. in Microbiology and Parasitology

Marco Garranzo Asensio
Predoctoral Researcher

BSc in Food Science and Technology & MSc in Bioinformatics and Computational Biology

Carlos Madariaga Aramendi
Research Technician

BSc in Computer Engineering, and Information Technologies

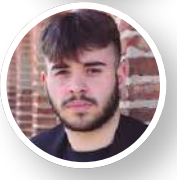


Sheyla Karina Ordoñez Cabascango
Research Technician

BSc in Food Science and Technology

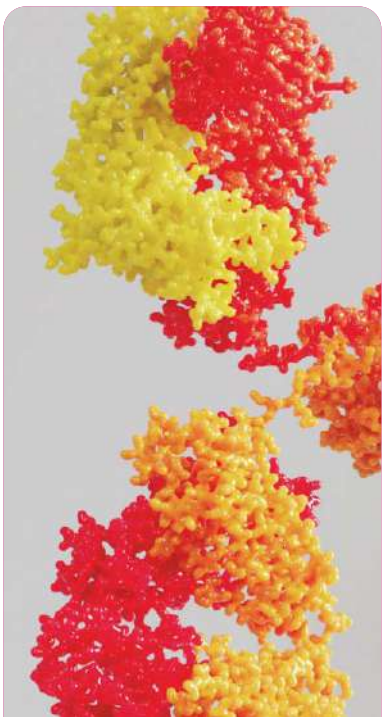
Silvia García Caballero
Research Technician

BSc in Food Science and Technology & MSc in Clinical Nutrition



David Pérez Serrano
Research Technician

Web Developer & Big Data specialist



Students

Ilaria Pace
ERASMUS+ Master student

University of Bologna, Italy

Blanca Lacruz Pleguezuelos
Master student

UAM Universidad Autónoma de Madrid

Víctor Manuel López Molina
Master student

UAM Universidad Autónoma de Madrid

Silvia García Caballero
FP student

EFA Valdemilanos Training Center

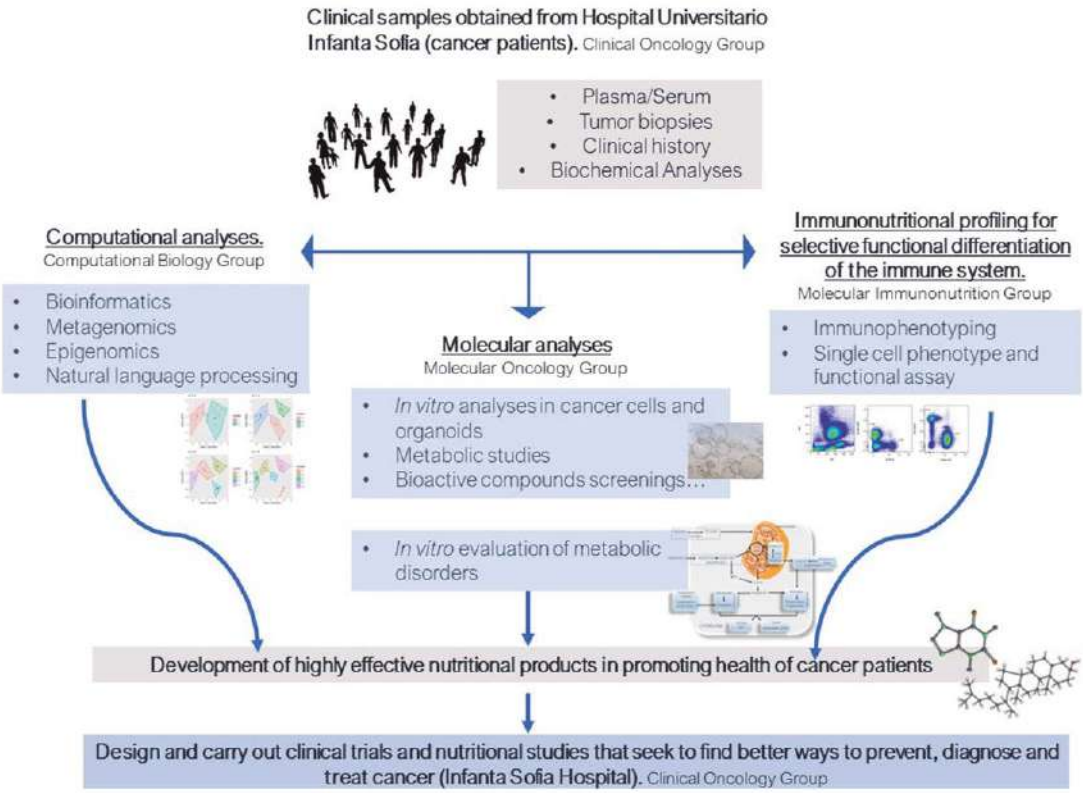
Sheyla Karina Ordonez Cabascango
FP student

EFA Valdemilanos Training Center

Scientific highlight

Precision nutrition for cancer prevention and treatment

The challenge of this project consists of the development of molecular nutrition strategies and formulations for the targeted treatment of cancer patients. This multidisciplinary project requires to gain knowledge of the different molecular characteristics of cancer patients that can be targeted through nutrition, as well as the development of computational tools to support the design and development of specific products, the validation of their molecular effects, first on cells and organoids derived from patients, and finally in clinical trials. Only with a multidisciplinary team as that included in the research program, is it possible to face this challenge. The approach of the identification of the molecular characteristics of cancer patients that can be targeted through precision nutrition is focused on the regulation of metabolism and associated processes such as inflammation and immunity. Metabolic reprogramming is considered one of the "hallmarks" in cancer. Along with the increase in aerobic glycolysis (Warburg effect) and glutaminolysis, reprogramming of lipid metabolism has become a key factor in cancer initiation and progression. Thus, different oncogenic pathways activate de novo synthesis of fatty acids and cholesterol and / or increase lipid uptake from the extracellular medium; lipids participate in different signalling pathways, being important mediators of inflammation associated with tumor progression, and they model the tumor microenvironment facilitating tumor dissemination by reprogramming adipocytes and fibroblasts (CAAs, CAFs), as well as cells of the immune system (polarization Protumoral Th2), and stimulation of angiogenesis, among other processes. To address this objective, clinical samples of cancer patients are analysed and classified regarding specific metabolic and molecular characteristics. The Clinical Oncology Group is in charge of recruiting cancer patients, that will be further analysed by the Molecular Oncology group, focused on an extensive metabolic and genetic analysis, including biomarkers of immune and inflammatory status, and anthropometry and dietary and life-style patterns. Then, the Computational Biology Group has built a molecular database from 119 studies with 334 food experiments and calculated transcriptomic signatures for each of them. The database has been compiled mining GEO Database with food terms in FoodDatabank, FoodDB and Phenolexplorer in collaboration with Food Nutrition Security Cloud activities (FNS-Cloud; H2020-EU.3.2.2.3 ID863059). This database will be used later on to stratify patients by their transcriptomic similarity for molecular responses to food bioactives. In addition, analyses of bulk tissues are the standard in clinical settings without consider the sum of cell types and their specific responses to drugs or food supplements. The Computational Biology group is applying methods in collaboration with University College of London (UCL, UK) and the Cancer Research Centre of Toulouse (CRCT, France) to create molecular signatures from 366,650 colon cells (Smillie et al. 2019) and deconvolute the signal in bulk colon tissues, in collaboration with the Computational Biology Institute of Shanghai, (PICB, China), to stratify colon cancer patients by their cell type structure and infers different origins and responses to food supplements. On the other hand, organoids of patients are obtained and cultured by the Molecular Oncology Group in order to determine the most effective molecular nutrition approach for each metabolic-type of cancer patients. Representative nutritional compounds and strategies are assayed as co-adjuvants in cancer treatment, analysing their func- 53 annual report Precision Nutrition and Cancer tional activity and mechanism of action. In addition, the Immunonutrion Group addresses the complex interactions between immune and cancer cells, analysing the effect of nutritional com-



pounds as agonists able to modulate innate immune signalling, and potential "trained immunity" interventions. Furthermore, the Computational Biology Group apply the developments described above to study the potentially most effective food bioactives for each patient with the aim of improving efficacy of cancer treatments. Finally, selected compounds and precision nutrition strategies are conducted to clinical trials in humans through the GENYAL Platform of Clinical Trials in Nutrition and Health in healthy volunteers, and the Clinical Oncology Group at Infanta Sofía Hospital for cancer patients. The final goal is to efficiently employ the knowledge of cellular, molecular, physiological, chemical or genetic processes to identify metabolic biomarkers of relapse and apply effective molecular nutrition approaches to improve cancer treatments and quality of life of cancer patients.

programme

Precision Nutrition and Obesity

Programme Director

Dr. Jose María Ordovás
Director of Precision Nutrition & Obesity Programme

Ph.D. on Biochemistry. His main research interests are the identification of novel gene-diet interactions that modulate individual response to lifestyle interventions to prevent cardiovascular disease, the integration of multiomic data in large population studies through n-equal-to-one and machine learning approaches to advance in the practical application of precision nutrition.

Goal and vision

The Precision Nutrition and Obesity Program aims to understand the inter-individual variability in the response to any therapeutic diet or physical regime with the aim to prevent obesity and/or return to a healthy body weight. The individual's susceptibility to becoming obese and the individual responsiveness to weight loss interventions are the result of an intricate network of linked biological mechanisms that, together, compose the biology of the system. On the basis of the n-equal-to-one aproach, we evaluate the individual response to diet and physical activity interventions by gathering genetic, epigenetic and metabolomic knowledge at individual level following systems biology approaches in large populations.

Nutritional Genomics And Epigenomics Research Group

Group Leader

Dr. Jose María Ordovás

Cardiovascular And Nutritional Epidemiology Research Group

Group Leader

Dr. Fernando Rodríguez

Nutritional Control Of The Epigenome Research Group

Group Leader

Dr. Lidia Daimiel

Research groups

research group

Nutritional Genomics and Epigenomics

GROUP LEADER

Dr. Jose María Ordovás
Director of Precision Nutrition & Obesity Programme
Ph.D. in Biochemistry

Objetives

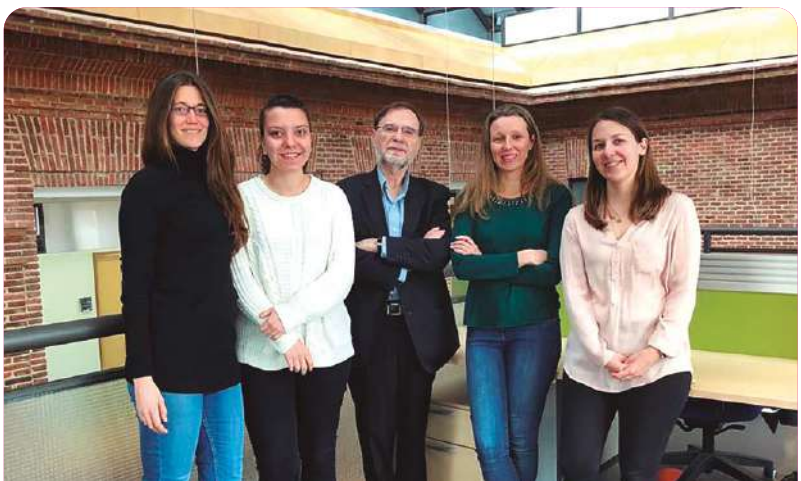
Our group aims to provide genomic tools and knowledge to manage obesity and related co-morbidites at the individual level through:

- The identification of genetic variants predisposing to obesity.
- The definition of how these variants interact with the diet to modulate such predisposition.
- The understanding of the dietary modulation of the how diet can modulate the obesogenic epigenome.

These general aims are developed through specific research projects aimed to:

- Identify postprandial methylation marks in response to a fat load in subjects with cardiovascular disease. In collaboration with the researchers of the CORDIOPREV study at the IMIBIC (Córdoba) and, as members of the European DIMENSION Consortium, we have studied how methylation marks change in the postprandial phase after a fat load. Our results will contribute to the current knowledge of the systems biology in the postprandial stage.

- Identify methylation marks associated with consumption of ultra-processed food (UPF). Current scientific evidence on the impact of UPF consumption



on health rely on observational population studies that have associated UPF consumption with total mortality and markers of cardiometabolic health. However, little is known about the mechanisms that link UPF consumption to health. We will contribute to elucidate the biological impact of UPF consumption at the epigenetic level through our METHYL-UP study and in collaboration with researchers of the ENRICA-Seniors II cohort.

Projects in Focus

DIMENSION Project

DIMENSION is a European project developed in collaboration with 5 groups from international excellent research institutions. The DIMENSION consortium studies dynamically the causal impacts of dietary intake on epigenetic regulation of gene function across tissues, and their impact on subsequent cardio-metabolic health outcomes. Within the project, we focused on postprandial changes in DNA methylation marks after a meal tolerance test combining data from PREDICT and CORDIOPREV cohorts. The aim is to tackle the causal relationships between diet, epigenetic modifications, and gene function. DNA methylation marks are supposed to be stable, and it has been traditionally stated that a long-term exposure is needed to change DNA methylation marks. In this study, we demonstrate that DNA methylation marks change in a few hours after a food intake, suggesting that DNA methylation is a dynamic epigenetic mechanism able to modulate gene expression in response to food intake in the short term.

Researchers

Dr. Celia Martínez
Postdoctoral Researcher
Ph.D. in Neuroscience

Cristina Climent Mainar
Predoctoral Researcher

Beatriz Martínez Blanco
Laboratory Technician

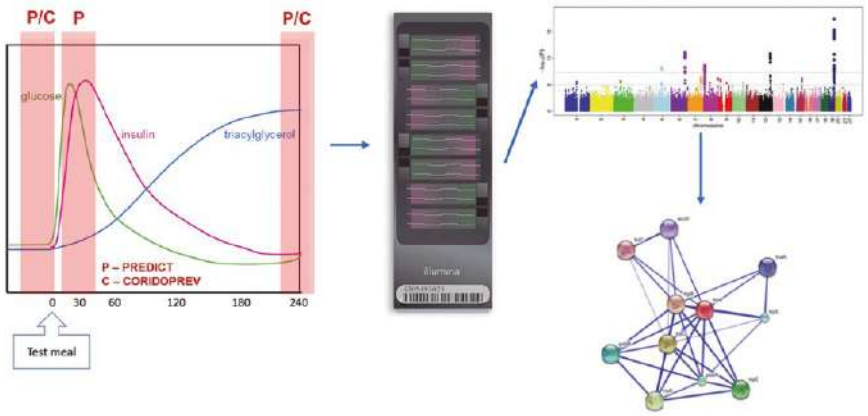


Figure. DIMENSION-postprandial study workflow. We combine 0 and 4h post test meal data from PREDICT and CORDIOPREV cohorts and analyze methylome. The aim is to identify DNA methylation marks with postprandial response and to study the gene regulatory network associated with those DNA methylation marks.

research group

Cardiovascular and Nutritional Epidemiology

Group Leader

Dr. Fernando Rodríguez
Cardiovascular and Nutritional Epidemiology Group Leader

MD and Ph.D. in Medicine. His main research interests are the study of the influence of non-cardiac factors on the prognosis of patients with heart failure, the population-based assessment of cardiovascular health, and the study of the effect of lifestyle on improving cardiovascular health and quality, as well as reversing frailty, in older adults.

Objetives

Our strategic objective is to produce relevant information to support clinical and population-based policies aimed at controlling cardiovascular diseases and their functional adverse outcomes. Specifically, we work on the following research areas:

- Nutritional and omic determinants of frailty and functional status in the older adult.
- Diet and physical activity as determinants of obesity and cardiovascular risk in the elderly.

The results of our studies have been incorporated into the National Strategy for Ischemic Heart Disease Control, the National Strategy for Obesity Prevention and Control, and the National Strategy on Disease Prevention and Health Promotion, elaborated by the Ministry of Health of Spain.

Projects in Focus

Physical inactivity is one of the leading risk factors for noncommunicable diseases and premature mortality. Overall, previous evidence suggests that people who are insufficiently active have a 20% to 30% increased risk of

death compared to people who are sufficiently active. However, this evidence is mainly limited by relying on a single measure of that assumes the stability of this behavior during follow-up.

Using data from the Taiwan MJ cohort, we observed an inverse, non-linear dose-response association between long-term physical activity obtained from repeated measures from at least two medical examinations for up to 20 years (median, IQR: 4.8 years, 2.3–9.0) and all-cause and cardiovascular mortality in 210,327 participants, aged 18 years and older. Also, we observed that achieving the recommended amount or even less than recommended amount of physical activity over a long term lowered the risk of all-cause and cardiovascular mortality, whereas doing more activity beyond the recommendations was only associated with a slight further reduction in all-cause mortality risk.

In this study, in addition, we found that the association between physical activity and risk of death was greater in magnitude when using repeated measures of physical activity compared with the associations between a single baseline measure of physical and risk of death; this finding confirmed that the potential effect of physical activity on survival was underestimated in previous studies (Figure).

Taken together, results provide support and higher certainty of evidence for most of the recommendations and good practice statements included in the recently updated WHO guidelines and to inform future guidelines. This was recently published in British Journal of Sport Medicine (1/88 Sport Sciences) and was awarded the 2021 National Sports Medicine Award (University of Oviedo, Oviedo, Spain).

Reference

Martinez-Gomez D, Cabanas-Sanchez V, Yu T, Rodriguez-Artalejo F, Ding D, Lee IM, Ekelund U. Long-term leisure-time physical activity and risk of all-cause and cardiovascular mortality: dose-response associations in a prospective cohort study of 210 327 Taiwanese adults. Br J Sports Med. 2022 Apr 6:bjsports-2021-104961. doi: 10.1136/bjsports-2021-104961.

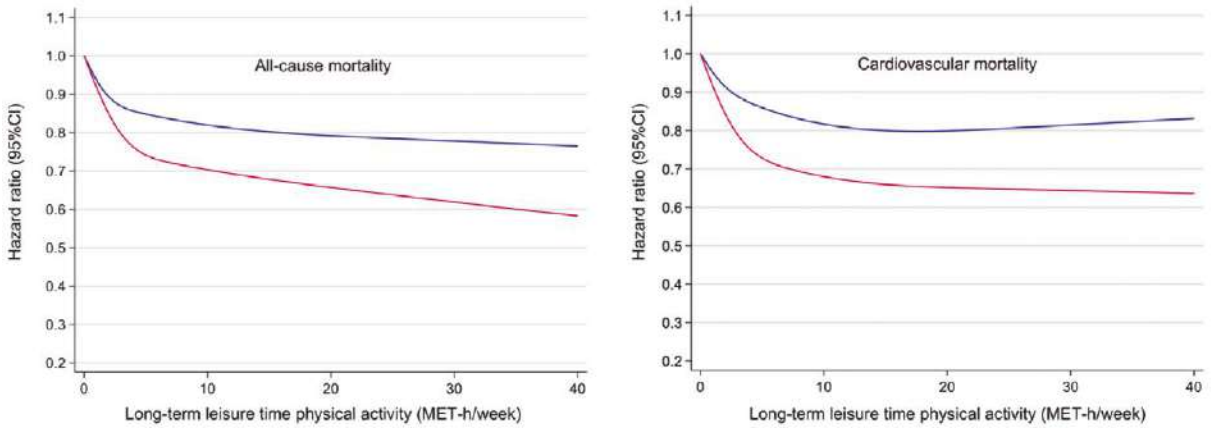


Figure. Dose–response associations between long-term (red) and baseline (blue) physical activity with all-cause and cardiovascular mortality in 210 327 adults.

Head of Research Line

Dr. Pilar Guallar Castillón

Senior researcher and Head of Research Line in the influence of diet on the development of cardiometabolic diseases

MD, PhD, and senior nutritional epidemiologist. She is particularly focused on the study of cooking methods, chronobiology, dietary patterns as well as ultra-processed food consumption and their influence on cardio-metabolic risk and healthy ageing. Lately, she is also interested in other environmental exposures through food. She leads a project focused on the association between phthalate intake and subclinical atherosclerosis.

Objectives

- Influence of ultra-processed food consumption on cardiovascular health, frailty, and cardiovascular health.
- Cooking methods and their association with inflammatory and cardio-metabolic biomarkers.
- Influence of phthalate consumption on cardiovascular health and subclinical atherosclerosis.

Projects in Focus

Ultra-processed food consumption and subclinical atherosclerosis progression: The role of specific food groups, phthalates, and phosphates.

Personnel

Carolina Donat Vargas
Postdoctoral Researcher
Ph.D. in Applied Medical Research

Head of Research Line

Dr. Mercedes Sotos-Prieto, PhD

Ramon y Cajal Fellow, Department of Preventive Medicine and Public Health, Medical School, University Autónoma of Madrid, Associate researcher, IMDEA Food, Member of CIBERESP, and Adjunct Professor, Harvard T.H. Chan School of Public Health

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Mercedes Sotos-Prieto, PhD is a nutritional epidemiologist. She completed her European PhD (2012) about the role of Mediterranean diet, genetic risk, and metabolic traits at the University of Valencia with research visits Harvard Chan School of Public Health, University College in London, and Cambridge University. She was a postdoctoral fellow in the Department of Nutrition in Harvard Chan School of Public Health (2013/2016) and got a position as an Assistant Professor at Ohio University. She is currently a Ramon y Cajal Scientist at the University Autonoma of Madrid and an adjunct Professor at Harvard Chan School of Public Health. Her current research focuses on dietary patterns, lifestyle, cardiovascular diseases and healthy aging, with special interest in translational nutritional epidemiology. Additionally, during the last years she got funding to evaluate the effect of a Mediterranean diet intervention on metabolites. She had a strong record of publications in high impact journals as first author such as Circulation or the New England Journal of Medicine, and several honors and awards (first national BSc Award for achieving excellent, best doctoral dissertation award, Outstanding Postdoctoral Researcher Award of the year (HSPH), Jeremiah and Rose Stamler Research Award for New Investigators (American Heart Association), etc.

Objectives

Her main current research topics include:

- The study of the association between different dietary patterns and healthy lifestyles adherence (including the Mediterranean lifestyle (MEDLIFE index)) and chronic diseases in large cohort populations (including cardiovascular disease, cardiometabolic risk factors, and healthy aging, frailty).
- The development of new Healthy Lifestyle Scores to study its association with main chronic diseases. (Grant PI20/00896)
- The development of interactive web and mobile applications based on the Healthy Lifestyle Scores for its implementation in the clinical practice and occupational settings. (Grant PI20/00896)
- The study of Mediterranean diets intervention in occupational health (Funding grants by the Federal Emergency Management Agency, USA) (Grant: EMW-2020-FP-00063; EMW-2014-FP-00612X)
- Precision nutrition: Mediterranean diet metabolic signatures (Grant: PMP21/00093)
- Sustainable plant-based diets and lifestyles and chronic diseases in several cohorts (Nurses' Health Study, Health Professionals Follow-up, UK biobank, ENRICA)

Head of Research Line

Dr. Esther Lopez-Garcia

Senior Researcher and Head of Research Line in Nutrition and omic determinants of frailty, multimorbidity and unhealthy aging. Professor of Epidemiology in the Department of Preventive Medicine and Public Health, Medical School, Universidad Autónoma de Madrid, Spain.

PhD, MPH, MPharm

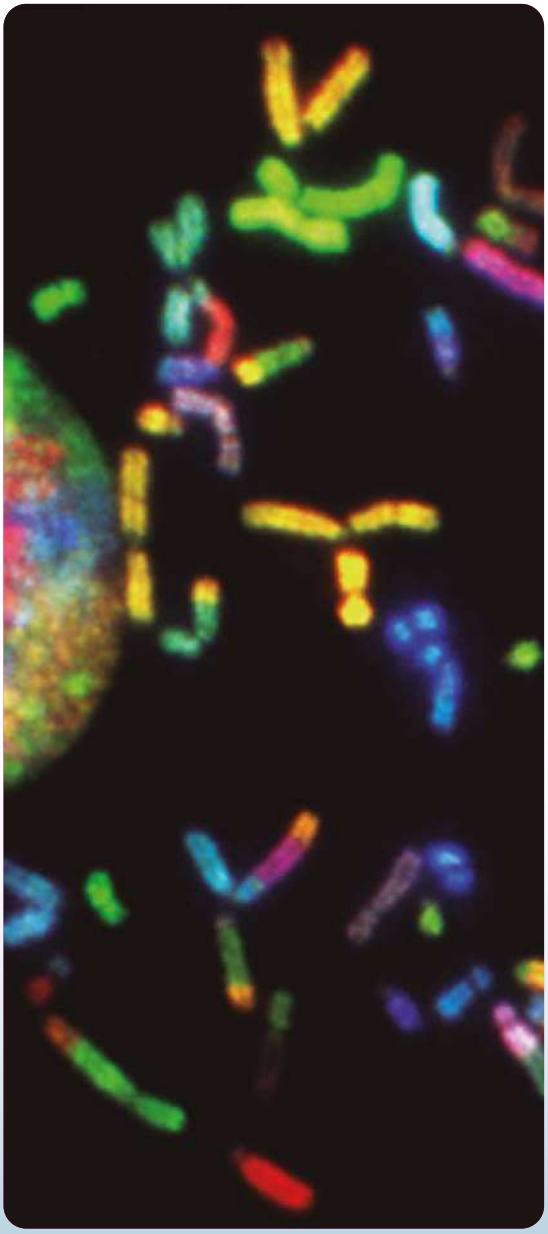
Dr Lopez-Garcia has previously been a Fulbright Fellow and a researcher scientist in the Department of Nutrition at the Harvard T. Chan School of Public Health, USA, and a Ramón y Cajal researcher at the UAM.

ORCID: 0000-0001-6202-4970

She has worked in the development of population studies in the Spanish population, with comprehensive methodology to assess diet and dietary habits, a complete battery to assess outcomes related to physical dysfunction and disability, and the creation of a biorepository of serum to develop projects based on the measurement of metabolites related to diet and aging outcomes.

Dr Lopez-Garcia has published more than 200 peer-reviewed papers in the field of lifestyle factors associated with cardiovascular disease and aging. Specifically, she has assessed the effect of dietary exposures on the development of physical and cognitive impairment, hearing loss, the risk of falls, the risk of becoming frail and the development of multimorbidity. She has also examined the biological mechanisms that may explain these associations, with a special focus on the metabolomics characterization of the studied outcomes. This work has been done using data from large population studies in the USA, UK, the Netherlands, and Spain. Additionally, she teaches general and nutritional epidemiology courses for undergraduate and postgraduate students.

Since 2017, she is a member of the Scientific Committee of the Spanish Agency for Food Safety and Nutrition (AESAN).



Head of Research Line

Dr. David Martínez

Senior researcher and Head of Research Line in Physical activity and sedentary behaviors as determinants of obesity and cardiovascular and death risk in the general population.

Ph.D. in Sports Sciences and Physical activity, by Universidad Autónoma of Madrid, Spain

Research interests

Cardiovascular risk factors, cardiovascular disease, physical activity assessments, aging, survival, physical activity promotion.

Objectives

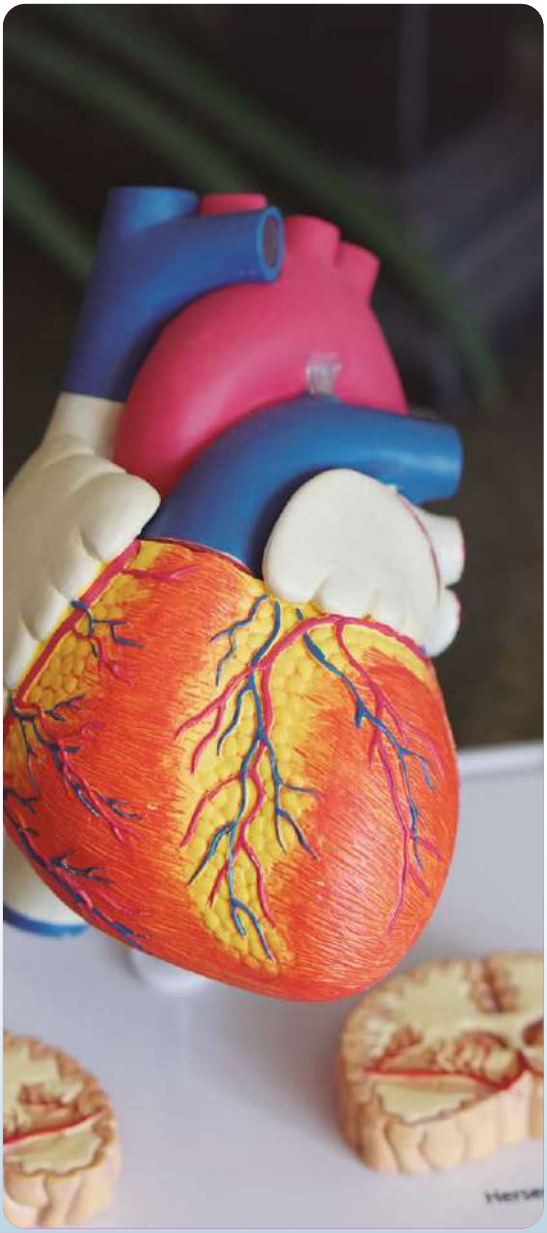
- To describe physical activity patterns in population-based cohorts.
- To examine the association of physical activity with key health outcomes.
- To promote physical activity at population level across the lifespan.

Personnel

Verónica Cabanas-Sánchez

Postdoctoral Researcher

Ph.D in Physical Activity and Sports Sciences



research group

Nutritional Control of the Epigenome

Group Leader

Dr. Lidia Daimiel

Nutritional Control of the Epigenome Group Leader

Ph.D. in Biology. Her main research interest is the study of how nutrients modulate epigenetic mechanisms, with a focus on DNA methylation and microRNAs related to nutrient sensing pathways and molecular hallmarks of aging.

Objetives

Our group aims to gain knowledge of the epigenetic mechanisms that control the individual's response to diet to promote a healthy aging. Our executive objectives are:

- The identification of microRNAs modulated by diet that regulate nutrient sensing pathways.
- The description of how interventions to prevent obesity based on diet and physical exercise modulate molecular hallmarks of aging, including telomerase activity, epigenetic regulation of gene expression and immunosenescence.
- The understanding of the relationship between obesity, diet and physical activity and neurocognitive decline in the elderly.

To address these general aims, we are currently developing some ongoing projects focusing on the definition of the impact of lifestyle interventions that include diet, specifically Mediterranean diet, and physical activity on molecular hallmarks of aging. In this regard, we are investigating how these lifestyle interventions modulate leukocyte telomere length (LTL), T lymphocyte senescence, telomerase activity and the expression of circulating and macrophage age-related microRNAs.

Projects in Focus

PREDIMED-Plus + Aging

NUCONEP group is part of the PREDIMED-Plus Consortium, which includes 23 Spanish research centers. PREDIMED-Plus aimed to compare an intensive intervention based on an energy-restricted Mediterranean diet plus physical activity and behavioral therapy to lose weight with a control intervention based on general advises to follow a Mediterranean diet in the prevention of major cardiovascular events. The study has recruited 6.845 participants and the intervention will last for 6 years. We are currently in the last intervention year. Within this study, we aim to assess the impact of the intervention on molecular markers of aging. We have analyzed the immunosenescence, the reverse cholesterol transport and the expression of aging-related microRNAs in samples at baseline and after 1 and 3 years of intervention and we have found that the intervention promotes a molecular aging profile related to healthy aging.

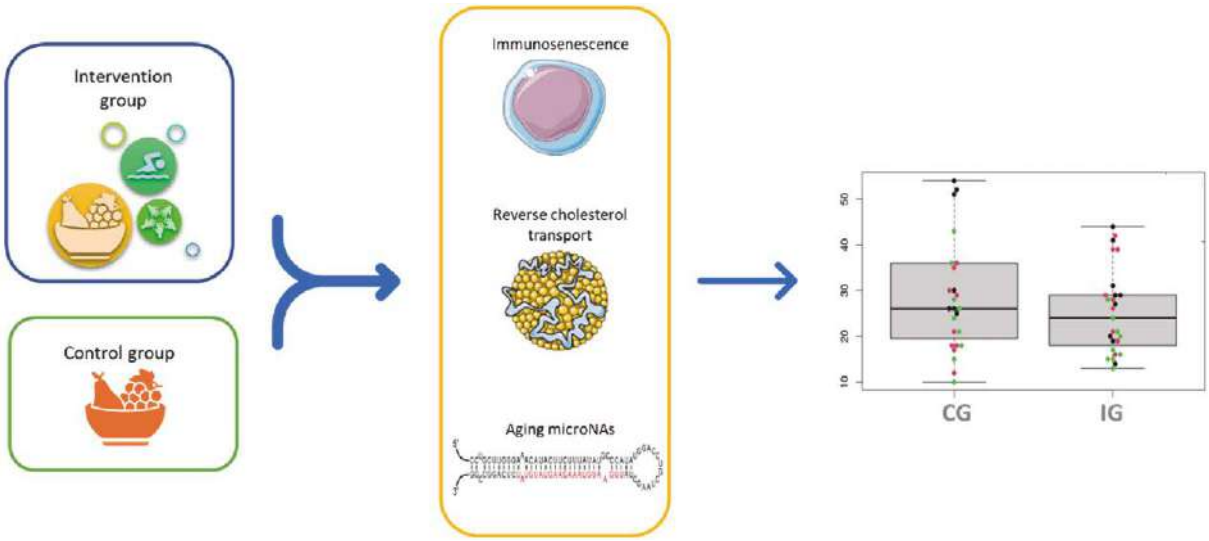


Figure. PREDIMED-Plus + Aging workflow. We measure markers of molecular aging: % of T senescent cells, reverse cholesterol transport and the expression of aging-related microRNAs in plasma and macrophages of the participants. Then, we compare changes in these markers between control and intervention groups. CG, control group. IG, intervention group.

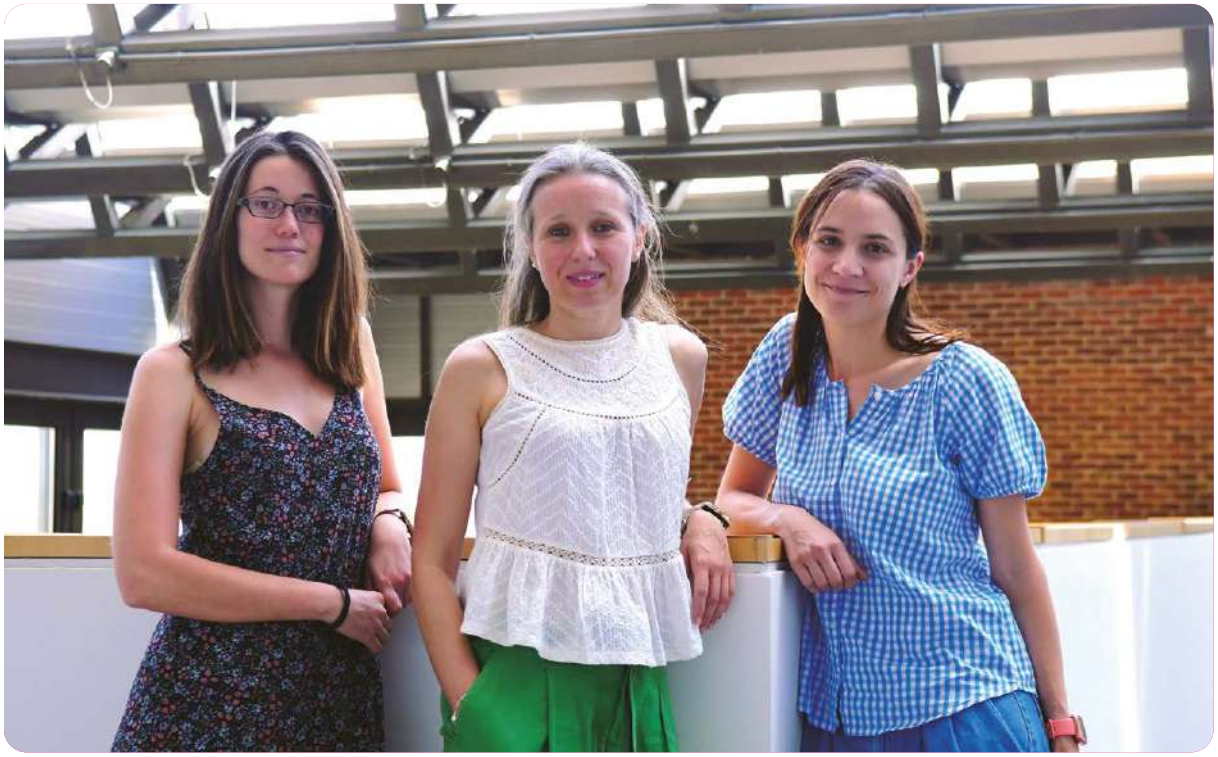
Researchers

Laura Díez Ricote
Predoctoral Researcher

Dr. Esther Cuadrado Soto
Postdoctoral Researcher
Ph.D. in Pharmacy

José Antonio Celada Guerrero
Nutricionist

Beatriz Martínez Blanco
Laboratory Technician



Scientific highlights

The PNO program includes three research groups. The Nutritional Genomics and Epigenomics group (NUGENEP), headed by Prof. José Mª Ordovas, has developed integrative research about the impact of consumption of ultra-processed food (UPF) on health and the mediator role of the epigenome on such association. The Nutritional Control of the Epigenome (NUCONEP) Group has deepened on the issue of the impact of the consumption of red meat and other animal products and their metabolites, choline, betaine, and L-carnitine on the production of Trimethylamine N-oxide (TMAO) and the relationship with cardiometabolic health traits. They have also described the effect of TMAO on the expression of microRNAs related to biological aging and on their target genes. The Cardiovascular and Nutritional Epidemiology Group has developed active research to assess the association between dietary patterns and physical activity on health outcomes and mortality.

NUGENEP: UPF-methylation-health

NUGENEP group has developed integrative research aimed to compare UPF classification systems, evaluate the limitations of those systems and the current tools to assess UPF consumption and to identify DNA methylation marks associated with UPF consumption. Theses studies are developed through two projects: METHYL-UP (national) and DIMENSION (European), both funded by the Ministerio de Ciencia e Investigación.

UPF are defined as "industrial formulations made mostly or entirely from substances derived from foods and additives, with little if any intact food". Food processing have some benefits, such as the reduction of microbiological risk, creating new products such as bread or fermented foods, fortifying foods, and improving accessibility to nutrients. However, epidemiological studies have associated UPF consumption with the risk of cardiovascular disease, type 2 diabetes, hypertension, irritable bowel disease, dyslipidemia, obesity, and cancer. However, the assessment of UPF consumption in a population has a great limitation because there is not currently a tool specifically designed to such assessment. UPF consumption is measured from the frequency of consumption of different food items, assessed through food frequency questionnaires. Different food processing classification systems are used to determine UPF consumption from that frequency of consumption. The most used food processing classification systems in nutrition research are NOVA, the International Agency for Research on Cancer (IARC), the International Food Information Council (IFIC) and the University of North Carolina (UNC). Some are based on the type and level of processing, whereas others focus on formulation and composition criteria. These differences have generated discrepancies in conclusions obtained from studies examining UPF consumption.

We used cross-sectional baseline data from the PREDIMED-Plus cohort to compare UPF consumption assessed by the four systems as well as to compare the association between UPF consumption and cardiometabolic traits according to the classification system. We found a positive association between UPF consumption and weight and waist circumference with all the four systems. But, only with NOVA, a positive association between UPF consumption and BMI was detected. Additionally, a positive association with systolic and diastolic blood pressure and fasting glucose levels was found only with UNC, and with HbA1c only using IARC. Marked differences were also detected in subject agreement between quintiles of UPF consumption, with the NOVA-IARC comparison showing the lowest concordance and percentage of subject agreement.

These results highlighted the need for a new UPF consumption assessment tool able to classify individuals

Figure. To know your HPF consumption, scan the QR code and fulfill the form. Then, you will get a score. Use the table in the right panel to guess your HPF consumption in % according to your score.

according to their UPF consumption level and able to define associations between UPF consumption and Health conditions. To fill this gap, we developed a new screening questionnaire that allows an easy and quick determination of a subject's highly processed food (HPF) consumption, the sQ-HPF. Again, we used cross-sectional baseline data from the PREDIMED-Plus study to identify those food items associated with a high consumption of HPF according to the four most used food processing classification systems. The result is a short, quick, 14-item questionnaire able to replace the estimation of HPF consumption from FFQ in future studies.

Should you want to know your HPF consumption? scan this QR code and go!

We also aimed to know if a high consumption of UPF altered DNA methylation marks. We select 50 subjects with high UPF consumption and 50 subjects with low UPF consumption from the NRIOCA-Seniors II cohort and studies the methylome through the EPIC Illumina chip. We observed changes in the methylation of genes involved in autophagy and gene expression regulation.

Publications

1. Martinez-Perez C, San-Cristobal R, Guallar-Castillon P, et al. Use of Different Food Classification Systems to Assess the Association between Ultra-Processed Food Consumption and Cardiometabolic Health in an Elderly Population with Metabolic Syndrome (PREDIMED-Plus Cohort). Nutrients. 2021 Jul 20;13(7):2471. doi: 10.3390/nu13072471.

2. Martinez-Perez C, Daimiel L, Climent-Mainar C, et al. Integrative development of a short screening questionnaire of highly processed food consumption (sQ-HPF). Int J Behav Nutr Phys Act. 2022 Jan 24;19(1):6. doi: 10.1186/s12966-021-01240-6.

NUCONEP: Animal food, TMAO, microRNAs and cardiovascular health

During 2021, the NUCONEP group has focused on the study of the role of TMAO as modulator of the expression of microRNAs related to aging processes. TMAO is a metabolite produce from L-carnitine, betaine and choline, and its production depends on microbiota. TMAO has been previously reported to be a marker for CVDs and has been suggested that it promotes atherosclerosis progression through cholesterol accumulation in macrophages by inducing proatherogenic receptors CD36 and SR-A1. However, the molecular mechanisms by which TMAO induces atheroma plaque formation are still unknown. MiRNAs are short noncoding RNA molecules that regulate gene expression by targeting mRNAs, and they play a pivotal role in fine-tuning the expression levels of their target genes in response to a stimulus. Several miRNAs have been associated with CVDs and related diseases, such as type 2 diabetes or dyslipidemia. We studied the impact of TMAO on the expression of a panel of microRNAs related to biological aging processes in cell lines of hepatocytes (HEGP-2) and macrophages (THP-1) and in mouse liver organoids and primary human macrophages. We found that miR-21-5p, miR-30c-5p and the cluster miR-17-92 are upregulated by TMAO, and this upregulation affect to target genes and encoding proteins involved in circadian rhythm (*PER2*), inflammation (*IL-12A*) and atherosclerosis development (*SERPINE1* and *CXCL16*).

Although we found a molecular link between TMAO and cardiovascular disease and atherosclerosis through the modulation of related microRNAs, the association between consumption of choline and betaine and cardiometabolic health is not well established, as controversial findings have been reported. However, studies published so far are based on cross-sectional studies that do not allow to infer causality. We aimed to assess if changes in the intake of those nutrients were associated with changes in cardiometabolic and renal health traits in a longitudinal study using baseline and 1-year data from the PREDIMED-Plus cohort. We found that increases in the intake of those nutrients associated with reduction in plasma glucose and glycated hemoglobin levels, a reduction in LDL and triglyceride levels, a reduction in weight and waist perimeter and with an improvement of renal function profile.

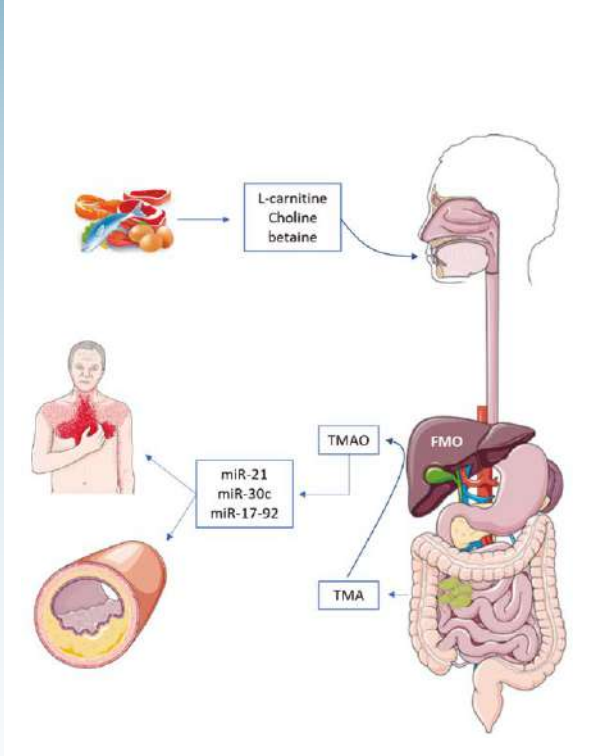


Figure. Red meat, eggs and other animal foods are sources of L-carnitine, choline, and betaine. In the intestine, the microbiota metabolizes these Nutrients to form Trimethylamine (TMA) that is then metabolized in the liver by FMO enzymes to TMAO. TMAO upregulate microRNAs that are involved in cardiovascular disease and atherosclerosis, such as miR-30c, miR-21 and the cluster miR-17-92. This image contains elements from Servier Medical Art reproduced under CC-By license.

Publications

1. Díez-Ricote L, Ruiz-Valderrey P, Micó V, Blanco-Rojo R, Tomé-Carneiro J, Dávalos A, Ordovás JM, Daimiel L. Trimethylamine n-Oxide (TMAO) Modulates the Expression of Cardiovascular Disease-Related microRNAs and Their Targets. Int J Mol Sci. 2021 Oct 15;22(20):11145. doi: 10.3390/ijms222011145.

programme

Precision Nutrition and Cardiometabolic Health

Programme Director

Prof. Alfredo Martínez
Director of the Precision Nutrition and Cardiometabolic Health Programme

Ph.D. Nutrition being also PharmD by University of Navarra and MD by University of Zaragoza, Spain.

He has addressed the topic of Personalized (and Precision) Nutrition, nutrigenetics and nutrigenomics. Among these publications are the position papers from ISNN (International Society of Nutrigenetics/Nutrigenomics). This research has been proposed as guides for the provision of personalized nutritional advice and the consolidation of knowledge in nutrigenetics and its applicability in personalized dietary advice. The integration of this knowledge allows every day a greater number of food and health professionals to offer this type of analysis for better management in nutritional prevention and treatment. His index h is higher than 85 and his papers citation numbers is superior to 30.000.

Goal and vision

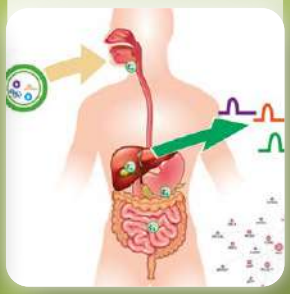
The Precision Nutrition and Cardiometabolic Health program aims to integrate nutriomic and metagenomic approaches to understand the phenotypic responses of specific nutrients and diets that trigger physiopatological pathways common to inflammation, obesity, cardiovascular, metabolic, liver and cancer diseases. The programme is focused on the analysis and implementation of new biomarkers with potential diagnostic and prognostic value, as well as on the study of the bases of the interaction between diet and genes. In this interaction, the effect of different functional foods on gene expression is sought in order to understand the molecular bases of the disease, develop therapeutic tools based on non coding-RNAs, extracellular vesicles, functional foods and design and define strategies for the implementation of precision nutrition.

Key Words: Nutriomics, metagenomics, precision nutrition, noncoding RNAs, lipid metabolism, extracellular vesicles, bioactive ingredients, nutraceuticals, therapeutic approaches.

Cardiometabolic Nutrition Research Group

Group Leader

Dr. Alfredo Martínez



Epigenetic of Lipid Metabolism Research Group

Group Leader

Dr. Alberto Dávalos

Bioactive Ingredients Food Group

Group Leader

Dr. Francesco Visioli

Research groups

research group

Cardiometabolic Nutrition

Group Leader

Prof. Alfredo Martínez
Director of the Precision Nutrition and Cardiometabolic Health Programme.
Leader of Cardiometabolic Nutrition Research Group

Ph.D. Nutrition being also PharmD by University of Navarra and MD by University of Zaragoza, Spain.

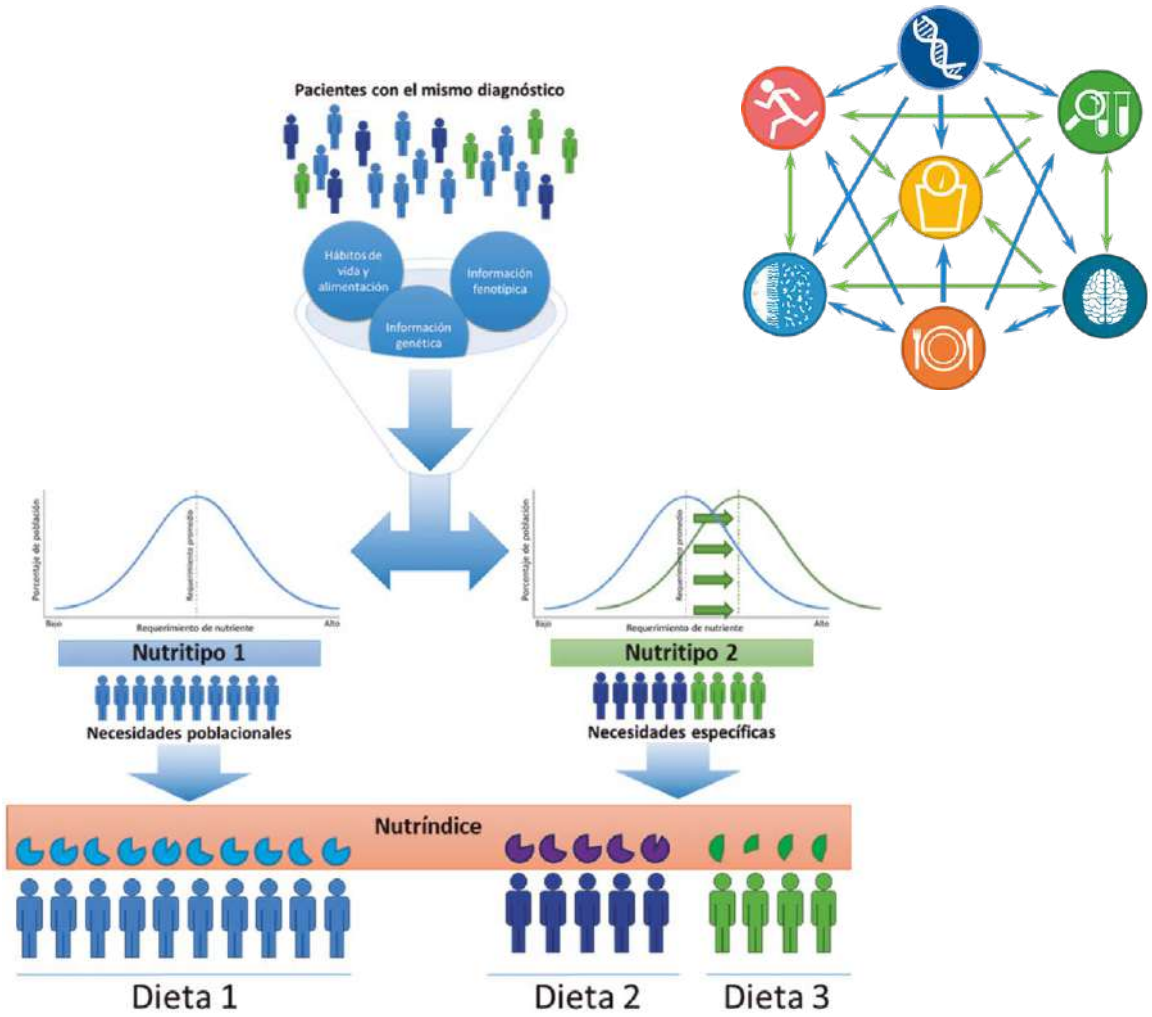
Objetives

- **Characterization of inter-individual response to dietary intake as a function of phenotypic and genotypic factors to provide Precision Nutrition management.** Integration in the near future of omics data into Precision Nutrition will allow the implementation of personalized nutritional treatments to prevent and manage chronic diseases and to monitor the individual's response to novel therapeutical interventions.

- **Establish new markers for the integration of dietary, nutritional, phenotypic and genetic data.**
  These markers are derived from the analysis of large cohort databases through advanced statistical tools, such as multivariate analysis and machine learning techniques, to facilitate the evaluation of patient's metabolic dysfunctions and unhealthy conditions involved in the development of obesity and associated cardiometabolic complications.

- **Integration of the markers obtained in clinical practice and precision nutrition.**
  The definition of these markers will help the translation and transmission of information from scientific evidence in progress for its application in clinical practice of precision nutrition and to discriminate responders to a given nutritional prescription, that allows an action directed to each person through individual characterization.

- **Define the role of NAFLD and inflammation on the individualized nutritional advice.**
  Characterize the role of NAFLD and inflammation for individualized nutritional counselling. That is, how lifestyle factors such as diet or physical activity impact on intestinal microbiota composition, with possible influence in body weight homeostasis/maintenance, type 2 diabetes, low grade inflammation, 2cardiovascular or liver diseases.



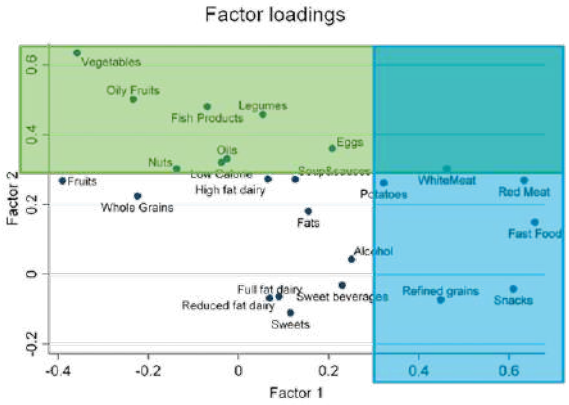
Projects in Focus

NutrIMDEA study

Principal Investigator: Dr. J. Alfredo Martínez
Duration: 2020-2023
Funded by: IMDEA Food and FINUT

This study aims to analyze the information on nutritional status aimed at personalizing individualized nutritional advice, with which an improvement in life and eating habits that improve the health of participants can be achieved by reducing the risk to develop future cardiometabolic diseases. In addition, potential low-cost, easy-to use markers can be obtained from the study results that can be applied in clinical practice for screening patients.

A total of 15000 participants have accessed to the questionnaire available in an on line platform where the volunteers can send the survey data.The results of this study may be integrated into clinical services and future studies, allowing to determine the type of complementary information needed (from biochemical, metabolomic or genetic analysis) to achieve greater precision and personalization in nutritional counseling.



PLENUFAR 7

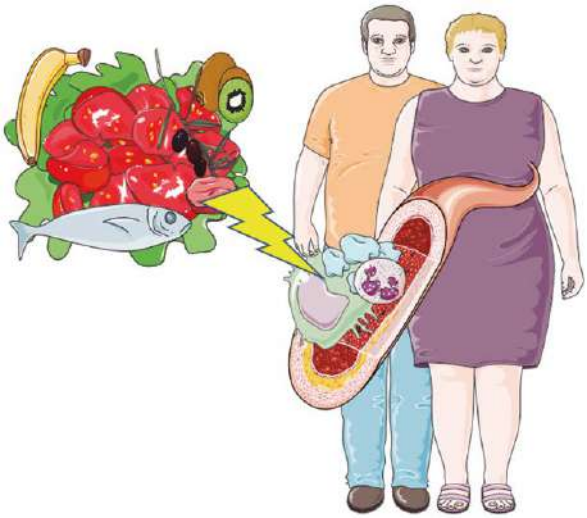
Principal Investigator: Dr. J Alfredo Martínez
Duration: 2022
Funded by: Spanish General Council of Pharmaceuticals

The PLENUFAR 7 project's main objective is the development of tools that help in a precision nutritional approach through the integration of a set of personal factors that allow the qualitative definition of certain individual nutritional profiles or groups of people (Nutritypes). In addition, bioinformatic analysis techniques of personalized information will allow the development of computations or "scores" (Nutrindex) for the objective quantification of the sum of exposure factors that influence the nutritional status of each individual. A questionnaire will be carried out in pharmacies to analyze some health variables in all Spanish communities. These strategies could finally serve to define personalized metabolic and nutritional action guides for your advice through nutritional decision algorithms.

METAINFLAMACION-CM

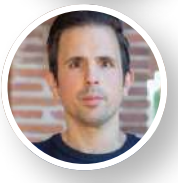
Principal Investigator: Dr. J Alfredo Martínez
Duration: 01/07/2021-30/06/2024
Funded by: Community of Madrid Call: 2020 Synergy Projects Ref. Y2020/BIO-66004

The objective of METAINFLAMACION project is the identification of new precision tools in patients with Lupus Eritematosus, COVID19, Obesity and Metabolic Syndrome, that will allow a better control of these inflammatory diseases favoring their clinical / metabolic stratification and the prevention of associated complications through the use of early biomarkers and the personalization of the therapeutic management and the design of precision therapeutic interventions.. In collaboration with Puerta de Hierro Majadahonda University Hospital and the Autonomous University of Madrid a total of 560 patients will be recruited for the 1) Phenotypically characterization of Lupus Eritematosus, COVID19, Obesity and Metabolic Syndrome patients and 2) Antiinflammatory precision nutritional intervention 32 weeks in patients with overweight to improve the health status of these patients.



Researchers

Dr. Rodrigo San Cristóbal
Postdoctoral researcher
Ph.D. in Food Science, Physiology and Health, University of Navarra



Dr. Iñaki Milton Laskibar
Postdoctoral researcher
Ph.D. in Human Nutrition and Dietetics, University of the Basque Country (UPV/EHU)

Dr. Victor Micó Moreno
Postdoctoral researcher
Ph.D. in Biology, Autonomous University of Madrid

Dr. Judit Gil Zamorano
Postdoctoral researcher and senior laboratory technician
Ph.D. in Biology, Complutense University of Madrid

research group

Bioactive Ingredients

Group Leader

Dr. Francesco Visioli

Bioactive Ingredients Food Group Leader

Francesco Visioli earned a degree in Pharmacy and Pharmaceutical Chemistry from the University of Milan and a PhD in Biotechnology from the University of Brescia (based on work performed at the Louisiana State University Neuroscience Center). After being Full Professor of physiopathology at the Université Paris 6 "Pierre et Marie Curie", where he directed the "Micronutrients and cardiovascular disease" unit, he is now Professor of human nutrition at the University of Padua, Italy and Senior Investigator at the Madrid Institute for Advanced Studies (IMDEA)-Food. Formerly involved in neurochemistry, Dr. Visioli's research currently concerns essential fatty acids, namely those of the omega 3 series, and natural antioxidants, as related to atherosclerosis and cardiovascular disease. In particular, Dr. Visioli's group discovered the biological and pharmacological properties of olive oil phenolics, including hydroxytyrosol

Objetives

The group aims at developing research lines that build upon strong basic research foundations. The findings are usually validated in pre-clinical models and finally tested in human trials. In close collaboration with private companies and also applying for research funds, the group maintains a strong publication record and entertains several collaborations worldwide. The core investigation activity of the group concerns (poly)phenols, namely those of olives for which the group is renown and that often attracts the interest of media and international bodies, such as the International Olive Council. In addition, the group enjoys a close collaboration with the CIAL/CSIC, with which develops investigation on milk fat globule membranes.

- **Milk fat globule membranes and their role in slowing cognitive decline and in infant nutrition.**

- **Milk fat globule membranes and their role in the immune system** ("immunefitness"). The group is developing a functional food composed of such membranes and carotenoids, with particular focus in the gastrointestinal tract, where immunity is largely regulated.

- **Olive (poly)phenols and their actions on the cardiovascular system.** In particular, the group is studying Non-Alcoholic Fatty Liver Disease (NAFLD), whose prevalence is rapidly increasing worldwide. Its modulation by olive phenols and the search for microRNAs to be employed diagnostically are now at the forefront of the group's research.

Projects in Focus

The group had a a strong focus on bioactive compounds of natural origin. The main sources the group is studying are milk by-products, e.g. buttermilk and olive oil (poly) phenols.

The following Project has been awarded in 2020

MFGM4health
Impact of milk fat globule membrane-enriched supplement on health in both in-vitro and in-vivo trials and its potential mechanisms of action

Researchers

João Tiago Estevao Tomé Carneiro
Postdoctoral researcher
Ph.D. in Integration and Modulation of Signals in Biomedicine

Carmen Crespo Lorenzo
Postdoctoral researcher and senior laboratory technician
Ph.D. in Pharmacology and Physiology

research group

Epigenetic of Lipid Metabolism

Group Leader

Dr. Alberto Dávalos

Epigenetic of Lipid Metabolism Group Leader

Ph.D. in Pharmacy Universidad Complutense de Madrid (Madrid); MsC in MBA (CESMA, Madrid).

His research is focused on the identification of new therapeutic strategies by modulating non-coding RNAs (ncRNAs) using diet or lifestyle factors to treat dyslipidemia and prevent CVDs; and to understand epigenome modifications through lifestyles and personalize population health using epigenetics (particularly ncRNAs) through the development of Precision Nutrition.

Objetives

- Understand how different **non-coding RNAs regulate lipid metabolism** during states of health and disease, developing new strategies, both pharmacological and dietetic, to modulate their function.
- Understand **lifestyle modification of the epigenome** in order to try to personalize the health of individuals using epigenetics for the development of Precision Nutrition.
- **Pharmacological or dietary modulation of the activity of non-coding RNAs** that, ultimately, regulate the metabolism of lipids lead to the prevention or treatment of cardiometabolic diseases.

- Understand the possible regulatory role of dietary miRNAs on **genoma modulation via cross kingdom communication**.

- **Exploit the use of extracellular vesicles**, from different fruits and vegetables, as drug delivery vehicle for miRNA-based therapy determining their biological impact in the consumer and evaluate their potential application in the transport of other bioactive compounds.

- Understand the **role of endogenous and exogenous sORFs** (micropeptides) in the gut-liver axis in the context of lipid metabolism and evaluate the impact of dietary components in their modulation.

- Understanding the molecular mechanism by which consumption of **micro and nanoplastics** via the food chain impact our genome affecting to metabolic diseases development.

Keywords: Noncoding RNAs, lipid metabolism, sORFs, epigenetics, cardiovascular disease, diet, cholesterol, food bioactives, exosomes, extracellular vesicles, nanoplastics.

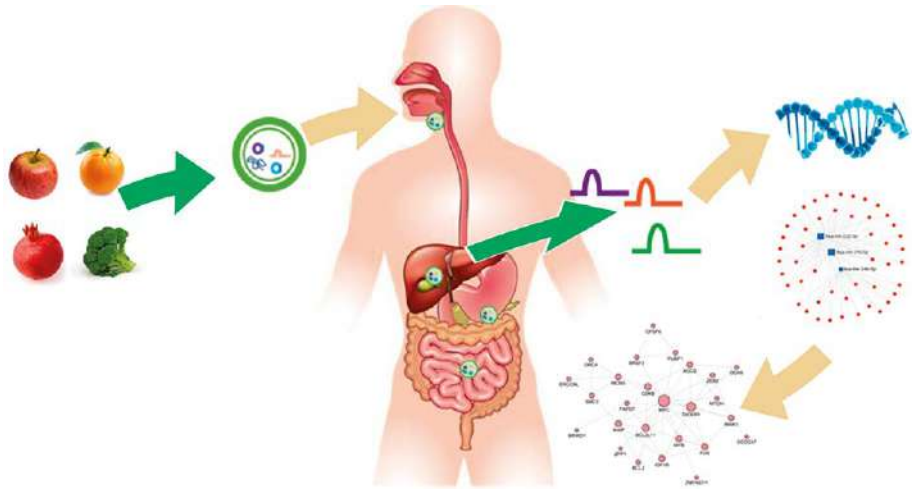
Projects in Focus

FoodVesicleTherapy

The journey of edible plants-derived extracellular vesicles through the mammalian body: extracellular ncRNAs as potential bioactive components of foods

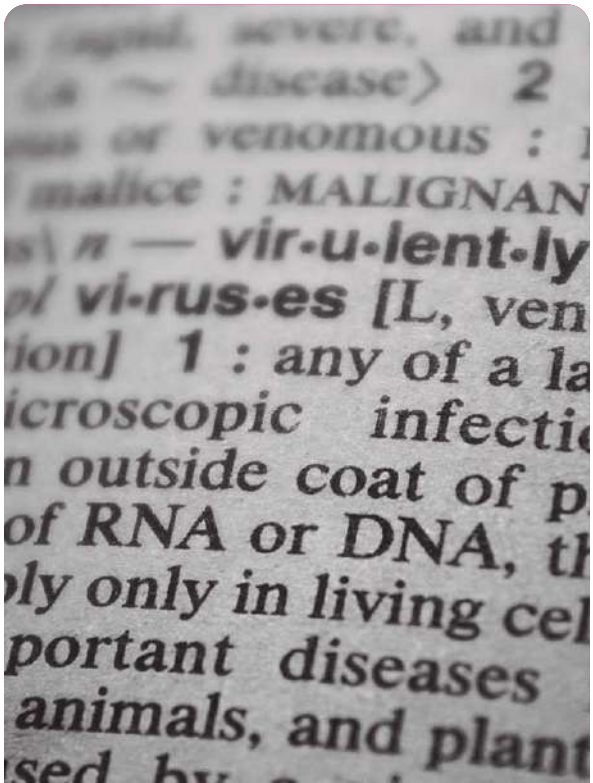
Principal Investigator: Dr. Alberto Dávalos
Duration: 01/06/2020 – 31/05/2023
Funded by: Spanish Ministry of Science, Innovation and Universities Call: PID 2019 Ref: PID2019-109369RB-I00.

It is believed that plant foods may have health beneficial effects, but is it only due to bioactive compounds? Recently, various reports revealed that plant non-coding RNAs (ncRNAs) share a certain degree of similarity and exhibit perfect complementarity to mammals. Research is in progress to determine whether dietary ncRNAs act as bioactive molecules and may regulate target genes in other kingdoms (i.e. animals). However, to produce any biological effect, dietary ncRNAs must first resist the different steps of the digestion process; second, they would have to be taken up and distributed throughout the tissues until arriving at the target cell. At this point they would have to maintain the minimum dose required



to regulate host gene expression and influence cell communication. The possibility of transferring ncRNAs by extracellular vesicles (EVs) would increase the probability of attaining this transference. Plants also produce EVs named exosome-like nanoparticles (ELNPs) that could transport different type of molecules including ncRNAs. Whether plant-derived ncRNAs enclosed in ELNPs could resist the harsh gastrointestinal conditions, being taken up and reach target tissues where directly modulate the gene expression will be studied in the present project.

If plant-derived ncRNAs are demonstrated to produce cross-kingdom communication, this will dramatically alter the prevalent nutrition paradigm. That is to say, they will need to be considered not only as new potentially source of bioactive components but will also have important regulatory concerns. A better understanding of the mechanism that contribute to the resistance, absorption, biodistribution and biological effects of dietary ncRNAs transported in EVs may open-up novel plant-based ncRNA therapeutic approaches.



Researchers

María-Carmen López de las Hazas Mingo
Postdoctoral Researcher
Ph.D. in Agricultural and Food Science and Technology

Belén Ruiz-Roso Guerra
Postdoctoral Researcher
Ph.D. in Pharmacy

Judit Gil Zamorano
Postdoctoral researcher and senior laboratory technician
Ph.D. in Biology

Diana Mantilla Escalante
Predoctoral Student
Ph.D. in Food Science

Lorena del Pozo Acebo
Predoctoral Student
Ph.D. in Biology

Luis A. Chapado
Predoctoral Student
Ph.D. in Food Science

Andrea del Saz Lara
Predoctoral Student
Ph.D. in Social health and physical activity research

Head of Research Line

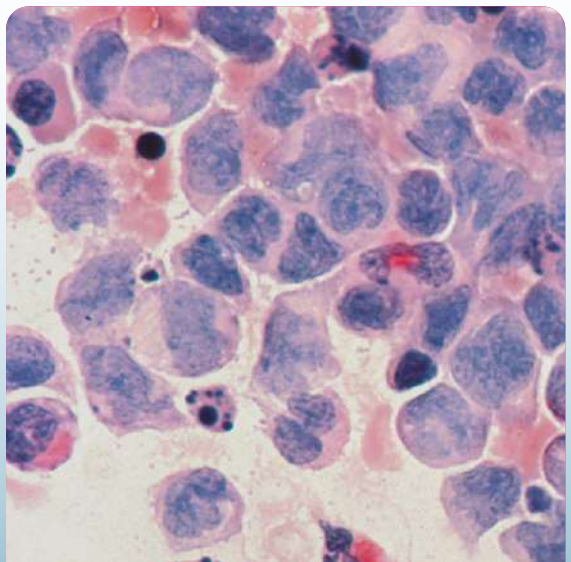
Dr. Aida Serra

Senior Researcher and head of the Research Line +Pec Proteomics, Doctor in Food Science and Technology from University of Lleida.

Dr. Aida Serra joined IMDEA Food Institute as senior researcher in June 2019 through the Talents Attraction plan of the Autonomous Community of Madrid. Dr. Serra has been researcher and fellow scholar at the Nanyang Technological University of Singapore from 2013 to 2019. Her research is based on the application of mass spectrometry technologies to clinical proteomics and at IMDEA Food her research lines focus on the potential of extracellular vesicles as biomarkers and nanocarriers and on the study of the role(s) of the oral microbiota in neurodegeneration.

Objectives

- Use of extracellular vesicles from food industry by-products as optimal nanocarriers.
- Study the role(s) of extracellular vesicles in health and pathological conditions.
- Investigate the modulatory effect of the oral microbiome in neurodegenerative diseases.



Projects in focus

SALVEMOS

Dysbiosis-influenced modulation of oral microbiome-derived extracellular vesicles and their role in Alzheimers disease

Principal Investigator: Dr. Aida Serra
Duration: 01/09/2021 – 31/08/2024
Funded by: Spanish Ministry of Science and Innovation. Call: PID 2020. Ref: PID2020-114885RB-C21

Food derived extracellular vesicles as optimal, safe and editable nanocarriers for the biotechnology and food industries.

Principal Investigator: Aida Serra Maqueda
Duration: 01/06/2019-30/06/2023
Funded by: Community of Madrid Call: Grants for the implementation of contracts “Talent Attraction” Modality 1 Ref. 2018-T1/BIO-10633

Personnel

Cristina Lorca Romero
PhD student

Head of Research Line

Almudena García-Ruiz

Senior researcher and Head of Research Line of human-miRNA-gut microbiota

Ph.D. in Food Science and Technology and Chemistry Engineering. My main interest is focused to research the modulation of the gut microbiota by human miRNAs, with the final goal to search and provide novel therapies to modulate the gut microbiota composition by miRNAs transported within bovine milk exosomes in order to prevent or treat human diseases associated with dysbiosis. In addition, I also investigate the identification and characterization of smORF-encoded peptides from the intestine.

Objectives

- Identification and characterization of smORF-encoded peptides (peptidomics, RNA-Seq, Ribo-Seq, CRISPR-Cas9) that regulate lipid metabolism in the axis intestine-liver in response to dietary excess.
- Modulation of the gut microbiota composition by human miRNAs. Encapsulation of human miRNAs in dietary exo-somes.

Project in focus

Regulation of gut microbiota by host and dietary mirnas: dietary exosomes and mimetic exosomes (miRBiota)

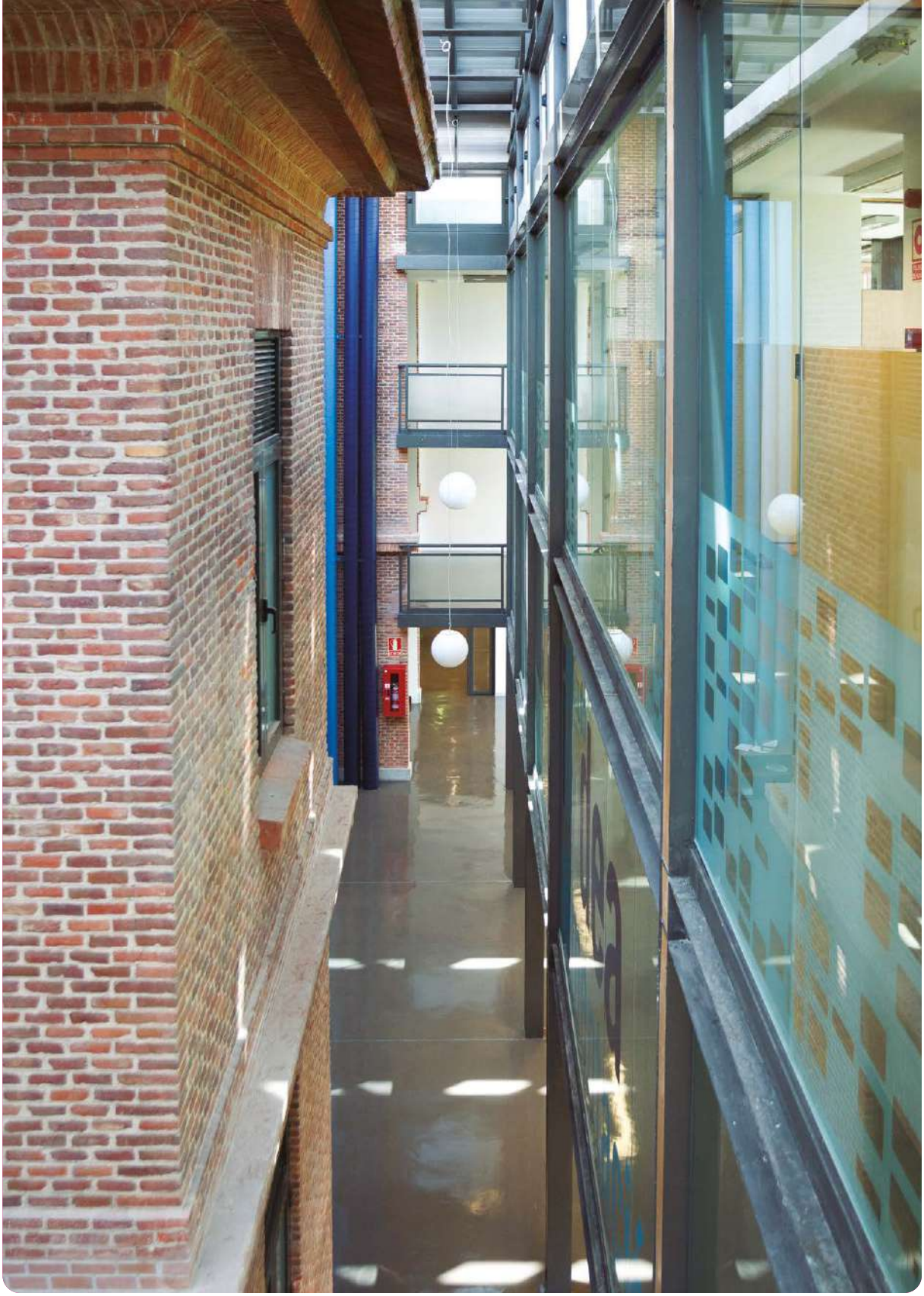
Principal Investigator: Dr. Almudena García Ruiz
Duration: 01/01/2019-31/12/2021
Funded by: Spanish Ministry of Science, Innovation and Universities Call: RTI 2018 Ref: RTI2018-093873-A-I00

Small open reading frames (smORF) as novel modulators of disorders of dietary excess (LIPMETIN-sURFing)

MSCA Individual Fellowships

Principal Investigators: Dr. Almudena García Ruíz and Dr. Alberto Dávalos
Duration: 01/10/2019-30/09/2021
Funded by: Horizon 2020 Framework Programme under MSCA Individual Fellowships Actions Call: H2020-MSCA-IF-2016 Ref: GA No. 746435

Researchers in Europe. 2021 European Researchers Night. September 24, 2021. Almudena García Ruiz.



Scientific Highlights

This year, the work of the different groups of the Precision Nutrition and Cardiometabolic Health Program has been reflected in several contributions:

Cardiometabolic Nutrition Group

The **Cardiometabolic Nutrition Group**, led by Prof. Dr. Alfredo Martínez has started numerous projects that involved the precision nutritional advice in the management of Metabolic Syndrome related diseases. A great example of these projects are the PLENUFAR7 and METAINFLAMACION projects as well as the participation in the European projects EU-REACT and DIETARY DEAL or more recently CLIMB OUT in EIT Food context related to microbiota in Childhood Obesity.

In this line, the group has published in 2021 more than 100 papers emphasizing specially some guidelines and expert position in childhood obesity published in Obesity Reviews.

The cardiometabolic nutrition groups has also contributed to the advance of knowledge in COVID 19 and the precision management of its complications (Martínez Urbistondo M 2021 doi: 10.20960/nh.03469, Ramos-Lopez O 2021 doi: 10.3390/jcm10143112., Martinez-Urbistondo M 2021 doi: 10.1155/2020/2914275.)

Another key point where Cardiometabolic Nutrition group has developed its research is the understanding of microbiome role in Metabolic Syndrome and how diet could influence in microbiota species (Milton-Laskibar I 2021 doi: 10.3390/nu13051738., Cuevas-Sierra A. 2021 doi: 10.1007/s00394-021-02508-0., Cuevas-Sierra A. 2021 doi: 10.3390/nu13082710.)

The following milestones of the group will be focus on the next key points:

- Body Inflammation and Non-Alcoholic Fatty Liver Disease (NAFLD) role and importance in precision nutrition and management in Metabolic Syndrome context.
- Body weight and adiposity rely on energy equilibrium driven by energy-yielding macronutrient intake and energy expenditure under strict neuroendocrine control.
- Complex energy homeostasis interactions between carbohydrates, lipids and proteins (dietary quantity and quality) follow the interpretation of their separate roles on fuel metabolism.
- The intake of simple sugars and some saturated fatty acids has adverse effects on body adiposity, while protein and fiber consumption seem to beneficially modulate satiety and energy metabolism-related processes.
- Personal genetic background and gut microbiota features contribute to explaining some metabolic inter-individual differences to macronutrient consumption.
- Advances in understanding metabolism pathways and hormonal control depending on macronutrient intake involved in energy utilization are needed for precision and public health nutrition.

The **Bioactive Ingredients group** obtained a National grant to study the effects of milk fat globule membranes and selected carotenoids on liver inflammation. The PIs are Drs. Javier Fontecha and Antonio Perez and, despite the Covid restrictions, the first results will be published soon.

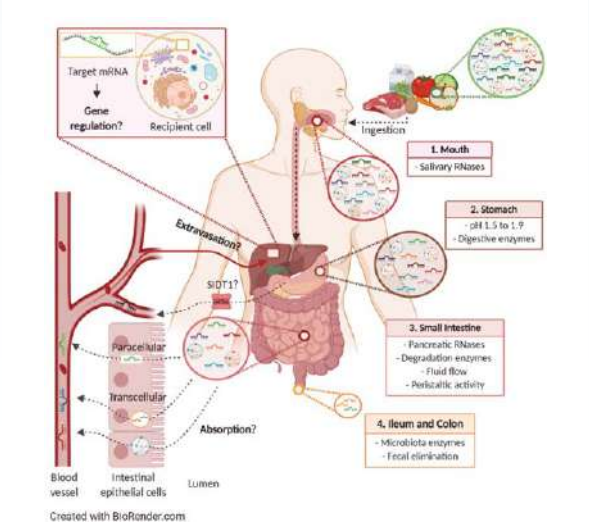
Epigenetics of lipid metabolism group

Epigenetics of lipid metabolism group has published several papers in international journals regarding extracellular vesicles, miRNAs and cross-kingdom communication.

Food-derived microRNAs (miRNAs) from the animal and plant kingdoms are being recognized as potential influen-

cers on host gene expression. This phenomena is called "cross-kingdom communication". However, to exert that effect, dietary miRNAs would resist the cooking conditions, the different steps of the digestion process, being taken up and distributed throughout the organs/tissues until arriving at the target cell. At this point, they would have a minimum number of copies to maintain the minimum dose required within the RNA interference (RNAi) machinery complex to regulate host gene expression and influence cell communication.

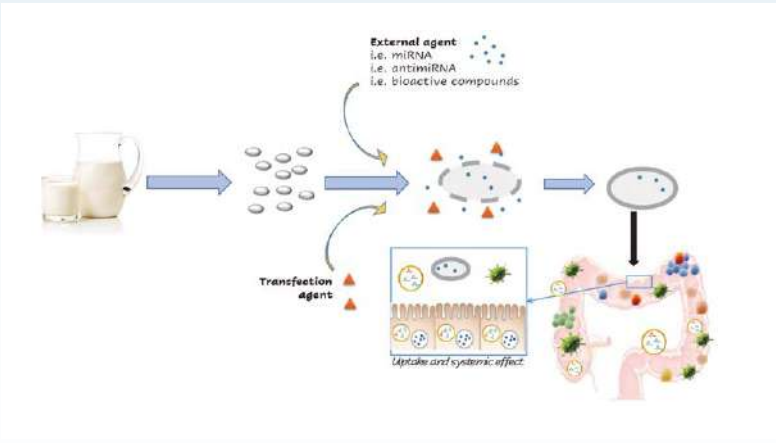
However, not all the exog-miRNAs resist these conditions. The resistance depends on miRNA structure, if they are methylated at the 3'-OH (as plants), and if they are vehiculized into extracellular vesicles, which may permit to increase their resistance.



Reference

Del Pozo-Acebo L, López de Las Hazas MC, Margollés A, Dávalos A, García-Ruiz A. Eating microRNAs: pharmacological opportunities for cross-kingdom regulation and implications in host gene and gut microbiota modulation. Br J Pharmacol. 2021 Jun;178(11):2218-2245. doi: 10.1111/bph.15421.

Extracellular vesicles (EVs) are stable nanovesicles released by cells and present in all biological fluids. Interestingly, dietary EVs possess tremendous potential as nanocarriers because they can enhance the stability of their cargo, enhance the biological activity, or poor bioavailability of bioactive compounds. In addition, they seems to be safe, biocompatible, non-inmunogenic and available for large-scale production which make them valuable tools for the safe delivery of several biomolecules.



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López de Las Hazas MC, Del Pozo-Acebo L, Hansen MS, Gil-Zamorano J, Mantilla-Escalante DC, Gómez-Coronado D, Marín F, Garcia-Ruiz A, Rasmussen JT, Dávalos A. Dietary bovine milk miRNAs transported in extracellular vesicles are partially stable during GI digestion, are bioavailable and reach target tissues but need a minimum dose to impact on gene expression. Eur J Nutr. 2022 Mar;61(2):1043-1056. doi: 10.1007/s00394-021-02720-y.

programme

Childhood Precision Nutrition

Programme Directors

Dra. Julie Chowen

Co-Director of the Childhood Precision Nutrition Programme. Senior Investigator, Foundation for Biomedical Investigation Hospital Infantil Niño Jesús

Ph.D. in Physiology and Biophysics. Her work is focused in Neuroendocrine control of metabolism, Glial cell in metabolic control, Early nutritional and hormonal effects on long-term metabolism.

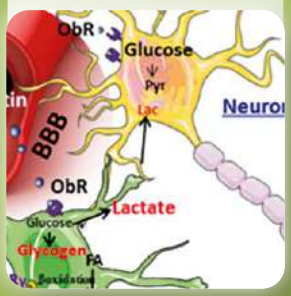
Dr. Jesús Argente

Co-Director of the Childhood Precision Nutrition Programme. Full Professor, Autonomous University of Madrid, Director of Pediatrics and Director of Endocrinology, Hospital Infantil Universitario Niño Jesús, Madrid. Head of Group in the Spanish Network for the study of obesity and nutrition (CIBEROBN).

Ph.D in Medicine. His work is focused in Childhood obesity, the control of pubertal onset, growth abnormalities and eating disorders.

Goal and vision

Our goal is to understand, prevent and treat the different causes of childhood obesity. Childhood obesity is an important problem in developed countries, as not only will many of these children be obese adults, but the comorbidities associated with this disease can develop at an earlier age and thus be a more chronic burden not only on the person's health but also on the healthcare system. Understanding all aspects of obesity and the acceptance that obese children are not small obese adults, is of utmost importance in order to curtail this epidemic; however, it is now clear that the underlying cause is heterogeneous and that we should speak of "obesities" instead of "obesity" and that effective treatment will also differ depending on etiology. This research programme focuses on the integral understanding of children with obesity on a clinical, genetic, epigenetic, biochemical, metabolomic, and inflammatory basis in order to focus treatment protocols and to reduce the risk of future comorbidities.



Childhood Obesity Research Group

Group Leader

Dr. Julie Chowen
Dr. Jesús Argente

Research groups

research group

Childhood Obesity

Group Leader

Dr. Julie Chowen

Co-Director of the Childhood Precision Nutrition Programme. Senior Investigator, Foundation for Biomedical Investigation Hospital Infantil Niño Jesús

Ph.D. in Physiology and Biophysics

Dr. Jesús Argente

Co-Director of the Childhood Precision Nutrition Programme. Full Professor, Autonomous University of Madrid, Director of Pediatrics and Director of Endocrinology, Hospital Infantil Universitario Niño Jesús, Madrid. Head of Group in the Spanish Network for the study of obesity and nutrition (CIBEROBN).

Ph.D in Medicine

Objetives

- To study the molecular basis of childhood obesity and its comorbidities in order to promote precision therapies, including nutritional approaches and new treatments for monogenic obesity.
- To investigate the interaction between epigenetics, genetics, genomics and diet, both quantity and quality, and their influence on long-term health outcomes.
- To understand the effects of early nutrition and hormonal changes on long-term metabolic health and how the brain, especially glial cells, responds to specific nutrients that affect metabolism and neuroinflammation.

Projects in Focus

CIBERobn
National Network for the study of Obesity and Nutrition

Principal Investigator: Dr. Jesús Argente;
CoPrincipal Investigator: Dr. Julie Chowen
Duration: 01/01/2006 - present
Funded by: Institute of Health Carlos III (ISCIII) Ref. CB06/03/0022
Web: https://www.ciberobn.es/en

HAPADIET
Crosstalk between hypothalamic astrocytes and perivascular adipose tissue in metabolism and cardiovascular function: Impact of diet

Principal Investigator: Dr. Julie Ann Chowen King
Duration: 01/01/2018 - 30/09/2022
Funded by: Ministry of Economy and Competitiveness Call: 2017 R&D+I Projects Ref: BFU2017-82565-C2-1-R

The study of newly identified regulatory factors in the GH/IGF system: Implications in human pathology, analysis of the underlying mechanisms and development of potential therapies

Principal Investigator: Dr. Jesús Argente Oliver
Duration: 01/01/2020 - 31/12/2022
Funded by: Institute of Health Carlos III (ISCIII) Call: Health Research Projects Ref. PI19/00166

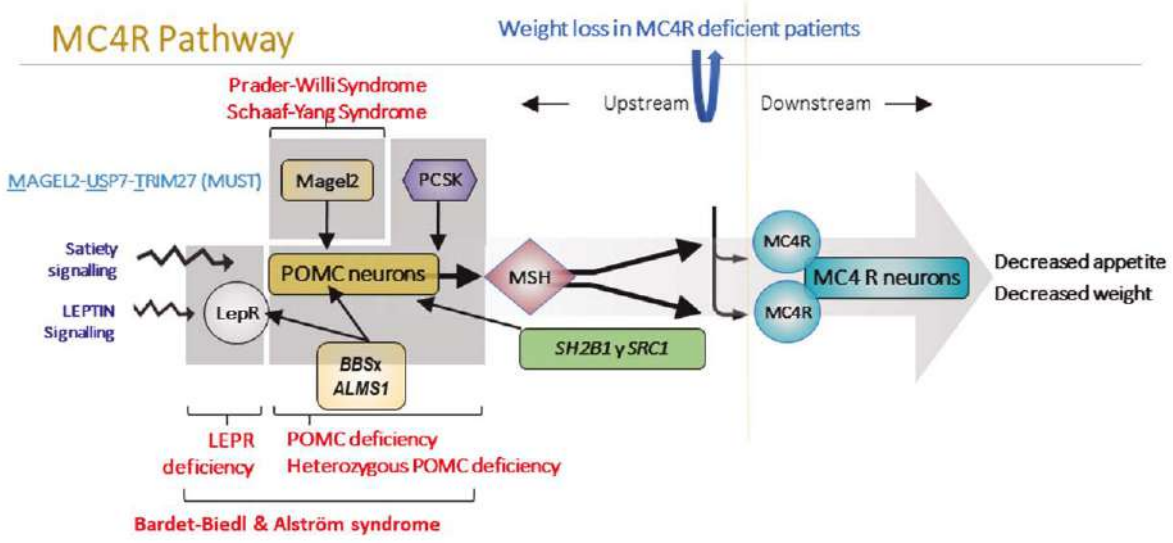
Scientific highlights

One of our main objectives is the search for effective treatments of childhood obesity and understanding the complications of obesity, including those that are specific for prepubertal children such as pubertal growth. The clinical assays underway in the laboratory are clearly demonstrating the efficacy and safety of setmelanotide, an MC4R agonist, in the treatment of specific genetic forms of obesity.

Polygenic obesity in children remains an important challenge and the current treatment continues to be based on dietary and exercise interventions. The long-term outcome of these interventions clearly demonstrate that new approaches are still needed.

Conservative Treatment for Childhood and Adolescent Obesity: Real World Follow-Up Profiling and Clinical Evolution in 1300 Patients. Martos-Moreno GÁ, Martínez-Villanueva Fernández J, Frías-Herrero A, Martín-Rivada Á, Argente J. Nutrients. 2021;13(11):3847. doi: 10.3390/nu13113847. PMID: 34836102

The pubertal growth spurt is diminished in children with severe obesity. Holmgren A, Martos-Moreno GÁ, Niklasson A, Martínez-Villanueva J, Argente J, Albertsson-Wikland K.Pediatr Res. 2021;90(1):184-190. doi: 10.1038/s41390-020-01234-3. PMID: 33173182



Specific sights of action for targeting monogenic obesity

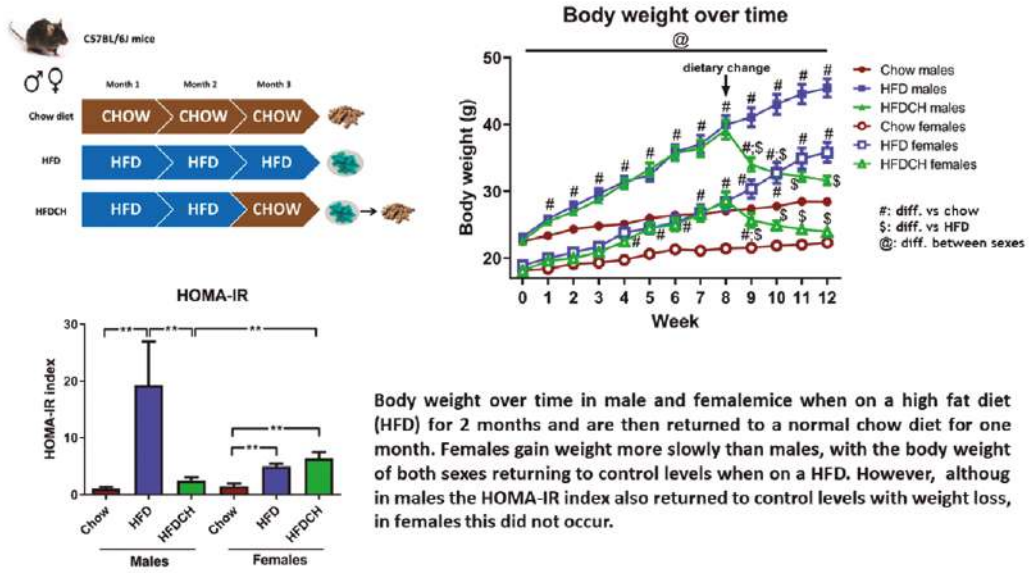
Another area of focus is the differences between the sexes in their response to nutritional challenges. During young adulthood, female mice are more resistant to high fat diet. Although their energy intake on an energy rich diet is greater than that of males, females have a delay in weight gain and onset of metabolic alterations. Moreover, we recently demonstrated thatfemales also have a longer delay in metabolic recuperation when returned to a healthy diet.

Some of these differences may lie in how the central and circulating insulin-like growth system (IGF) systems respond to nutritional challenges.

Sex Differences in Metabolic Recuperation After Weight Loss in High Fat Diet-Induced Obese Mice. Guerra-Cantera S, Frago LM, Collado-Pérez R, Canelles S, Ros P, Freire-Regatillo A, Jiménez-Hernaiz M, Barrios V, Argente J, Chowen JA. Front Endocrinol. 2021, 12:796661. doi: 10.3389/fendo.2021.796661. eCollection 2021.PMID: 34975768

Impact of Long-Term HFD Intake on the Peripheral and Central IGF System in Male and Female Mice. Guerra-Cantera S, Frago LM, Jiménez-Hernaiz M, Ros P, Freire-Regatillo A, Barrios V, Argente J, Chowen JA. Metabolites. 2020;10(11):462. doi: 10.3390/metabo10110462. PMID: 33202914

Current research in the laboratory regarding the role of astrocytic exosomes in the control of metabolic neuronal circuits is advancine and these ground-breaking results have been presented and various national and international meetings this past year.



Body weight over time in male and femalemice when on a high fat diet (HFD) for 2 months and are then returned to a normal chow diet for one month. Females gain weight more slowly than males, with the body weight of both sexes returning to control levels when on a HFD. However, althoug in males the HOMA-IR index also returned to control levels with weight loss, in females this did not occur.

Innovation, Communication and Education Unit

Programme Director

Prof. Guillermo Reglero Rada
IMDEA Food Director and Director of the Innovation and Communication Unit

Ph.D. in Food Science. His work is focused in Food as a preventive and therapeutic tool for health improvement. Design, study of the activity and demonstration of effects of food products for health specific use.

Goal and vision

We aim to search and facilitate the transfer of knowledge generated through applied and basic research into Precision Nutrition applications, and from whose use Society and Industry can equally profit. This unit focuses on fostering and boosting innovation in the Food arena. Communication is the springboard to engage the general public to participate in the changes driving this innovation under the 2030 Agenda objectives.

This unit brings Science to both Industry and Society through 3 strategic pillars:

- Innovation & Business Creation
- Education
- Communication

IMDEA Food, in association with the Universidad Autónoma de Madrid, is a partner of EIT Food, a Knowledge and Innovation Community (KIC) established by the European Institute for Innovation & Technology (EIT), an independent EU body set up in 2008 to drive innovation and entrepreneurship across Europe. Following EIT Food functional structure, the EIT Food Innovation&Business Creation, Education and Communication Groups address and connect three of the EIT Food pillars to develop world-class solutions to make the food system more sustainable, healthy and trusted by consumers and to catalyse food entrepreneurship and innovation.

Units

Innovation & Business Creation Group

Head of Unit

Dr. Ana Ramírez de Molina

Education Group

Head of Unit

Dr. María Jesús Latasa Sada

Communication Group

Head of Unit

Sara Castillo Alonso

unit

Innovation & Business Creation

Head of Unit

Dr. Ana Ramírez de Molina

Deputy Director of IMDEA Food.
Director of the Precision Nutrition and Cancer Programme.
Master contact of EIT Food for UAMIMDEA Food

Ph.D. in Molecular Biology

Projects in Focus

Five pillars drive the Innovation & Business Creation activities:

1. Entrepreneurship initiatives with IMDEA Food Spin-Offs
2. EIT Food innovation projects
3. Industrial PhD projects
4. Innolink project (2018 Call for Linking Innovation Entities in Comunidad de Madrid)
5. InnohealthFood Project

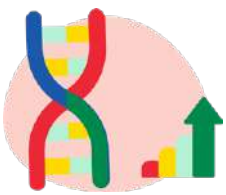
1. Entrepreneurship initiatives with IMDEA Food Spin-Offs

Technology-based companies promoted by IMDEA Food and the Autonomous University of Madrid (UAM) for the industrial and commercial exploitation of innovations derived from IMDEA Food and UAM in the field of precision nutrition, that is to say in the design and application of effective nutritional strategies in the improvement of health, adapted to the genetic profile of people, and their lifestyle or physiological situation.

1.1. Spin-Offs

Precision ForHealth S.L. (P4H)

Precision For Health (P4H; https://p4h.es/es/) is a knowledge-based start-up company established by IMDEA Food Institute and the Universidad Autónoma de Madrid. P4H is dedicated to bring scientific discoveries in nutrition and health to society by personalized advice based on the genetic profile of each individual. At the moment, the company has 3 commercially available nutrigenetic tests that have been clinically validated and are prescribed by specialized professionals. :



ForAging: analyses genetic variants scientifically associated with the health status of each person, allowing to evaluate the metabolic and physiologic processes at a genetic level in order to provide information to maintain or improve one´s health status along aging, help prevent diseases and increase the quality of life time on an individual basis. It provide us with information on several parameters that, as a whole, offer us an overall assessment on the individual predisposition of the health status and ageing. In particular, it analyzes variants involved in energy balance and biorhythm, optimal nutrition, physical appearance and skin care, cognitive development and the ageing processes.

ChronoSport: analyses genetic variants that have been scientifically shown to be related to the genetic predisposition for performance in sports, as well as to other factors closely related to sports, such as the metabolism, hydration, risk of injury, or the individual biorhythm.

ForWeight: the genetic variants analyzed provide us with information on the genetic predisposition to weight gain and best personalized approaches to reach and optimal weigh and metabolic balance, as well as about mechanisms involved in this process, such as appetite control, food intake and satiety, or fat and carbohydrates metabolism among others.

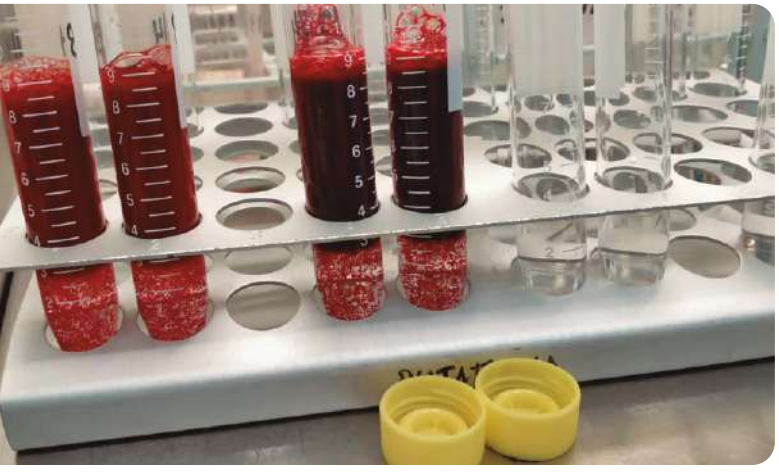
P4H is currently developing **additional specific tests to improve health, such as that evaluated by HEALTH 4BRAIN project**

PH4 projects ongoing

Health4Brain
Precision nutrition for the maintenance and improvement of cognitive function

Principal Investigators: Dr. Ana Mª Ramírez, Dr. Carolina Maestre, Dr. Isabel Espinosa, Dr. Guillermo Reglero
Duration: 01/04/2020-31/03/2023
Funded by: Spanish Ministry of Science, Innovation and Universities Call: Collaboration Challenges Programme.RTC 2019 Ref: RTC2019-007294-1
Partners: P4H S.L, Natac Biotech S.L and IMDEA Food.

HEALTH4BRAIN is an innovative project that is developing a nutrigenetic test that will make it possible to offer precision nutrition recommendations aimed at maintaining and improving cognitive function. The IMDEA Food Institute in collaboration with the companies PRECISION FORHEALTH, SL and NATAC BIOTECH SL make up the consortium of the HEALTH4BRAIN project that will work for three years with the aim of contributing to the personalization of the diet to improve the health and quality of life of the population, helping to maintain **and improve** their cognitive function. The project is designing **personalized genetic tests and associated nutritional recommendations and functional foods to improve cognitive function and inhibit cognitive decline, which will be validated in a nutritional intervention study developed by IMDEA Food.**



Forchronic S.L.

FORCHRONIC S.L is a technology-driven biotech company initiated by Canaan Research & Investment, S.L., the Universidad Autónoma de Madrid (UAM) and researchers from both the IMDEA Food Institute and the Hospital Universitario Infanta Sofía that aims to **develop novel nutraceuticals for the treatment of chronic diseases.**

The **tecnological innovation** of FORCHRONIC S.L. lies on its lipid-based vehicles, which increase the bioavailability and biological function of bioactive phytochemicals (Patent WO/2017/187000). Importantly, this innovation covers the clinical use of any bioactive compound that is encapsulated by the patented lipid vehicles. Therefore, FORCHRONIC S.L. has the potential to develop **a wide range of nutraceuticals** and center its **business activity** in the field of **Precision Nutrision.**

FORCHRONIC S.L. **distinctive competencies** are:

1. Elevated bioavailability and efectiveness of its products,
2. Molecular therapeutic activity validated in clinical trials.

FORCHRONIC S.L. **business model** is based on:

1. Development and production of novel nutraceuticals,
2. Parthnership with third parties that wish to use our patented lipid vehicle and
3. License to third parties the use and production of patented lipid vehicles.

Using its patented innovation and supported by a solid biomedical and clinical research (clinical trials)[1], **FORCHRONIC S.L. has launched LIPCHRONIC**, a rosemary extract-based nutraceutical that promotes immune func-

1 Gómez de Cedrón, et al., 2019. Nutrients. Aug 24;11(9):2001. DOI: 10.3390/nu11092001.

tion. Currently, this product has demonstrated **tolerability and safety** as a nutritional supplement. Furthermore, FORCHRONIC S.L. is currently **undergoing clinical trials** for the use of LIPCHRONIC as an adjuvant of **lung and breast cancer** (ONCOLIPCHRONIC)**.**

FORCHRONIC S.L. ´s **research team** has a solid background in Precision Nutrition. Furthermore, it has been supported by several national research fellowships that include the Industrial PhD Program from Comunidad de Madrid 728 (IND2017/BIO-7857), as well as the National Postdoctoral Research Program Torres Quevedo (PTQ2020-011216).

IMDEA Food participant researchers: Dr. Lara Pérez Martínez, Dr. Ana Ramírez de Molina and Dr. Guillermo Reglero.

Forchronic projects ongoing

INNO-FORCHRONIC (NEOTEC)
Precision Nutritional Formulas for Immune and Inflammatory Diseases.

Principal Investigator: Dr. Ana Mª Ramírez, Dr. Lara Pérez Martínez and Dr. Guillermo Reglero
Duration: 01/01/2021-31/12/2022
Funded by: CDTI Call: NEOTEC Programme Ref. SNEO20201139
Partners: FORCHRONIC S.L

Project coordinated by the company FORCHRONIC S.L., with the aim of developing a vehicle for food-derived bioactive phytochemicals, and validating in humans the preventive and/or therapeutic effects of various formulas for infectious and/or chronic diseases related to immunity and inflammation. This project has been supported by several national grants that also facilitated the recruitment of one Industrial PhD candidate as well as two postdoctoral fellows (Torres Quevedo Fellowship).The product developed (patent PCT/ES2017/010263) is currently being used in clinical trials as an adjuvant in cancer patients.

2. EIT Food Innovation Projects

IMDEA Food role within EIT Food guides and accelerates the innovation process that will transform the food system. We are committed to overcoming low consumer trust, creating consumer-valued food for healthier nutrition through Precision Nutrition, building a consumer-centric connected food system and enhancing sustainability through promoting a circular Bioeconomy.

ChiLd MicroBes predict how to stay away from Obesity: CLiMB-Out

Overweight affects greater than 50% of the EU population and contributes to the development of chronic metabolic (type-2 diabetes) and cardiovascular disorders, which are leading causes of morbidity and mortality worldwide. Child obesity is of special concern as the number of overweight children has increased 10 fold in the last 40 years and, of those, 60% are expected to remain overweigh in adulthood. CLIMB-OUT proposes (1) to develop microbiome-informed predictive tools for early detection of obesity risk that facilitate the implementation of lifestyle and dietary changes and (2) to co-design ad hoc educational and communication innovative programs to engage families and health care professionals in support for the adoption of healthy lifestyles across different societal environments. To this end, CLIMB-OUT undertakes a study of a large cohort of children in Southern European countries, which is deeply phenotyped using the latest advances in omics technologies and artificial intelligence in order to validate the preliminary findings of the EU project MyNewGut. The ultimate goal is to facilitate early detection of obesity risk and timely implementation and adoption of healthier diet and lifestyles across different societal environments to reverse the obesity epidemic.

3. Industrial PhD Projects

IMDEA Food is carrying out three projects, funded by the Madrid Regional Government through the *Calls for applications for industrial doctorates in Community of Madrid* , to promote innovation and technology transfer to industry:

Identificación de la actividad de compuestos activos de la Miracle Berry sobre la modulación de rutas implicadas en enfermedades crónicas no comunicables. Validación del uso de Sweetalin® en una Nutrición de Precisión efectiva en la promoción de la salud (IND2018/BIO-10097).

Researcher: Sonia Wagner

The project aims to add value to the nutritional products derived from the Miracle Berry (MB) by basing this value on solid scientific studies by studying the molecular pathways involved in the bioactive effects and their functional impact on the cell. The effect of MB-derived products as Novel Food will be analysed holistically using "omics" based strategies and assessed from a Precision Nutrition perspective, taking into account individual gene and genomic characteristics.

Desarrollo y validación de formulaciones nutricionales como complementos terapéuticos en enfermedades crónicas relacionadas con la alimentación (IND2017/BMD-7857)

Researcher: Adrián Bouzas

The project aims to design and develop new formulas for humans, effective in the regulation of the molecular mechanisms of cellular cholesterol transport and the activation of fatty acid synthesis, fundamental routes in the development of cancer, obesity and metabolic syndrome, to achieve high added value food products, highly effective as nutritional supplements aimed at improving the treatment of these diseases.

Identificación del efecto molecular de extractos de plantas para el desarrollo de nutracéuticos eficaces en nutrición de precisión frente en la prevención y el tratamiento del envejecimiento y sus enfermedades crónicas asociadas (IND2017/BIO-7826).

Researcher: Marina Reguero

Study of plant extracts in precision nutrition within the field of metabolic nutrigenomics. Different phytochemicals effective in the treatment and/or prevention of the ageing process and its genetic predisposition, especially related to chronic metabolic diseases such as obesity, have been precisely selected. The main objective is to analyse the modulation of specific molecular targets to improve the population's metabolic profile.

4. Innolink Project

This initiative is part of the framework of Linking Entities in Innovation promoted by Comunidad de Madrid. Its goal is to potentiate and energize the Food ecosystem within the Madrid region by facilitating the necessary networking capabilities IMDEA Food holds through its participation in the EIT Food consortium. The project allows the involvement of the food sector from the Madrid region in different activities developed under the umbrella of EIT Food to push the internationalization of this ecosystem and, at the same time, attract innovative talent to generate new businesses based on technological innovation. Our vision is to develop a transversal technology platform of precision nutrition innovation risen from sound scientific research. This platform will promote collaboration among the various stakeholders from the food, precision nutrition, and health sectors, and constitute a node to collate the knowledge, stakeholders, and technology implicated in the advancement of translational research in the precision nutrition arena. This node will function as a tractor for innovation within a consolidated food ecosystem, give support to technology-based newly generated businesses on Precision Nutrition, and attract genetics and health-related industries interested in partaking in the nutrition field.

5. InnoHealthFood Project

After several decades of searching for a health-promoting diet, the population has not yet benefited from a truly effective healthy diet. It has been 40 years of the FOSHU Program in Japan that aimed to improve health through nutrition. But it is only in the 21st century that science has generated the basic knowledge that is key to making food strategies and products as tools for health care. The discovery of the genetic code, published in February 2001, was transformative, giving rise to Genomics and Metagenomics, basis of Precision Nutrition or nutrition tailored to the characteristics of individuals according to their genetic profile and physiological situation. INNOHEALTHFOOD is an integrated structure of means to support the food industry in bringing Precision Nutrition strategies and products to the market.

unit

Education

Head of Unit

Maria Jesús Latasa Sada

Head of Education Programmes EIT Food UAM-IMDEA Food

Ph.D. in Pharmacy, specialty on Biochemistry and Molecular Biology. Her work is focused in the effect of diet on the regulation of microRNAs and other non-coding RNAs expression. Development of R&D&I activities to promote Innovation around nutrigenomics and nutrigenetics to implement Precision Nutrition – based strategies. Management and implementation of educational activities around Food Innovation through international and national programmes.

IMDEA Food is greatly involved in many education activities, promoting and implementing different programmes along with various EIT Food partners. These programmes are aimed at current and future students as well as professionals either wanting to work or already working in the food sector. They are designed together with industry professionals and entrepreneurs to offer:

- **career development** by taking part in a range of courses for professional development to keep up-to-date and develop new skills.
- **global challenges solving skills** by co-creating new solutions to transform the food system and have real impact in the world.
- **business creation and growth** with our courses for entrepreneurs and SME owners, helping you to transform towards a more sustainable future.
- **learning** by joining one of our online courses about the food system and how future trends will change how we produce and consume food.

Projects in Focus

Food Systems Master of Science Programme (MFS)

Participants will develop in-depth knowledge about food systems through studying consecutively at three distinct European academic institutions and use your knowledge to drive the future transformation of the food system. The programme is based on a combination of essential entrepreneurial skills, which helps participants to become an effective innovator, and key technical skills that are tailored to their career ambition in the sector.

Global Food Venture Programme (GFVP)

EIT Food's flagship Global Food Venture programme is a dedicated offering to Doctoral Students across Europe working on food system challenges, offering a 6-month curriculum designed to address the needs of aspiring entrepreneurs and early phase start-up ventures from PhD students.

European Food Systems Education and Training (EFSET)

This programme addresses the increasingly challenging array of food-related problems, such as food waste or malnutrition. Through multidisciplinary and collaborative approaches that simultaneously target different parts of the food system, the course gives postgraduate students the confidence and skills necessary to bring about positive change. EFSET provides students at European universities unique and exciting opportunities to address real-world Food System Challenges set by industry partners.

RIS Professional Development: WE Lead Food

This programme is creating a network of women leaders who wish to drive change, innovation and sustainability within the food sector as we face supply chain challenges. The WE Lead Food Programme is designed to equip the participants with the tools to make that difference and achieve results. The network is open to all discipline backgrounds; research, business, policy, civil society members.

Cross-KIC Strategic Education

Supported by the European Institute of Technology (EIT), this Human Capital project, which focuses on innovation in education and on digital skills and competencies, is an EU-wide effort to build bridges between research communities in climate, energy, food, health, manufacturing, raw materials, urban mobility and digital technologies. IMDEA Food specifically participates in the WP4 Consumer & Customer Engagement (Healthy Citizen and Consumer Engagement) developing and implementing new digital educational and engaging tools to divulge healthy food habits.

Open call for online courses: "Nutrition: Health and Sustainability" (SPOC)

This course has been developed for medical students or people working in health and wellbeing sector to explore the relationship between nutrition, health and sustainability, and understand how healthy eating can prevent disease.

RIS Inspire Programme

This programme aims to build a critical mass of new talent in Regional Innovation Scheme (RIS) countries. This will help to fill the current gap in scientific, entrepreneurial and managerial skills with capable multidisciplinary talent able to take on the challenges faced by the agrifood sector.

This project developed three Schools which were aimed at graduates from a range of disciplines in RIS countries, specifically designed to increase knowledge and innovation generated about food systems and to foster greater societal engagement, eventually developing a knowledge lab and an open-innovation ecosystem. The schools covered three different focus areas:

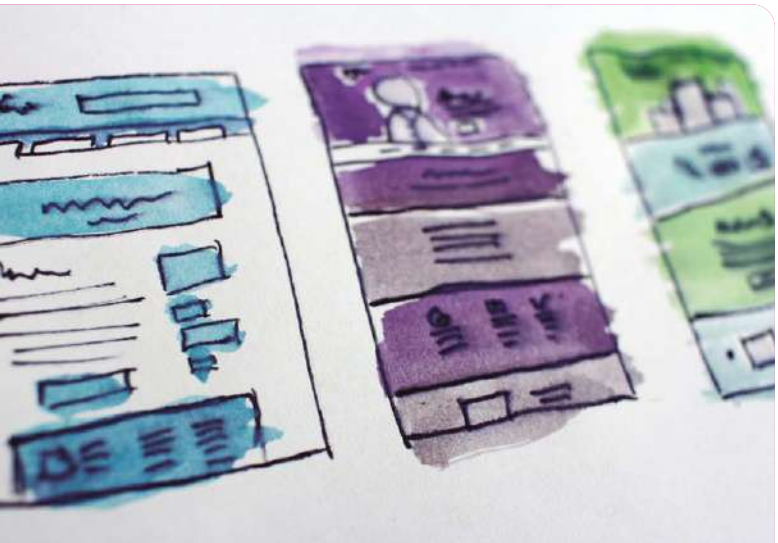
- Targeted Nutrition
- Transparent Food Chains
- Circular Business Models

The model is designed to develop skills and capabilities based on entrepreneurship, as well as enhance knowledge relating to the different issues facing the agrifood sector. This approach involves making each student a co-builder of their own knowledge with collaborative and problem-solving oriented learning. Importantly they will become aware of the different phases involved in knowledge building, using a path of planning for skills development (from ideation to business creation). IMDEA Food actively participated in the designing and content development in the School related to Targeted Nutrition.

Food Solutions: FoodFE

Food Solutions brings together multi-disciplinary teams to tackle real-life industry challenges and develop innovative new solutions for the food system. Participant teams are mentored by industry experts and lessons delivered by the academic partners to equip them with the specialist knowledge they need to tackle their challenge. This is paired with a thorough course on innovation and entrepreneurship, led by world experts, to take students through their entrepreneurial journey from scoping out a potential market to pitching their final concept to industry at the end of the programme.

FoodFE (Food for the elderly) programme aimed to design novel food products for the elderly addressing issues of loss of taste, palatability and efficiency of nutrient uptake.



HEI Initiative: Innovation Capacity Buiding for Higher Education

This initiaive is a key objective for the EIT as part of its new strategy, the EIT Strategic Innovation Agenda (SIA) 2021-2027. The initiative aims to support higher education institutions with expertise and coaching, access to the EIT innovation ecosystem, and funding, enabling them to develop innovation action plans complementing the needs of individual higher education institutions. The initiative is a joint EIT Community activity coordinated by EIT Raw Materials. The Pilot Call for Proposals 2021 invited European higher education institutions to design institution-wide action plans that will improve their entrepreneurial and innovation capacity across all institutional levels. By supporting such activities, this new EIT initiative aims to create systemic impact, empowering HEIs to become regional engines of innovation and foster sustainable growth and jobs across Europe. The activities can focus on several themes, including:

- Fostering institutional engagement and change
- Strengthening partnerships between higher education, business and research organisations
- Developing innovation and business support services
- Enhancing the quality of entrepreneurial education
- Creating and disseminating knowledge

IMDEA Food is part of the HEADLINES (Higher Education Accelerating Directed Learning in Nurturing Entrepreneurship) consortium within the HEI Initiative along with Universidad de Burgos, Universidad Autónoma de Madrid, Munster Technological University, Centria (University of Applied Sciences) and Mashauri. The partnership developes and implements different activities promoting entrepreneurship among stdents, academics and researchers along the Food and Health sectors.

Communication

Head of Unit

Sara Castillo Alonso
Head of Communication Programs
EIT Food IMDEA Food

Bachelor's degree in Economics. Her work is focused in Dissemination activities and communication projects linked to research, education, innovation and business creation programmes. Development of international and national projects, to disseminate scientific and innovation results around Precision Nutrition. Encouraging the promotion of a healthier and sustainable Nutrition to improve the well-being of society.

IMDEA Food aims to disseminate the Institute research results, leading to changes in society's behavior and attitudes towards a healthier and more sustainable food system. There is a low flow of information among scientists, industry and end-users, which delays knowledge transfer, and prevents citizens from partaking in the creative process driving innovation. The communication group aims to catalyze the interaction between the IMDEA Food research community and relevant stakeholders.

The Institute, along with EIT Food vision, is building an inclusive and innovative community where the consumer can be actively involved. Together, we can deliver an innovative food sector that produces healthy and sustainable food and is trusted by society. All the communication activities are designed to engage with people to become agents of change in the food system.

Projects in Focus

The AnnualFoodAgenda

food annualagenda

IMDEA Food participated as a partner in the different international consortia for several EIT Food projects, but for #AnnualFoodAgenda, IMDEA Food has acted as the leading partner, coordinating the various events that took place during the implementation of this Communication activity.

The AnnualFoodAgenda encourages consumers to think about the food they eat, increasing their knowledge of the entire value chain and linking healthy diets to an active and healthy lifestyle, as well as to a healthier planet.

The project encompasses a series of interactive events, which provide a space to explore food topics with large numbers of people across Europe. Events taking place include interactive exhibitions, scientific cafes and hands-on activities and are designed to inspire debate and foster dialogue between experts and consumers.

In 2021 this project was developed in 6 countries simultaneously, designing, planning and implementing quarterly events. Every quarter the events shared a common general topic, such as Healthier Nutrition, Circular Food, Alternative Proteins and Sustainable Agriculture amounting to a total of 30 events developed during 2021.

Proof of Concept: Prevention strategies for social engagement and healthy ageing

This Proof of Concept (PoC) for Public Engagement is a programme designed to develop a set of new experiences related to food, nutrition, and health, helping to prevent or retard the onset and progression of NCDs and/or ameliorate their effects.

The aim is to connect with a big range of citizens stratifying and developing programmes and activities according to age, and designed by experts on precision nutrition and food science, gastronomy experts and chefs, and specialists in ageing and prevention of Non Communicable Diseases.

Proof of Concept: Picture your microbes: A co-creation participatory action to empower citizens on nutritional health decisions

Picture your microbes is the project that connects science and photography. The main objective is to raise awareness among citizens with risk factors for developing non-communicable diseases, in particular people who are overweight or obese, by raising awareness about the importance of taking care of the bacterial communities (microbiome) that live in our bodies.

"#PictureYourMicrobes is a participatory action project to motivate citizens to implement healthy lifestyle habits."

Proof of Concept: Food Imaginarium: Promoting healthy eating habits

How can we influence children towards healthy food choices? A positive connection to food, nutrition, sustainability and education on where food comes from, contribute to how children can be healthier food consumers in the future. Food Imaginarium is an effective and engaging platform for children, a space devoted to stimulating and cultivating the imagination of children around food. Children are exposed to a virtual world where they can experience the innovations of the food sector and get insight on healthy food and their dietary benefits. This is a new approach in the food area to get children positively involved with food.

Proof of Concept: Peers4Food Peer engagement design to Improve societal health and to reduce childhood obesity

The project aim is to build "smart food training" (SFT) which includes a shared diet, shared physical exercise and individual psychological support designed to accompany and progressively empower teenagers, so that they can be independent and proactive in their journey of losing weight and, above all, adopt healthy habits: smart and good food, fun exercise, positive relationships and supportive friendships.

The project focuses on the active engagement of teenagers aged between 14 and 18, with a longitudinal snowball design useful for evaluating changes towards a healthier food habits and lifestyles, and the expansion of the support network between the participants, who could later become peer mentors. These are teenagers who, having experienced being overweight/obese, are a precious resource that can be used as a "mentor" or "friend" for new peers who have never previously been engaged.

Personnel

Lorena Carrillo
Comunication Programs Manager EIT Food-IMDEA Food

Carolina Rodríguez
Innovation and Communication INNOLINK Project Manager

Carmen Hernández
Communication Programs manager for EIT Food Education Projects

Sonia Wagner
Predoctoral researcher Industrial doctorate project

Marina Reguero
Predoctoral researcher Industrial doctorate project

Adrián Bouzas
Predoctoral researcher Industrial doctorate project

Lara Pérez Martínez
Postdoctoral Researcher (Torres Quevedo)

Elena Díaz Rubio
Postdoctoral Researcher
Metabolomic expert

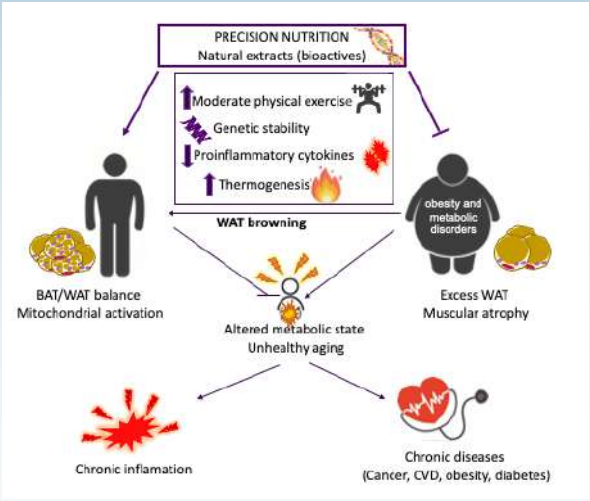
Manuela Fuentes
EIT Food Financial Officer

Innovation, Communication and Education Unit

Highlight

Innovation in Precision Nutrition: from the laboratory to the industy

Globally, the average life expectancy has increased exponentially, leading to an increased occurrence of diseases such as cardiovascular disease, obesity and cancer. In this process, one of the main factors involved is inflammation throughout the body, especially in fatty tissue, which loses its function, leading to metabolic imbalance. This means that there is an urgent need for therapeutic options, not only through drugs, but also through strategies based on precision nutrition, taking into account the genetic background of each individual. Thus, in Marina Reguero's industrial doctoral thesis carried out at NATAC, the therapeutic potential of twenty natural plant extracts was evaluated by studying their effect on improving energy metabolism in fat and muscle tissue, key tissues in disorders such as obesity and diabetes. This PhD thesis has reported that extracts of milk thistle and pomegranate improved lipid metabolism, inflammation, energy expenditure, mitochondrial metabolism and insulin sensitivity, both molecularly and functionally in cell and animal models. Thus, the findings of this research suggest that these natural extracts could be used as an effective tool in precision nutrition to reduce the metabolic stress associated with accelerated ageing.



Boosting Innovation-to-Entrepreneurship mindset through Education

Transference of research results and innovations to society and industry is a fundamental part of IMDEA Food mission, although this key objective is not so easy to accomplish. In order to fill the gap between research and consumers, researchers require certain entrepreneurship skills which are not usually included within academic curricula. The Education Group implements various programmes to provide the necessary skills that will enable scientists to take their ideas to the final consumer through entrepreneurship. The different activities target specific science professionals to adapt the content to their various knowledge and experience levels. The unit provides activities for both undergraduate and PhD students, as well as early and late stage PhD researchers. From idea co-creation to market analysis, these programmes aim to build an entrepreneurial mindset around science-based innovation. Our experience in previous and ongoing entrepreneurship programmes in the food arena has allowed our participation in a novel EIT initiative called HEI (Higher Education Institutions) Initiative. Through this new pro-

gramme, IMDEA Food participates in the HEADLINES (Higher Education Accelerating Directed Learning in Nurturing Entrepreneurship) consortium, helping building an entrepreneurial mindset in the Food and Health sectors.

Comunicating Innovation

Since 2019, the EIT Food #AnnualFoodAgenda project has developed a yearly plan of interactive events aimed primarily at the general public and families. The project has increased consumer confidence in the food system, encouraging attitudes towards healthy and sustainable food. In 2021 the themes of the events were: Circular Food System, Alternative Proteins, Targeted Nutrition and Sustainable Agriculture.

2021 was the final year of this project, in which 12 partners took part, carrying out more than 100 events with the direct participation of more than 8,000 people in 6 countries, 4 of them belonging to RIS areas.

The events were conducted in close collaboration between industrial partners, academia, research centres and two EIT Food CLCs.

All the events were designed following different cocreation dynamics to encourage interaction between consumers and the different agents of the food system (researchers, farmers or food manufacturers, among others). The aim was to promote informed consumption choices and develop critical thinking, encouraging changes in behaviour for healthier and more sustainable food.

In the aftermath of the pandemic, increased consumer interest has been identified in healthy eating to protect them from disease, and more sustainable food consumption and production to protect the planet.

The end of #AnnualFoodAgenda in December 2021 completes a three-year cycle of communication activities that have allowed the partners to develop a network of collaborative contacts with professors and different entities. Together with the learning tools and materials created, these will serve as a lever for the implementation of future activities by the partners in line to promote healthy and sustainable food consumption and production.

GENYAL Platform of Clinical Trials in Nutrition and Health

Programme Director

Dr. Ana Ramírez de Molina
Deputy Director of IMDEA Food

Ph.D. in Molecular Biology

Goal and vision

The Platform for Clinical Trials in Nutrition and Health (GENYAL) constitutes a high-level scientific tool to assess the biological activity and health properties of food, supplements, targeted nutritional strategies and functional foods, taking into account the specific characteristics of population subgroups. Thus, GENYAL is a specialized platform for clinical trials in Precision Nutrition.

Both observational and clinical intervention studies involving healthy subjects and those with pathologies can be performed (obesity, diabetes, dyslipidemias, celiac disease, etc.), both in adults and childhood. We investigate how individual characteristics (genetics, microbiome, physiology, etc..) interact with nutrients and food components, in order to provide specific recommendations and products to promote health.

GENYAL caters Spanish and foreign research groups and companies working on nutritional genomics and targeted nutrition, interested in:

- Nutritional intervention studies required for product development or for obtaining official approval of the nutritional and health claims made for products.
- The generation of the information needed to provide added value to new and existing products (e.g., the identification of new indications and the most appropriate target groups of population). Main activities include postprandial response to different functional food and bioavailability components studies in humans, or the determination of the effectiveness of nutritional products in health promotion taking into account specific characteristics that might condition efficacy.
- The identification of (mainly) genetic or metabolic markers involved in the response to product consumption. Analysis of the interaction among genotype-microbiota and food components.
- Targeted nutrition for specific populations, including both, health (childhood, post- menopausial period, sport performance, etc..) and disease (obesity, metabolic syndrome, dyslipemias, etc..).

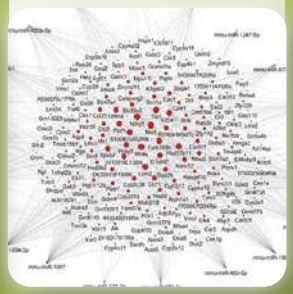
GENYAL
PLATAFORMA DE GENÓMICA NUTRICIONAL Y ALIMENTACIÓN

Nutrition & Clinical Trials Unit

Nutritional Genomics & Health Unit

Head of Unit

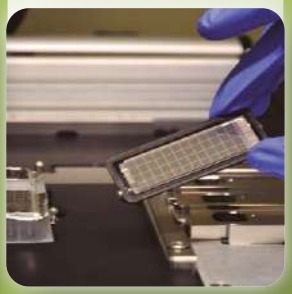
Dr. María Isabel Espinosa



Biostatistics And Bioinformatics Unit

Head of Unit

Dr. Gonzalo Colmenarejo



Genyal Lab

Lab Manager

Dr. Susana Molina

Units and lab

research group

Nutrition & Clinical Trials

The Nutrition and Clinical Trials Unit (Registered in the Community of Madrid with number CS13175 (13/05/2015) conducts nutritional intervention studies designed to evaluate the biological activity and health properties of functional foods/bioactive compounds and diets in humans.

This Unit designs and develop nutrition programs to improve or maintain the health of adult and child population, developing preventive tools against obesity, as well as other high prevalent diseases.

Projects in Focus

GENYAL Study. Childhood obesity prevention

The main objective of this study is to design and validate a machine learning-based predictive model that identifies children who would benefit most from actions aimed at reducing the risk of obesity and its complications, considering both environmental and genetic factors, and applicable at the beginning of the school stage. The nutrition education developed in the intervention's schools will be also evaluated as part of the predictive model. The study is a cluster randomized clinical trial with 5-year follow-up.

Principal Investigator: Dr. Viviana Loria
Duration: 2017-2021
Funded by: IMDEA Food
Partners: Publics Schools Juan Zaragüeta, Fernando el Católico, Fernández Moratín, La Rioja, Concepción Arenal and Rosa Luxemburgo.

NUTRIPRECISION Study. Precision nutrition for healthy aging

This project aims to develop new food products and technology platforms to design precise nutritional strategies with the aim of effectively preventing ailments associated with ageing, and of improving the quality and lifestyle of older demographics. AMC Innova Juice and Drinks, Iberfruta Muerza, Hijo de José Martínez Somalo, Grupo ICA, Congelados de Navarra, Galletas Gullón and Europastry comprise the consortium of companies that unite six research centres and lead the new NUTRIPRECISION project.

Principal Investigators: Dr. Guillermo Reglero y Dr. Ana Ramírez de Molina
Funded by: CDTI Call: CIEN Ref. IDI-202160734
Partners: Consortium: AMC Innova Juice and Drinks S.L. (empresa líder), Iberfruta Muerza, S.A., Hijo de José Martínez Somalo, S.L., Grupo ICA, S.L., Congelados de Navarra, S.A.U., Galletas Gullón, S.A. y Europastry, S.A.

POLIMICROBIO

Metabolites and gut microbiota associated with polyphenol metabolism: Metabotyping of normal-weight and obese volunteers.

Principal Investigator: Dr. Juan Carlos Espín (CEBAS)
Principal Investigator: Dr. Ana Ramírez de Molina (IMDEA Food)
Funded by: CEBAS-CSIC
Partners: CEBAS-CSIC (Murcia) & IMDEA FOOD (Madrid)

Researchers

Dr. Elena Aguilar Aguilar
Postdoctoral Research and Senior Nutritionist
Ph.D. in Nutrition

Helena Marcos Pasero
Nutricionist and Predoctoral Researcher

unit

Nutritional Genomics & Health

Group Leader

Dr. Isabel Espinosa Salinas

Head of the Nutritional Genomics and Health Unit of GENYAL Platform. Senior Nutritionist

Ph.D. in Biology and Food Sciences. Her work is focused in measure and provide evidence of the effectiveness of precision nutrition strategies for health promotion.

The nutritional genomics and health unit aims to give a precision approach to classic nutritional strategies, based on the effect that genetics has on each person. The objective consists in evaluating and improving precision nutritional strategies to achieve greater adherence and effects of dietary treatments.

Projects in focus

AI4Food-CM
Artificial Intelligence for the Prevention of Chronic Diseases through Personalized Nutrition Personalized Nutrition

The main objective of AI4Food is to integrate all this information and develop new machine learning algorithms to generate a paradigm shift in the field of nutritional counselling. To this end, the Genyal Platform will carry out a nutritional intervention study with a crossover design that will include about 100 overweight and obese individuals, who will be monitored in a traditional and technological way for one month while they follow a hypocaloric diet to lose weight in a healthy way.

Coordinator Group Principal Investigator: Dr. Javier Ortega García (UAM)
No coordinator Group Principal Investigator: Dr. Enrique Carrillo (IMDEA Food) and Dr. Isabel Espinosa (IMDEA Food)
Duration: 01/07/2021-30/06/2024
Funded by: Community of Madrid Call: 2020 R&D Sinergy Grants Ref: Y2020/TCS-6654

ALIBIRD2020-CM mHealth Platform

Analysis of the applicability for an e-health platform and the impact on the follow-up of cancer patients: a pilot study in a sample of patients with advanced non-small cell lung carcinoma.

Principal Investigators: Dr. Enrique Gómez (UPM) and Dr. María Sereno (Hospital Infanta Sofía)
Principal Investigators at IMDEA Food: Dr. Ana Ramírez de Molina and Dr. Isabel Espinosa
Funded by: Community of Madrid and co-founded with European Union Structural Funds. Ref: S2018/BAA-4343
Partners: GBT (UPM), POL (HUIS), ONCOGENOM (IMDEA Food), INGREEN (UAM), NUTRINVEST (HULP), ALIMENTA (CSIC), GENYAL LAB (IMDEA Food)
Duration: 01/01/2020-31/12/2022
Web: https://www.healthtech.upm.es/es/plataforma-mhealth-alibird/

FNS-Cloud Food Nutrition Security Cloud: Cloud solution facilitates access to food and nutrition information

The main aim of the EU-funded FNS-Cloud project is to overcome fragmentation by federating FNS data on diet, health, and consumer behaviour as well as sustainable agriculture and the bio-economy. The implemented cloud solution will increase the exploitation of FNS knowledge and will contribute to reducing knowledge gaps that inhibit public health and agricultural policy. Furthermore, it will support the food industry in reducing development and production costs and increasing sustainable production. Ultimately, the cloud solution will facilitate informed and healthy choices by consumers.

Principal Investigator: Dr. Enrique Carrillo de Santa Pau
Duration: 2019-2023
Funded by: Horizon 2020 Call: H2020-EU.3.2.2.3 Ref: GA No. 863059.
Web: https://www.fns-cloud.eu/

MENOPAUSE

This project aims to determine the effect of daily consumption of a combination of different compounds to treat physical and psychological disorders that can appear in menopause. To this end, a double-blind, randomised pilot nutritional intervention study was carried out in women between 40 and 55 years of age.

Principal Investigators at Laguna University: Dr. Catalina Valdés Baizabal and Dr. Raquel Marín Cruzado.
Principal Investigators at IMDEA Food: Dr. Isabel Espinosa-Salinas and Ana Ramírez de Molina
Duration: 01/06/2021 – 31/12/2021
Funded by: Agustín de Betancourt Program. Laguna University. Department of Basic Medical Sciences. Faculty of Medicine.

Researchers

Jorge Fernández Cabezas
Research Assistant
Graduated in Human Nutrition and Dietetics

Gala Freixer Ballesteros
Research Assistants Nutritionist
Graduated in Human Nutrition and Dietetics

unit

Biostatistics and Bioinformatics

Group Leader

Dr. Gonzalo Colmenarejo
Biostatistics and Bioinformatics
Group Leader

ORCID ID: 0000-0002-8249-4547.

Ph.D. in Biology (Complutense University, Spain); M. Sc. in Biostatistics and Bioinformatics (Open University of Catalonia, Spain). Before joining IMDEA FOOD, he was a postdoctoral researcher in the University of California at Berkeley (Chemistry Department), and afterwards investigator in GlaxoSmithKline for 17 years (Computational Chemistry and Cheminformatics Departments). His work is focused in the Cheminformatics of bioactive compounds (foods, drugs, and metabolites), using Statistical, Machine Learning and Deep Learning methods together with Computational Chemistry and/or experimental data: structure-activity/property models, generative molecular design, virtual screening, pharmacophore building and molecular simulations.

The Biostatistics & Bioinformatics Unit collaborates with the different groups in IMDEA Food and external groups in order to perform complex Bioinformatic analyses: phenotype/genotype associations, identification of biomarkers, the analysis of microarray data, RT-qPCR analysis, next-generation sequencing (NGS), etc; as well as Biostatistical analyses: multivariate analyses, design of experiments, longitudinal analyses, survival analyses, Machine Learning and Deep Learning; and Cheminformatics analyses: virtual screening, QSAR, hit expansion, pharmacophore generation, etc. In addition, their members develop their own research lines, on Artificial Intelligence in Molecular Design, and on new bioinformatics tools for Nutritional Genomics research. Their members are part of the Biostatnet Spanish network in Biostatistics (https://biostatnet.com/en), and the Unit is a member of the ES-OPENSCREEN Observatory of drug discovery capabilities in Spain (https://www.es-openscreen.com/partner/imdea-food-biostatistics-bioinformatics-unit/).

Projects in focus

Cheminformatics of bioactive compounds

Cheminformatics of bioactive compounds (foods, drugs, and metabolties), using Artificial Intelligence (AI) methods together with Computational Chemistry approaches and/or experimental data: structure-activity/property models, generative molecular design, virtual screening, pharmacophore building and molecular simulations. Aiming at modeling and predicting the chemical biology of these molecules and their effect on human health. By using generative AI, these models will aid in the design of novel bioactive molecules with improved efficacy and tailored functionality.

- Identification of mechanisms of action of bioactive compounds through computational approaches.
- Structure-activity/property modeling.
- Generative design of new molecules with improved properties or activities using AI.

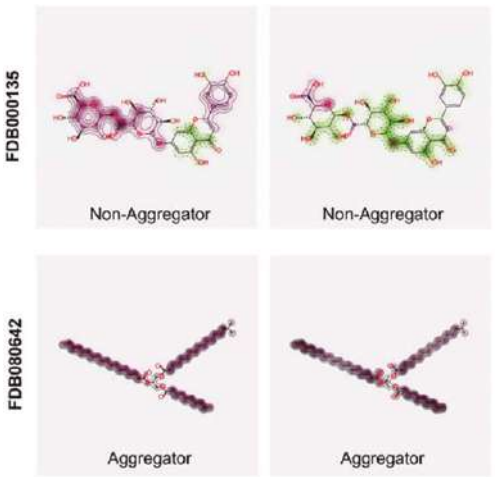


Figure. Fragment contribution to aggregating behavior of two food compounds: The color of contours indicate the direction and strength of the contribution: magenta for aggregation and green for nonaggregation. (Sánchez-Ruiz, A.; Colmenarejo, G. "Updated prediction of aggregators and assay-interfering substructures in Food compounds" (2021) J Agricultural & Food Chem. 69, 15184–15194

Bioinformatics analysis of nutrigenomics data

- Computational analysis of massive gene expresión data.
- Data integration for functional interpretation of omics data.
- Modelling of molecular networks to interpret associations between multi-omics data.
- Integrative analysis of nutrigenomics experiments using distinct data mining techniques.
- Development of algorithms and web-based applications for the study of molecular nutrition.

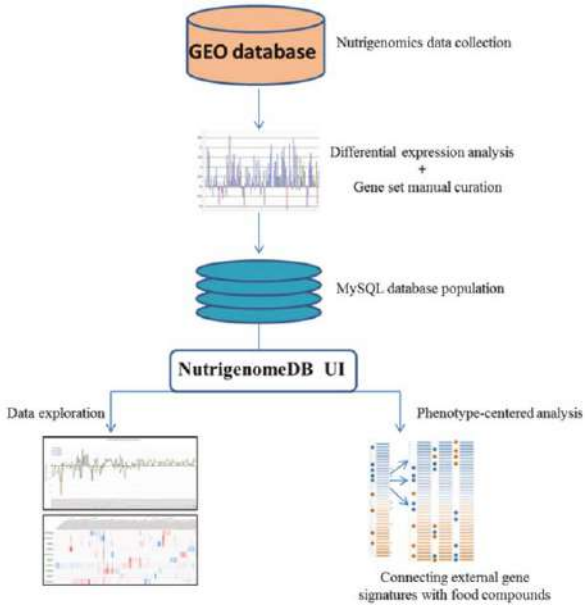


Figure. NutrigenomeDB platform for analysis of nutrigenomic data (https://nutrigenomedb.org/). R. Martín-Hernández, G. Reglero, JM. Ordovás, A. Dávalos. NutriGenomeDB: a nutrigenomics exploratory and analytical platform. **Database (Oxford),** *Volume 2019, 2019.*

Researchers

Dr Roberto Martín-Hernández

Postdoctoral researcher and Senior Bioinformatician.

PhD in Nutrition Sciencies (Autonomous University of Madrid, Spain), M.Sc. in Biochemistry & Biotechnology (Paul Sabatier University, Toulouse, France).

Andrés Sánchez-Ruiz

Research-Assistant

Graduate in Biotechnology (Rovira I Virgili University, Spain). M.Sc. in Translational Medicine (Barcelona University, Spain), and M.Sc. in Biostatistics and Bioinformatics (Open University of Catalonia, Spain).

GENYAL Lab

Group Leader

Dr. Susana Molina Arranz

Lab Manager and Technical responsible of the Genomic Laboratory

Susana Molina Arranz, performed her PhD studies in the group of Prof. Luis Carrasco at the "Centro de Biología Molecular Severo Ochoa" (CSIC-UAM). Between 2007 and 2009 joined to research groups as Dr. Juan M. Torres group at "Centro de Investigación en Sanidad Animal" (INIA), and Fernando Valdivieso group at the "Centro de Biología Molecular Severo Ochoa" (CSIC-UAM). During all these years she acquired experience in cell culture, as well as several techniques in molecular biology such as nucleic acid extraction from various types of samples, cloning, or PCR. In 2009 started in IMDEA Food as the Technical responsible of the Genomic Laboratory, working both in the research line about nutritional genomics of cancer, as well as in GENYAL Nutrigenomic Laboratory.

The Genomics Laboratory has the necessary infrastructure for providing genetic and genomic services, as well as metabolomic analysis, providing technical and scientific support to researchers and private companies.

The Genomic Laboratory GENYALLab has the accreditation as Genetics Unit U.78 and is member of REDLAB, the laboratories network of the Community of Madrid, under the registration number 440: (http://mcyt.educa.madrid.org/laboratorios/busquedas/comun/FichLab.asp?-Clabo=440)

GENYAL Lab
PLATAFORMA DE GENÓMICA NUTRICIONAL Y ALIMENTACIÓN

REDLAB
RED DE LABORATORIOS
Nº Registro: 440

This Laboratory is equiped with appropriate devices for sample processing and nucleic acid extraction and quantification, as well as the latest hardware for gene expression and high-performance genotyping analysis, such as the latest

GENYAL Platform of Clinical Trials in Nutrition and Health

generation QuantStudio™ 12K Flex System apparatus. Other equipments for genomic analysis include qPCR 7900HT and conventional PCRs.

These devices have different applications, such as digital PCR, DNA fragment analysis, expression/gene quantification analysis, allele discrimination using TaqMan probes, and the detection of SNPs and mutations, etc.

In addition, the laboratory has specific equipment for analyzing metabolites with different techniques such as chromatography (Agilent 1260 HPLC system), cellular metabolism measurement (Seahorse XFe96 and Seahorse HS Mini), or simultaneous detection and quantitation of several secreted proteins (Luminex MAGPIX® System). Recently, an Illumina iScan equipment has been acquired for use in DNA methylation assays, as well as whole-genome and population genotyping studies, and CNV detection.

All these techniques provide a high value added tool in nutrigenomic and nutrigenetic studies, to achieve effective Precision Nutrition.
https://www.alimentacion.imdea.org/services/Platform-Clinical-Trials-Nutrition-and-Health/Genomics-Laboratory

Projects in focus

GENYAL LAB participates in ALIBIRD2020-CM project (S2018/BAA-4343): "Therapeutic formulas of precision nutrition for cancer", supported by program call of R & D Activities among Research Groups of the Community of Madrid (Technologies 2018) and co-financed with European Union Structural Funds (https://alibird.org/2020-CM/consorcio/)

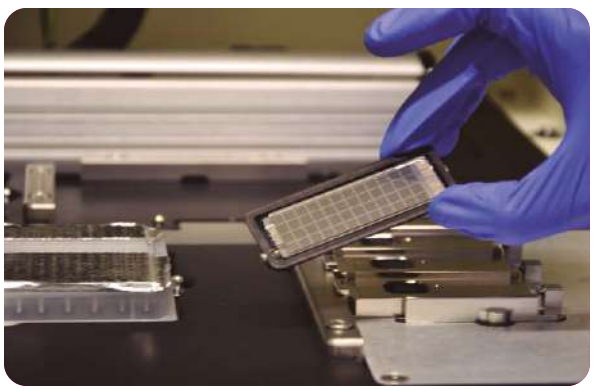
ALIBIRD2020-CM
S2018/BAA-4343
Comunidad de Madrid
UNIÓN EUROPEA
FONDOS ESTRUCTURALES
Invertimos en su futuro

Staff

Mónica Gómez Patiño
Biosafety and occupational risk prevention Manager. Senior Lab Technician

Dr. Carmen Crespo Lorenzo
Postdoctoral researcher and senior program technician

Ph.D. in Pharmacology and Physiology



Scientific highlights

Artificial Intelligence for the Prevention of Chronic Diseases through Personalized Nutrition Personalized Nutrition: AI4FoodCM

Artificial Intelligence for the prevention of chronic diseases through personalized nutrition (AI4Food) project will develop a series of enabling technologies to process, analyse and exploit a large number of biometric signals indicative of individuals' habits, phenotypic and molecular data. The main objective of AI4Food is to integrate all this information and develop new machine learning algorithms to generate a paradigm shift in the field of nutritional counselling. This project seeks to develop a new generation of digital tools to assist in personalized decision making in the field of nutrition. These tools will allow a more objective and effective assessment of individuals' nutritional status, helping experts to propose changes towards healthier eating habits from general to personalized recommendations that will be more effective and sustained over time for the prevention of chronic diseases.

For this purpose, we designed an interventional study with cross-over design that will include nearly 100 overweight and obese individuals, which will be monitored for a month while following a hypocaloric diet for healthy weight-loss. Participants are going to be randomized in two groups. The first group will start collecting data via questionnaires (traditional method) for the first two weeks, and switch to the digital data-collection method for the last two weeks (uploading pictures of their diet with a smartphone, wearing a glycemic sensor and using a smartwatch which records a wide range of parameters such as skin temperature, breathing rate, blood oxygen saturation, heart rate, sleep cycles, it can track until 20 different exercise activities, steps and active time, among others). Conversely, the second group will perform the data-collection on the opposite order. The intervention consists of three follow-up visits in which clinical, anthropometric, lifestyle, biochemical, metabolomic, lipidomic, genetic and metagenomic data will be obtained.

This project will allow us to gain knowledge on 1) which are the sensor-dependent and sensor-independent biomarkers that work best for nutritional modelling of human behaviour and habits 2) when, that is, under what circumstances (e.g., user habits, signal quality, context, phenotypic and molecular data), and 3) how can we best leverage those signals and context information to improve nutritional recommendations.

AI4FOOD-CM (Y2020/TCS-6654): Artificial Intelligence for the Prevention of Chronic Diseases through Personalized Nutrition" project is funded by the 2020 call for R&D Synergistic projects, of the Community of Madrid.

Publications

Espinosa-Salinas I, Colmenarejo G, Fernández-Díaz CM, Gómez de Cedrón M, Martinez JA, Reglero G, et al. Potential protective effect against SARS-CoV-2 infection by APOE rs7412 polymorphism. Sci Rep. 4 de mayo de 2022;12(1):7247.

Espinosa-Salinas I, Fernández-Cabezas J, Fernández-Díaz CM, Reglero G, Martínez JA, Molina AR de. Test nutrigenéticos como herramienta para una alimentación de precisión. Revista Española de Nutrición Humana y Dietética. 26 de diciembre de 2021;25:18-9.

Management Unit

Unit Director

Alejandro Arranz Calvo
General Manager

Personnel

Inmaculada Galindo Fernández
Programme Coordinator

Roberto Huecas Sotelino
Financial and Procurement Manager

Mónica Gomez Patiño
Head of Occupational Risk Prevention and Covid-19 Prevention Plan Manager.

Gema Alegre Pulido
Accounting Manager

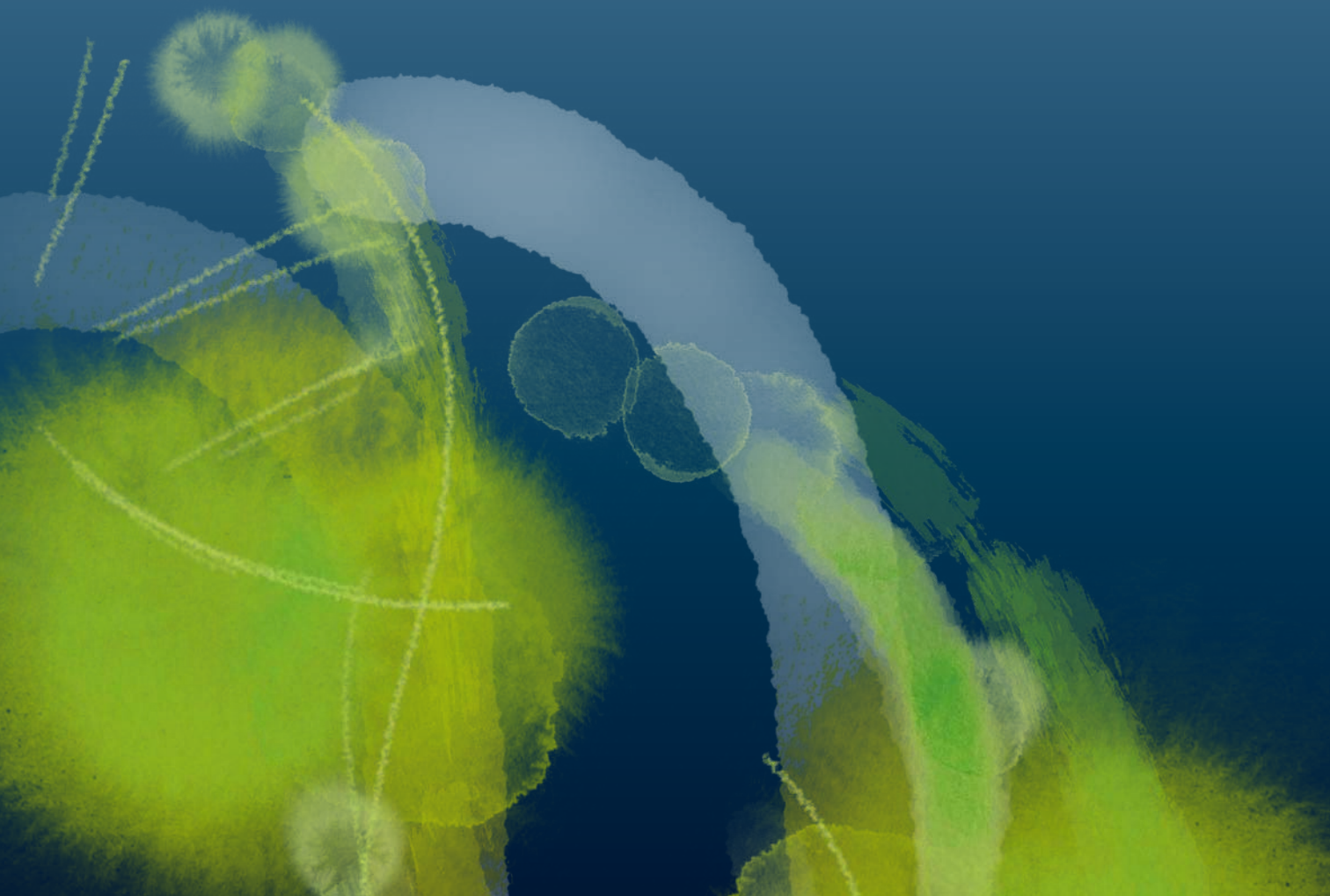
Mar Mesas Ruiz
R&D Project Management Technician

Álvaro Ruiz Cuevas
Infrastructure and Services Manager

Leyre Soler Castelló
R&D Talent Project Management Technician

Management Unit

annex



1. R&D projects and contracts

1.1. International Projects

Horizon 2020 - European Cooperation in Science and Technology (COST)

Title: European Epitranscriptomics Network (EPITRAN)
Principal Investigator: Dr. Alberto Dávalos
Duration: 29/03/2017-18/09/2021
Funded by: European Union´s Horizon 2020 research and Innovation Programme. European Cooperation in Science and Technology (COST).
Call: COST Actions Ref: CA16120
Web: https://www.cost.eu/actions/CA16120/

Title: Identifying Biomarkers Through Translational Research for Prevention and Stratifica Prevention and Stratification of Colorectal Cancer (TRANSCOLOCAN).
Principal Investigators: Dr. Ana Ramírez de Molina and Dr. Marta Gómez de Cedrón
Duration: 01/10/2018-30/09/2022
Funded by: European Union´s Horizon 2020 research and Innovation Programme under European Cooperation in Science and Technology (COST).
Call: COST Actions. Ref: CA17118
Web: https://www.cost.eu/actions/CA17118/

Title: Statistical and machine learning techniques in human microbiome studies (ML4Microbiome)
Principal Investigator: Dr. Enrique Carrillo de Santa Pau
Duration: 22/02/2019-21/02/2023
Funded by: European Union´s Horizon 2020 research and nnovation Programme under European Cooperation in Science and Technology (COST).
Call: COST Actions. Ref: CA18131
Web: https://www.cost.eu/actions/CA18131/

Title: European Venom Network (EUVEN)
Principal Investigator: Dr. Maria Ikonomopoulou
Duration: 06/10/2020-05/10/2024
Funded by: European Union´s Horizon 2020 Research and Innovation Programme under European Cooperation in Science and Technology (COST).
Call: COST Actions. Ref: CA19144
Web: https://www.cost.eu/cost-action/european-venom-network/

Horizon 2020 – Societal Challenge 2

Title: Food Nutrition Security Cloud (FNSCloud)
Principal Investigators: Dr. Enrique de Santa Pau
Duration: 01/10/2019-30/09/2023
Funded by: European Union´s Horizon 2020 research and innovation Programme.
Call: H2020-SFS-2019-1 Ref: GA No. 863059
Web: https://cordis.europa.eu/project/id/863059

ESCMID

Title: Profiling hostmicrobiome interactions in non-responding Celiac Disease symptoms persistence.
Principal Investigators: Dr. Laura J Marcos Zambrano
Duration: 01/04/2020-31/12/2021
Funded by: ESMID Organization
Call: ESCMID 2020 Research Grants Ref: GAA-2020
Web: https://www.escmid.org/

EIT Food 2021

Co-funded by the European Union

Title: Food System Master of Science Program
Principal Investigators: Dr. Maria Jesús Latasa
Duration: 01/01/2018-31/12/2021
Funded by: EIT Food. Call 2021. Ref: 18249-21
Partners: UNITO, UAM, Warsaw University, Hohenheim University, Reading University, Queen's University of Belfast, IARFR PAS, Lund U, U. Aarhus, IMDEA Food, EIT Food ivzw.

Title: The #AnnualFoodAgenda
Principal Investigator and Consortium Leader: Sara Castillo
Duration: 01/01/2019-31/12/2021
Funded by: EIT Food. Call 2021. Ref: 19169-21
Partners: IMDEA Food, Grupa Maspex, Food Banks, CLC South, Grupo AN, UAM, Cambridge University, IARFR PAS, CLC North-East, CSIC, VTT, PepsiCo.
Web: https://annualfoodagenda.com/

Title: Global Food Venture Program
Principal Investigators: Dr. Maria Jesús Latasa
Duration: 01/01/2018-31/12/2021
Funded by: EIT Food. Call 2021. Ref: 18250-21

Partners: UNITO, UAM, Warsaw University, KU Leuven, TUM, Queen's University of Belfast, Technion, Aarhus University, EPFL, ETH Zürich, IMDEA Food, EIT Food ivzw.

Title: EFSET - European Food Systems Education and Training
Principal Investigators: Dr. Maria Jesús Latasa
Duration: 01/01/2019-31/12/2021
Funded by: EIT Food. Call 2021. Ref: 19126-21
Partners: UNITO, UAM, Hohenheim University, Reading University, PepsiCo, Grupo AN, Agricolus, John Deere, IMDEA Food, EIT Food ivzw.

Title: Online courses - Nutrition: Health and Sustainability
Principal Investigator: Dr. Maria Jesús Latasa
Duration: 01/01/2021-31/12/2021
Funded by: EIT Food. Call 2021. Ref: 21015
Partners: EIT Food ivzw, Reading University, CSIC, UNITO, RUG, IMDEA Food.

Title: ChiLd MicroBes predict how to stay away from Obesity (CLiMB-Out)
Principal Investigator: Dr.Alfredo Martínez
Duration: 01/01/2021-31/12/2022
Funded by: EIT Food. Call 2021. Ref: 21249
Partners: Unibo, CLC South, CUT, Danone Research, CSIC, IMDEA Food.

Title: RIS Summer Schools – Summer School Targeted Nutrition
Principal Investigators: Dr. Moisés Laparra
Duration: 01/01/2021-31/12/2021
Funded by: EIT Food. Call 2021. Ref: 21308
Partners: IARFR PAS, Matis, Aarhus University, BBC Innovation, Unibo, Microbion, NapiFeryn BioTech, IMDEA Food.

Title: RIS Professional Development - WE Lead Food
Principal Investigator: Dr. Maria Jesús Latasa
Duration: 01/01/2021 - 31/12/2021
Funded by: EIT Food. Call 2021. Ref: 21324
Partners: Cambridge University, Aarhus University, EUFIC, UAM, IMDEA Food.

Title: Food Solutions 2021 - Food for the elderly (FoodFE)
Principal Investigators: Maria Jesús Latasa
Duration: 01/01/2021-31/12/2021
Funded by: EIT Food. Call 2021. Ref: 21330
Partners: DIL, Swiss Food Research, Technion, E-Seniors, Grupo AN, UAM, IARFR PAS, CSIC, Helsinki University, Hohenheim University, IMDEA Food.

Title: Capacity Building Initiative Pre-Pilot 2021 (HEI)
Principal Investigators: Maria Jesús Latasa
Duration: 01/07/2021-30/06/2023
Funded by: EIT Food. Call 2021. Ref: 21383
Partners: Burgos University, UAM, Centria, MTU, Mashauri Limited, IMDEA Food.

Title: Food Imaginarium: Promoting healthy eating habits
Principal Investigator: Lorena Carrillo
Duration: 01/01/2021-31/10/2021
Funded by: EIT Food.
Call: Public Engagement Proof of Concepts 2021. Ref: 21350-A2103 – PoC28
Partners: Aarhus University, EUFIC, Matis, IMDEA Food.

Title: Picture your microbes - A co-creation participatory action to empower citizens on nutritional health decisions
Principal investigator and activity leader: Dr. Laura J Marcos Zambrano
Duration: 01/03/2021-31/10/2021
Funded by: EIT Food. Call RIS Public Engagement Proof of Concepts 2021. Ref: 21384-A2104 - PoC47
Partners: IMDEA Food.

Title: Prevention strategies for social engagement and healthy ageing (EngAgeing)
Principal Investigators: Dr. Ana Ramírez de Molina and Carolina Rodríguez
Duration: 01/03/2021-31/10/2021
Funded by: EIT Food. Call RIS Public Engagement Proof of Concepts 2021. Ref: 21384-A2103 PoC46
Partners: UAM, BCC Innovation, IMDEA Food.

Title: Peer-to-Peer engagement in food to promote healthy, fun and smart diets
Principal Investigators: Dr. María Isabel Espinosa and Carmen Hernández
Duration: 01/03/2021-31/10/2021
Funded by: EIT Food. Call RIS Public Engagement Proof of Concepts 2021. Ref: 21384-A2108 PoC33
Partners: UNITO, Warsaw University, IMDEA Food.

Title: Cross-KIC Strategic Education
Principal Investigators: Dr. Maria Jesús Latasa
Duration: 01/01/2021-31/12/2021
Funded by: EIT Food. Call RIS Public Engagement Proof of Concepts 2021. Ref: 21704 - A2100 WP2 - Human Capital - OS
Partners: EIT Food ivzw, Matis, Queen's University Belfast, UNITO, Warsaw Universiy, CLC Central, IMDEA Food.

1.2. National R&D Projects

Title: Characterization of the molecular mechanisms of short-term fasting as an enhancer of chemotherapy (AYUQUIM)
Principal Investigator: Dr. Pablo J. Fernández-Marcos
Duration: 01/01/2018 – 30/09/2021
Funded by: Spanish Ministry of Economy, Industry and Competitiveness.
Call: 2017 R&D&I Projects Ref: SAF2017-85766-R

Title: Effect of weight loss with a low-calorie Mediterranean diet and promotion of physical activity on the prevention of type 2 diabetes in people with metabolic syndrome. (PREDIMED+DM)
Principal Investigator: Dr. Lidia Daimiel Ruiz
Duration: 01/01/2018 – 31/12/2021
Funded by: Health Institute Carlos III (ISCIII) and

co-funded by EU funds under ERDF/ESF, "A way to make Europe"/"Investing in your future").
Call: 2017 Health Research Projects Ref: PI17/00508

Title: Precision nutrition and physical exercise as modulators of the epigenome in pathologies of dietary excesses. (Nutri-Epigen)
Principal Investigator: Dr. Alberto Dávalos Herrera
Duration: 01/07/2018 -30/06/2021
Funded by: Spanish Ministry of Economy, Industry and Competiveness.
Call: 2017 Networks of excellence Ref: AGL2017-90623-REDT
Web: http://www.nutriepigen.com/eng/

Title: Study on diet-induced changes in the metelone and transcriptome to assess the impact of nutrition on cardiometabolic health (DIMENSION)
Principal Investigator: Dr. José María Ordovás
Duration: 01/01/2019 – 31/12/2022
Funding: Spanish Ministry of Science, Innovation and Universities
Call: Joint Programing Iniciatives (PCI 2018 Projects). Ref: PCI2018-093009

Title: Regulation of gut microbiota by host and dietary mirnas: dietary exosomes and mimetic exosomes (miRBiota)
Principal Investigator: Dr. Almudena García Ruiz
Duration: 01/01/2019-31/12/2021
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: RTI 2018 Ref: RTI2018-093873-A-I00

Title: New posttranscriptional regulators as a molecular link between diabetes, obesity and Alzheimer's disease
Principal Investigator: Dr. Cristina Ramírez Hidalgo
Duration: 01/01/2019-30/09/2022
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: RTI 2018 Ref: RTI2018-095061-B-I00

Title: Targeting DNA-Methylation fingerprints linked to ultra-processed foods consumption to prevent non-communicable diseases (METHYL-UP)
Principal Investigator: Dr. José María Ordovás
Duration: 01/01/2019-30/09/2022
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: RTI 2018 Ref: RTI2018-095569-B-I00

Title: Food technology applications to modulate the microbiome and microbiome interference on tumour cells for the treatment of colorectal cancer. (FoodTech4Microbes)
Principal Investigators: Dr. Laura J Marcos Zambrano
Duration:01/06/2019-31/05/2021
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: EIN 2019 Ref: EIN2019-103470.

Title: Development of precision food formulations for colon cancer treatment (FORDISCOVERY)
Principal Investigator: Dr. Ana Mª Ramírez de Molina
Duration: 01/06/2020 – 31/05/2023
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: PID 2019 Ref: PID2019-110183RB-C21

Title: Understanding the dynamic interaction of enhanced food formulations with immunonutritional benefits in the prevention and onset of liver dysfunction (Food4IMNut)
Principal Investigator: Dr. Moisés Laparra
Duration: 01/06/2020 – 31/05/2023
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: PID 2019 Ref: PDI2019-107650RB-C22.

Title: The journey of edible plants-derived extracellular vesicles through the mammalian body: extracellular ncRNAs as potential bioactive components of foods (FoodVesicleTherapy)
Principal Investigator: Dr. Alberto Dávalos
Duration: 01/06/2020 – 31/05/2023
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: PID 2019 Ref: PID2019-109369RB-I00.

Title: From Aging Biology to Sustainable Interventions: a microbiome-based approach (ABSIMA)
Principal Investigator: Dr. Alberto Díaz Ruiz
Duration: 01/06/2020 – 31/05/2024
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: PID 2019 Ref: PID2019-106893RA-I00

Title: Precision nutrition for the maintenance and improvement of cognitive function (HEALTH4BRAIN)
Principal Investigator: Dr. Ana Mª Ramírez
Duration: 01/04/2020-31/03/2023
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: Collaboration Challenges Programme.RTC 2019 Ref: RTC2019-007294-1

Title: Characterization of the molecular mechanisms of short-term fasting against cancer and metabolic syndrome (FASTMET)
Principal Investigator: Dr. Pablo J. Fernández-Marcos
Duration: 01/09/2021 – 31/08/2024
Funding: Spanish Ministry of Science and Innovation.
Call: PID 2020. Ref: PID2020-114077RB-I00.

Title: Dysbiosis-influenced modulation of oral microbiome-derived extracellular vesicles and their role in Alzheimers disease (SALVEMOS)
Principal Investigator: Dr. Aida Serra
Duration: 01/09/2021 – 31/08/2024
Funding: Spanish Ministry of Science and Innovation.
Call: PID 2020. Ref: PID2020-114885RB-C21

1.3. Regional Projects

Title: Consortium for the study of acute renal failure: pathophysiology, novel therapies, biomarkers and experimental models (CIFRA2-CM)
Principal Investigators: Moisés Laparra Llopis
Period: 2018-2021
Funded by: Community of Madrid.
Call: I+D Collaboration Call Technology 2018 Ref: B2017/BMD-3686
Web: http://www.cifra2-cm.com/

Title: Precision nutrition therapeutic formulations for cancer (ALIBIRD2020-CM)
Principal Investigators at IMDEA Food: Dr. Ana Ramírez de Molina (ONCOGENOM) and Susana Molina (GENYAL LAB)
Period: 01/01/2019-30/04/2023
Funded by: Community of Madrid and co-funded by EU Structural Funds ERDF/ ESF, "A way to make Europe"/"Investing in your future").
Call: Technologies 2018, R&D Activities among Research Groups of Community of Madrid Ref: S2018/BAA-4343
Web: https://alibird.org/2020-CM/

Title: Dynamisation of Madrid's food ecosystem based on Innovation through the implementation and expansion of the European project EIT-Food (INNOLINK-CM)
Principal Investigators: Dr. Ana Ramírez de Molina
Period: 01/01/2019-31/12/2022
Funded by: Community of Madrid and co-funded by EU Structural Funds ERDF "A way to make Europe"
Call: 2018 Grants for Innovation link entities Ref: OI2018/INNOLINK-5352

Title: Personalized metacategorization of inflammatory processes associated with metabolic syndrome, autoinmune and viral diseases for precision medicine (METAINFLAMACION-CM)
Coordinator Group Principal Investigator:
Dr. José Alfredo Martínez (IMDEA Food)
No coordinator Group Principal Investigator:
Dr. Juan Antonio Vargas (Puerta de Hierro Hospital Biomedical Research Foundation)
Duration: 01/07/2021-30/06/2024
Funded by: Community of Madrid,
Call: 2020 R&D Sinergy Grants Ref: Y2020/BIO-6600
Amount: 583.110€

Title: Precision nutritional strategies to reactivate the impaired immune system as a resulta of age, obesity or chemotherapy (NUTRISION-CM)
Coordinator Group Principal Investigator:
Dr. Ana Ramírez de Molina (IMDEA Food)
No coordinator Group Principal Investigator:
Dr. Elisa Carrasco (CBM_UAM_CSIC)
Duration: 01/07/2021-30/06/2024
Funded by: Community of Madrid
Call: 2020 R&D Sinergy Grants Ref: Y2020/BIO-6350
Amount: 616.730€

Title: Artificial Intelligence for the Prevention of Chronic Diseases through Personalized Nutrition (AI4FOOD-CM)
Coordinator Group Principal Investigator:
Dr. Javier Ortega García (UAM)
No coordinator Group Principal Investigator:
Dr. Enrique Carrillo de Santa Pau (IMDEA Food)
Duration: 01/07/2021-30/06/2024
Funded by: Community of Madrid
Call: 2020 R&D Sinergy Grants Ref: Y2020/TCS-6654
Amount: 634.290€

Title: Understanding and Facing Up Long COVID-19 through Precision Nutrition (FACINGLCOVID-CM)
Principal Investigator: Dr. Guillermo Reglero Rada
Duration: 08/11/2021-07/11/2024
Funded by: Community of Madrid
Call: REACT EU Ref: 59/143839.9/21
Amount: 1.450.000€ (Infraestructure) and 1.715.000€ (R&D project)

1.4. Privately – Funded R&D Projects

Title: Sirtuins as biomarkers and targets in cancer: Sirt1 and Sirt3 in lung and liver carcinogenesis (SIRTBIO)
Principal Investigator: Dr. Pablo J. Fernández-Marcos.
Duration: 01/10/2018 – 31/03/2022
Funding: Spanish Association Against Cancer (AECC).
Call: LAB AECC 2018 Ref: LABAE18008FERN.

Title: Nutritional strategies and bioactive compounds to target lipid metabolism alterations in cancer: Platform of Patient derived Paired Organoids for Precision Nutrition.
Principal Investigator: Dr. Ana Ramírez de Molina
Duration: 03/04/2019 – 31/12/2022
Funding: Ramon Areces Foundation
Call:2018 Research in life and matter Sciences Ref: CIVP19A5937

Title: Search for new biomarkers for diagnosis and stratification of NAFLD/ NASH: can circulating exosomal mirnas play a role?"
Principal Investigator: Dr. Alberto Dávalos
Duration: 01/01/2019 – 31/12/2021
Funding: Gilead Foundation
Call:VI Edition of GILEAD Biomedic Research Grants Ref: GLD18/00143

1.5. R&D Contracts

Title: Determination of genetic variants associated with genetics, nutrition and health studies
Company/Institution: PRECISION FOR HEALTH, S.L. (P4H)
Principal Investigators: Dr. Susana Molina Arranz
Period: 2019-2021

Title: MORINGA
Company/Institution: BIOSABOR SAT
Principal Investigators: Dr. José Alberto Díaz-Ruiz
Duration: 2019-2021

Title: Epigenetics processing of PREDIMED samples
Company/Institution: CIBERobn Consortium
Principal Investigators: Dr. Lidia Daimiel Ruiz
Duration: 2020-2021

Title: ANDERSON
Company/Institution: ANDERSON Foundation
Principal Investigators: Dr. Pablo J. Fernández Marcos
Duration: 2020-2021

Title: HEALTHMICROBIOTICS
Company/Institution: CANAAN Research and Investment
Principal Investigators: Dr. Moisés LaParra
Duration: 2020-2021

Title: MetaboGut
Company/Institution: CEBAS (CSIC)
Principal Investigators: Dr. Ana Ramírez de Molina
Duration: 2020-2021

Title: 2021 European Researcher´s Night
Funded by: Horizon 2020
Call: H2020-MSCA-NIGHT-2020bis
Principal Investigators: Sara Castillo
Duration: 2021

Title: INNO-FORCHRONIC
Company/Institution: Precision for Health S.L
Funded by: CDTI. NEOTEC Programme Ref: SNEO20201139
Principal Investigators: Dr. Ana Ramírez de Molina and Dr. Guillermo Reglero
Duration: 2021-2022

Title: TELOTRISTAT
Company/Institution: FIBIO-HRC
Principal Investigators: Dr. Pablo J. Fernández Marcos
Duration: 2021-2022

Title: PLENUFAR 7
Company/Institución: Official Colleague of Pharmacist
Principal Investigators: Dr. Alfredo Martínez
Duration: 2021-2022

Title: ASTAXANTHIN
Company/Institution: BGG
Principal Investigators: Dr. Joao Thiago Estevao Tome
Duration: 2021-2022

Title: MENOPAUSE
Company/Institution: ULL
Principal Investigators: Dr. Mª Isabel Espinosa
Duration: 2021-2022

Title: PROTEOMICS
Company/Institution: UNED
Principal Investigators: Dr. Aida Serra
Duration: 2021-2022

1.6. Licenses

Patent title: Biocompatible extracellular vesicles obtained from fermented food industry by-products, compositions and applications thereof
Inventors and authorship percentage: Dr. Aida Serra (40%); Dr. Xavier Gallart-Palau (40%); Cristina Lorca (5%) and Dr. Elisabet Vilella (15%).
Participating entities (owners): IMDEA Food, Institut d'Investigació Sanitaria Pere Virgili – Hospital Universitari Institut Pere Mata (IISPV-HUIPM) and Ciber Consortium.
Application No.: EP21382983.1.
Registration date: 02/11/2021.
EU Patent Attorney: Herrero y Asociados Madrid (H&A).

2. Fellowships

2.1. National

Ref. RYC-2015-18083
Principal Investigator: Dr. José Moisés Laparra Llopis
Duration: 01/12/2016-30/12/2021
Funded by: Spanish Ministry of Economy, Industry and Competitiveness
Call: Ramón y Cajal Grants for contracting

Ref. RYC-2017-22335
Principal Investigator: Dr. Pablo Fernández Marcos
Duration: 01/02/2019-31/01/2024
Funded by: Spanish Ministry of Science, Innovation and Universities
Call: Ramón y Cajal Grants for contracting

Ref. APRO2018
Project: Characterization of the molecular mechanisms of short term fasting as a chemotherapy enhancer
Principal Investigator: Andrés Pastor
Duration: 01/10/2019-30/09/2022
Funded by: Spanish Association against Cancer (AECC)
Call: PREDOCTORAL GRANT IN ONCOLOGY (APRO)

Ref. PTA2017-14689-I
Principal Investigator: José Luis López Aceituno
Duration: 08/01/2019-08/01/2022
Funded by: Spanish Ministry of Science, Innovations and Universities
Call: PTA 2017

Ref. IJC2018-038008-I
Project: Physical activity behaviors: determinants and relationships with social and mental health in old age
Principal Investigator: Veronica Cabanas Sánchez
Duration: 01/02/2020-31/01/2023
Funded by: Spanish Ministry of Science, Innovations and Universities
Call: Juan de la Cierva 2018

Ref. FJC2018-038168-I
Principal Investigator: Rodrigo San Cristóbal Blanco
Duration: 01/02/2020-31/01/2022
Funded by: Spanish Ministry of Science,Innovations and Universities
Call: Juan de la Cierva 2018 Training Grant

Ref. PRE2019-087643
Principal Investigator: Cristina Climent Mainar
Duration: 01/10/2020-30/09/2024
Funded by: Spanish Ministry of Science and Innovation
Call: Grants for Predoctoral Contracts for the training of PhDs

Ref. FJC2019-038925-I
Principal Investigator: Iñaki Milton Laskibar
Duration: 01/01/2021 - 31/12/2022
Funding Institution: Spanish Ministry of Science and Innovation
Call: Juan de la Cierva 2018 Training Grant

Ref. IJC2019-042188-I
Principal Investigator: Laura Judith Marcos Zambrano
Duration: 01/05/2021 - 30/04/2024
Funded by: Spanish Ministry of Science and Innovation
Call: Juan de la Cierva 2019 Incorporation Grant

2.2. International

Project title: Small open reading frames (smORF) as novel modulators of disorders of dietary excess (LIPMETIN-sURFing)
Principal Investigator: Dr. Almudena García Ruíz and Dr. Alberto Dávalos
Duration: 01/10/2019-30/09/2021
Funded by: Horizon 2020 Framework Programme under MSCA Individual Fellowships Actions
Call: H2020-MSCA-IF-2016 Ref: GA No. 746435

Project title: Discovery and characterization of food bioactive compounds modulating the Pentose Phosphate Pathway against non-alcoholic fatty liver disease (Food-PPP-NAFLD).
Principal Investigator: Dr. Ildefonso Rodriguez Ramiro and Dr. Pablo J. Fernandez-Marcos
Duration: 01/10/2019-30/09/2021
Funded by: Horizon 2020 Framework Programme under MSCA Individual Fellowships Actions
Call: H2020-MSCA-IF-2018 Ref.: GA No. 832741

2.3. Regional

Ref. 2016-T1/BIO-1854
Principal Investigator: Manuel Alejandro Fernández Rojo
Duration: 10/04/2017-09/04/2021
Funded by: Community of Madrid
Call: Grants for the implementation of contracts "Talent Attraction" Modality 1

Ref. IND2017/BIO-7826
Principal Investigator: Marina Reguero Simon
Duration: 19/02/2018-18/02/2021
Funded by: Community of Madrid
Call: 2017 Industrial Doctorates

Ref. IND2017/BIO-7857
Principal Investigator: Adrián Bouzas Muñoz
Duration: 02/04/2018-31/12/2021
Funded by: Community of Madrid
Call: 2017 Industrial Doctorates

Ref. 2017-T1/BMD-5333
Principal Investigator: Cristina Ramírez Hidalgo
Duration: 09/04/2018-08/04/2021
Funded by: Community of Madrid
Call: Grants for the implementation of contracts "Talent Attraction" Modality 1

Ref. 2018-T1/BIO-22262
Principal Investigator: María Ikonomopoulou
Duration: 01/02/2019-31/01/2023
Funded by: Community of Madrid
Call: Grants for the implementation of contracts "Talent Attraction" Modality 1

Ref. 2018-T1/BMD-11966
Principal Investigator: José Alberto Díaz-Ruiz Ruiz
Duration: 01/02/2019-31/01/2023
Funded by: Community of Madrid
Call: Grants for the implementation of contracts "Talent Attraction" Modality 1

Ref. IND2018/BIO-10097
Principal Investigator: Sonia Wagner Reguero
Duration: 11/02/2019-10/08/2022
Funded by: Community of Madrid
Call: 2018 Industrial Doctorates

Ref. PEJD-2018-POST/BMD-8900
Principal Investigator: Ana Pérez García
Duration: 04/03/2019-03/03/2021
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2018

Ref. PEJD-2018-POST/BIO-8933
Principal Investigator: María Belén Ruiz Roso
Duration: 04/03/2019-03/03/2021
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2018

Ref. PEJ-2018-AI/BMD-9724
Principal Investigator: Marta Torrecilla
Duration: 01/06/2019-31/05/2021
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2018

Ref. 2018-T1/BIO-10633
Principal Investigator: Aida Serra Maqueda
Duration: 01/06/2019-30/06/2023
Funded by: Community of Madrid: Grants for the implementation of contracts "Talent Attraction" Modality 1

Ref. PEJD-2019-PREBMD-17041
Principal Investigator: María Castejón Mariscal de Gante
Duration: 01/06/2020-31/05/2022
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2019

Ref. PEJD-2019-PREBMD-14499
Principal Investigator: Yolanda Martín Martín
Duration: 01/06/2020-31/05/2022
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2019

Ref. PEJD-2019-POSTBIO-15004
Principal Investigator: Cristina Mª Fernández Díaz
Duration: 01/06/2020-31/05/2022
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2019

Ref. PEJD-2019-POST/BMD-14722
Principal Investigator: Luis Vicente Herrera Marcos
Duration: 01/06/2020-31/05/2022
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2019

Ref. PEJD-2019-POST/SAL-15892
Principal Investigator: Celia Martínez Pérez
Duration: 01/06/2020-31/05/2021
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2019

Ref. PEJ-2019-TL/BMD-15706
Principal Investigator: Lorena Blanco Calcerrada
Duration: 01/06/2020-31/05/2022
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2019

Ref. 2019-T2/BMD-15849
Principal Investigator: Carolina Donat Vargas
Duration: 01/06/2020 -24/05/2024
Funded by: Community of Madrid
Call: Grants for the implementation of contracts "Talent Attraction" Modality 2

Ref. PEJD-2019-PRE/BIO-16475
Principal Investigator: Mª Cristina Lorca Romero
Duration: 01/07/2020-30/06/2022
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2019

Ref. PEJD-2019-POST/SAL-15164
Principal Investigator: Esther Cuadrado Soto
Duration: 01/07/2020-30/06/2021
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2019

Ref. 2019-T1-BMD-13039
Principal Investigator: Mª Elena Rodríguez García-Rendueles
Duration: 01/09/2020 -31/08/2024
Funded by: Community of Madrid
Call: Grants for the implementation of contracts "Talent Attraction" Modality 1

Ref. PEJ-2020-AI/BMD-19384
Principal Investigator: Andrés Sánchez Ruiz
Duration: 01/04/2021 -31/03/2023
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2020

Ref. PEJ-2020-AI/BMD-17717
Principal Investigator: Jorge Fernández Cabezas
Duration: 01/04/2021 -31/03/2023
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2020

Ref. PEJ-2020-AI/BMD-17652
Principal Investigator: Macarena Palacios Ramo
Duration: 01/04/2021 -31/03/2024
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2020

Ref. PEJ-2020-AI/BIO-17904
Principal Investigator: Ana Vela Sebastián
Duration: 01/04/2021 -31/03/2024
Funded by: Community of Madrid
Call: Youth Employment Program (PEJ) 2020

Ref. 2020-5A/BIO-19724
Principal Investigator: Manuel Alejandro Fernández Rojo
Duration: 10/04/2021-09/04/2022
Funded by: Community of Madrid
Call: Grants for the implementation of contracts "Talent Attraction" Modality 1- Talent Fifth year

3. Scientific results

3.1. Publications

1. Blázquez-Prieto J, Huidobro C, López-Alonso I, Amado-Rodriguez L, Martín-Vicente P, López-Martínez C, Crespo I, Pantoja C, Fernandez-Marcos PJ, Serrano M, Sznajder JI, Albaiceta GM. Activation of p21 limits acute lung injury and induces early senescence after acid aspiration and mechanical ventilation. Transl Res. 2021 Jul;233:104-116. doi: 10.1016/j.trsl.2021.01.008. Epub 2021 Jan 27. PMID: 33515780; PMCID: PMC7838583.

2. Marhuenda-Muñoz M, Rinaldi de Alvarenga JF, Hernáez Á, Tresserra-Rimbau A, Martínez-González MÁ, Salas-Salvadó J, Corella D, Malcampo M, Martínez JA, Alonso-Gómez ÁM, Wärnberg J, Vioque J, Romaguera D, López-Miranda J, Estruch R, Tinahones FJ, Lapetra J, Serra-Majem JL, Bueno-Cavanillas A, Tur JA, Sánchez VM, Pintó X, Delgado-Rodríguez M, Matía-Martín P, Vidal J, Vázquez C, Daimiel L, Ros E, Serra-Mir M, Vázquez-Ruiz Z, Nishi SK, Sorlí JV, Zomeño MD, Zulet MA, Vaquero-Luna J, Carabaño-Moral R, Notario-Barandiaran L, Morey M, García-Ríos A, Gómez-Pérez AM, Santos-Lozano JM, Buil-Cosiales P, Basora J, Portolés O, Schröder H, Abete I, Salaverria-Lete I, Toledo E, Babio N, Fitó M, Martínez-Huélamo M, Lamuela-Raventós RM. High Fruit and Vegetable Consumption and Moderate Fat Intake Are Associated with Higher Carotenoid Concentration in Human Plasma. Antioxidants (Basel). 2021 Mar 17;10(3):473. doi: 10.3390/antiox10030473. PMID: 33802859; PMCID: PMC8002704.

3. Trilla-Fuertes L, Gámez-Pozo A, Maurel J, Garcia-Carbonero R, Capdevila J, G-Pastrián L, Mendiola M, Peña C, López-Vacas R, Cuatrecasas M, García-Alfonso P, Ramos-Ruiz R, Llorens C, Ghanem I, Conill C, Heredia-Soto V, Campos-Barros Á, Fresno Vara JÁ, Feliu J. Description of the genetic variants identified in a cohort of patients diagnosed with localized anal squamous cell carcinoma and treated with panitumumab. Sci Rep. 2021 Apr 1;11(1):7402. doi: 10.1038/s41598-021-86966-w. PMID: 33795829; PMCID: PMC8016846.

4. Feliu J, Espinosa E, Basterretxea L, Paredero I, Llabrés E, Jiménez-Munárriz B, Losada B, Pinto A, Custodio AB, Muñoz MDM, Gómez-Mediavilla J, Torregrosa MD, Cruz P, Higuera O, Molina-Garrido MJ. Prediction of Unplanned Hospitalizations in Older Patients Treated with Chemotherapy. Cancers (Basel). 2021 Mar 22;13(6):1437. doi: 10.3390/cancers13061437. PMID: 33809852; PMCID: PMC8004134.

5. Leon-Gonzalez R, Rodriguez-Artalejo F, Ortola R, Lopez-Garcia E, Garcia-Esquinas E. Social Network and Risk of Poor Sleep Outcomes in Older Adults: Results from a Spanish Prospective Cohort Study. Nat Sci Sleep. 2021 Mar 17;13:399-409. doi: 10.2147/NSS.S288195. PMID: 33762861; PMCID: PMC7982710.

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3.2. Books

1. Gallart-Palau X, Hemu X, Motilva MJ, Serra A. Editorial: Food Proteomes: Beyond Their Nutritional Value. Front Nutr. 2021 Aug 24;8:744473. doi: 10.3389/fnut.2021.744473. PMID: 34504863; PMCID: PMC8421600.

2. Silvia Garcia Caballero, Sheyla Ordoñez, Gloria Fuentes, & Laura Judith Marcos Zambrano. (2021). Photobook #PictureYourMicrobes (Version 1). Zenodo. https://doi.org/10.5281/zenodo.5682942

3.2.1 Book Chapters

1. Marcos-Pasero H, Aguilar-Aguilar E, Ikonomopoulou MP, Loria-Kohen V. BDNF Gene as a Precision Skill of Obesity Management. Adv Exp Med Biol. 2021;1331:233-248. doi: 10.1007/978-3-030-74046-7_15. PMID: 34453302. ISBN: 978-3-030-74045-0

2. Visioli, Francesco and Carmen Crespo, M. Chapter 7 Oxidative Stress and Response in Physiological Systems. Handbook of Antioxidant Methodology: Approaches to Activity Determination. 2021; 246-261. The Royal Society of Chemistry. doi: 10.1039/9781839165337-00246 ISBN: 978-1-83916-155-1 http://dx.doi.org/10.1039/9781839165337-00246

3. Jana Baranda, Juan Antonio Giménez-Bastida, M. Morante, Aurora García-Tejedor, Jose Moises Laparra. Chapter 26 - Immunonutritional agonists in the neuroimmune response in AGE-Ing, Current Advances for Development of Functional Foods Modulating Inflammation and Oxidative Stress, Academic Press, 2022; 535-544, ISBN 9780128234822, https://doi.org/10.1016/B978-0-12-823482-2.00007-8.

3.3. Invited & plenary talks and conferences

3.3.1 Congress

Congress: 33 Congress of the Galician Society of Endocrinology and Nutrition
Title: Implication of the HIPPO pathway in thyroid cancer
Authors: Maria E Rodríguez García-Rendueles
Date: 28-30/01/2021
Country: Spain
Type of communication: Invited talk
Web: https://sgenm.es/wp-content/uploads/2021/11/Programa_Comunicaciones_SGENM21.pdf

Congress: 17th Annual NIH Graduate Student Research Symposium
Title: Exploring the Synergistic Effect of Energy Restriction and Metformin in Colorectal Cancer Models
Authors: María Castejón-Mariscal de Gante, Andrés Pastor-Fernández, Paula Ostos-Arellanos, Lorena Blanco-Calcerrada, Pablo Jose Fernandez-Marcos, Rafael de Cabo, Alberto Díaz-Ruiz Graduate Student: Maria Castejon-Mariscal de Gante NIH Institute-Center: NIA NIH Research Advisor: Dr. Rafael de Cabo University Research Advisor: Dr. Alberto Diaz-Ruiz Graduate University: IMDEA Food-Universidad Autonoma de Madrid
Date: 17-18/02/2021
Country: EEUU
Type of communication: Poster
Web: https://www.training.nih.gov/assets/17th_Graduate_Symposium_Program_Book_508.pdf

Congress: Endocrine Society Annual Meeting (2021 ENDO Annual Meeting)
Title: Hypothalamic astrocytes modify the miRNA content of exosomes in response to fatty acids
Authors: Roberto Collado-Pérez, Jorge García-Piqueres, María Jiménez-Hernaiz, Jesús Argente, Denise Belsham, Laura M. Frago and Julie. A Chowen
Date: 02 -23/03/2021
Country: EEUU
Type of communication: Poster
Web: https://www.endocrine.org/meetings-and-events/endo2021

Congress: 38th International Symposium on Diabetes and Nutrition (DNSG 2021)
Title: Inflammatory potential of diet and bone mineral density in a senior Mediterraneanpopulation: a cross-sectional analysis in the PREDIMED-Plus
Authors: Dr. Jesús Francisco García Gavilán, Dr. Dora Romaguera, Dr Maria Angeles Martinez, José Antonio de Paz Fernandez, Dr Monica Bullo, Indira Paz-Graniel, Dr J. Alfredo Martínez, Dr Jadwiga Konieczna, Dr Albert Goday, Prof Jordi Salas-Salvado, Dr Nancy Babio, Dr Vicente Martin, Dr Miguel Ruiz-Canela, Dr Miguel Angel Martinez-Gonzalez
Date: 21-24/06/2021
Country: Spain (Virtual event)
Type of communication: Poster
Web: https://www.seen.es/portal/otras-actividades/38th-international-symposium-on-diabetes-and-nutrition

Congress: 38th International Symposium on Diabetes and Nutrition (DNSG 2021)
Title: Prospective association of a priori dietary patterns and kidney function in thePREDIMED-Plus study
Authors: Cristina Valle Hita, Miguel Angel Martínez-González, Montse Fitó, Julia Wärnberg, José López-Miranda, José Lapetra, Josep A. Tur, Miguel Delgado-Rodríguez, Clotilde Vázquez, Jordi Salas-Salvadó, Andrés Díaz-López, María Angeles Martínez-Rodríguez, Alfredo Martínez, Jesús Vioque, Ramon Estruch, Luís Serra-Majem, Vicente Martín-Sánchez, Pilar Matía-Martín, Lidia Daimiel, Nancy Babio, Nerea Becerra-Tomás, Dolores Corella, Ángel M Alonso-Gómez, Dora Romaguera, Francisco J Tinahones, Aurora Bueno-Cavanillas, Xavier Pintó, Josep Vidal, Emilio Ros.
Date: 21-24/06/2021
Country: Spain (Virtual event)
Type of communication: Poster
Web: https://www.seen.es/portal/otras-actividades/38th-international-symposium-on-diabetes-and-nutrition

Congress: 38th International Symposium on Diabetes and Nutrition (DNSG 2021)
Title: Ultra-processed foods consumption and fasting blood glucose and glycated haemoglobin in elderly individuals with metabolic syndrome: preliminar longitudinal analysis in the PREDIMED-Plus trial
Authors: Dr. Sandra González Palacios Dr. Miguel Ángel Martínez-González Dr. Jordi Salas-Salvadó Dr. Dolores Corella Dr. Montserrat Fitó Dr. Alfredo Martínez Dr. Ángel M Alonso-Gómez Dr. Julia Wärnberg Dr. Jadwiga Konieczna Dr José López-Miranda Dr. Ramon Estruch Dr. Francisco Tinahones Dr. José Lapetra Dr. Luís Serra-Majem Dr. Aurora Bueno-Cavanillas Dr. Josep A. Tur Dr. Vicente Martín Sánchez Dr. Xavier Pintó Dr. Miguel Delgado-Rodríguez Dr. Pilar Matía-Martín Dr. Josep Vidal Dr. Clotilde Vázquez Dr. Lidia Daimiel Dr. Emilio Ros Dr. Laura Torres-Collado Dr. Jesús Vioque
Date: 21-24/06/2021
Country: Spain (Virtual event)
Type of communication: Poster
Web: https://www.seen.es/portal/otras-actividades/38th-international-symposium-on-diabetes-and-nutrition

Congress: 38th International Symposium on Diabetes and Nutrition (DNSG 2021)
Title: Variety in fruits and vegetables and changes in cardiometabolic risck factors after one year of follow-up in an elderly Mediterranean population at right cardiovascular risk
Authors: Leyre Lopez González, Miguel Angel Martínez-González, Montse Fitó, Julia Wärnberg, José López-Miranda, José Lapetra, Josep A. Tur, Miguel Delgado-Rodríguez, Clotilde Vázquez, Nerea Becerra-Tomás, Cristina Mestres, José Alfredo Martínez, Jesús Vioque, Ramon Estruch, Luís Serra-Majem, Vicente Martín-Sánchez, Pilar Matía-Martín, Lidia Daimiel, Nancy Babio, Nerea Becerra-Tomás, Dolores Corella, Ángel M Alonso-Gómez, Dora Romaguera, Francisco J Tinahones, Aurora Bueno-Cavanillas, Xavier Pintó, Josep Vidal, Emilio Ros.
Date: 21-24/06/2021
Country: Spain (Virtual event)

Type of communication: Poster
Web: https://www.seen.es/portal/otras-actividades/38th-international-symposium-on-diabetes-and-nutrition

Congress: 38th International Symposium on Diabetes and Nutrition (DNSG 2021)
Title: Assessment of ultra-processed food classification systems in relation to cardiometabolic health and glucose metabolism traits in an elderly population with metabolic syndrome
Authors: Dr. Celia Martínez Dr. Rodrigo San Cristóbal Dr. Pilar Guallar-Castillon Dr. Miguel Ángel Martínez-González Dr. Jordi Salas-Salvadó Dr. Dolores Corella Dr. Olga Castañer Dr. J. Alfredo Martínez Dr. Angel M Alonso-Gómez Dr. Julia Wärnberg Dr. Jesús Vioque Dr. Dora Romaguera Dr. José López-Miranda Dr. Ramón Estruch Dr. Francisco J. Tinahones Dr. José Lapetra Dr. Lluis Serra-Majem Dr. Aurora Bueno-Cavanillas Dr. Josep A. Tur Dr. Vicente Martín Sánchez Dr. Xavier Pintó Dr. Miguel Delgado-Rodríguez Dr. Pilar Matía-Martín Dr. Josep Vidal Dr. Clotilde Vázquez Dr. Emilio Ros Prof. José M. Ordovás
Date: 21-24/06/2021
Country: Spain (Virtual event)
Type of communication: Oral Communication
Web: https://www.seen.es/portal/otras-actividades/38th-international-symposium-on-diabetes-and-nutrition

Congress: 38th International Symposium on Diabetes and Nutrition (DNSG 2021)
Title: A new 14 item tool to assess ultra-processed food consumption in subjects with metabolic syndrome
Authors: Dr. Celia Martínez Dr. Lidia Daimiel Ms. Cristina Climent Mainar Dr. Miguel Ángel Martínez-González Dr. Jordi Salas-Salvadó Dr. Dolores Corella Dr. Montserrat Fitó Dr. Alfredo Martínez Dr. Ángel M. Alonso-Gómez Dr. Julia Wärnberg Dr. Jesús Vioque Dr. Dora Romaguera Dr. José López-Miranda Dr. Ramón Estruch Dr. Francisco J Tinahones Dr. José Lapetra Dr. J. Luís Serra-Majem Dr. Aurora Bueno-Cavanillas Dr. Josep A. Tur Dr. Vicente Martín Sánchez Dr. Xavier Pintó Dr. Miguel Delgado-Rodríguez Dr. Pilar Matía-Martín Dr. Josep Vidal Dr. Clotilde Vázquez Dr. Emilio Ros Prof. José M. Ordovás Dr. Rodrigo San Cristóbal
Date: 21-24/06/2021
Country: Spain (Virtual event)
Type of communication: Poster
Web: https://www.seen.es/portal/otras-actividades/38th-international-symposium-on-diabetes-and-nutrition

Congress: 38th International Symposium on Diabetes and Nutrition (DNSG 2021)
Title: Ultra-processed products and markers of liver health: longitudinal analysis in older individuals with metabolic syndrome from the PREDIMED-Plus trial cohort
Authors: Dr. Jadwiga Konieczna Miguel Fiol Marga Morey Maira Bes-Rastrollo Miguel Ruiz-Canela Jesús Vioque Sandra Gonzalez-Palacios Lidia Daimiel Miguel Ángel Martínez-González Jordi Salas-Salvadó Alfredo Martínez Dora Romaguera
Date: 21-24/06/2021
Country: Spain (Virtual event)
Type of communication: Poster
Web: https://www.seen.es/portal/otras-actividades/38th-international-symposium-on-diabetes-and-nutrition

Congress: International Human Microbiome Consortium Congress (IHMC 2021)
Title: Establishment of Microbial Biomarkers in non-responding celiac disease patients
Authors: Laura Judith Marcos-Zambrano, Juliana Arcila, Ana Ramírez de Molina, Viviana Loria-Kohen, Enrique Carrillo de Santa Pau
Date: 27-29/06/2021
Country: Barcelona, Spain (Virtual event)
Type of communication: Poster
Web: https://www.microbiomesupport.eu/2021-microbiome-events-conferences/

Congress: 31st European Congress of Clinical Microbiology & Infectious Diseases (ECCMID)
Title: Microbiome in Celiac Disease: Changes in microbial profile along the gastrointestinal tract revealed by 16S rRNA high throughput gene sequencing
Authors: Laura Judith Marcos-Zambrano, Juliana Arcila, Ana Ramírez de Molina, Viviana Loria-Kohen, Enrique Carrillo de Santa Pau
Date: 09-12/07/2021
Country: Viena, Austria (Virtual event)
Type of communication: Poster
Web: https://2021.eccmid.org/

Congress: XII ISIN Conference on Immunonutrition
Title: Immunonutritional supplements for precision nutrition at controlling infectious and inflammatory processes
Authors: José Moisés Laparra Llopis, Adrian Bouzas, Marta Gómez De Cedrón, Guillermo Reglero, Ana Ramírez
Date: 14-16/07/2021
Country: Barcelona, Spain (Virtual event)
Type of communication: Poster
Web: https://www.isinbarcelona2021.com/

Congress: 43rd Annual Meeting of the Spanish Society of Biochemistry and Molecular Biology (SEBBM Congress)
Title: miR-7 regulates mitochondrial metabolism and autophagy in neuronal and glial cells
Authors: Torrecilla-Parra M., Fernández-de Frutos M., Pérez-García A., Martín-Martín Y., Pardo-Marqués V., Boscá L, Aranda JF, Ramírez CM
Date: 19 /07/2021
Country: Barcelona, Spain
Type of communication: Poster
Web: https://congresosebbm.barcelona2021.es/

Congress: 43rd Annual Meeting of the Spanish Society of Biochemistry and Molecular Biology (SEBBM Congress)
Title: Role of miR-7/hnRNPK in cholesterol biosynthesis
Authors: Fernández-de Frutos M., Torrecilla-Parra M., Pérez-García A., de la Peña G., Martín-Martín Y., Pardo-Marqués V., Gómez Coronado D, Busto R., Ramírez CM
Date: 19 /07/2021
Country: Barcelona, Spain
Type of communication: Poster
Web: https://congresosebbm.barcelona2021.es/

Congress: American Chemical Society Fall 2021 Meeting
Title: Nuisance substructures and aggregators in a database of food compounds (FooDB) as source for putative false positives and promiscuity in their bioassays
Authors: Colmenarejo, G.; Sánchez-Ruiz, A.; Kaya, I.
Date: 23/08/2021
Country: Atlanta, EEUU
Type of communication: Oral Communication
Web: https://www.acs.org/content/acs/en/meetings/acs-meetings.html

Congress: Oxford Venoms & Toxins Conference
Title: The anti-tumoral profile of an octopus tachykinin peptide in melanoma of BRAF mutation is mediated by the structural conformation in the neurokinin 1 receptor-binding domain
Authors: Maria P. Ikonomopoulou
Date: 25-27/08/2021
Country: Virtual Event
Type of communication: Oral Communication
Web: http://lpmhealthcare.com/venoms-and-toxins-2021/

Congress: PBA 2021
Title: A Multi-OMICS Study of Treatment-Related Metabolic Deprograming in Pancreatic Cancer PBA2021
Authors: Maria P. Ikonomopoulou
Date: 29/08/2021-01/09/2021
Country: Kyoto, Japan
Type of communication: Oral Communication (Educational Special Lecture)
Web: http://soyaku.phar.kyushu-u.ac.jp/PBA2021/index.html

Congress: ARRDD2021
Title: A Long-lasting Metabolic Memory elicited by Short Cycles of Very Low-Calorie Intake
Authors: Alberto Diaz-Ruiza,b, Tyler Rhinesmitha, Laura C.D. Pomattoa, Nathan L. Pricea, Farzin Eshaghia, Margaux R. Ehrlicha, Jacqueline M. Moatsa, Melissa Carpentera, Annamaria Rudderowa, Sebastian Brandhorstc, Julie A. Mattisond, Miguel A. Aona,e, Michel Berniera, Valter D. Longoc,f and Rafael de Caboa,b
Date: 31/08/2021-03/09/2021
Country: Copenhaguen, Denmark
Type of communication: Poster
Web: http://agingpharma.org/

Congress: CIBERobn Symposium
Title: Prospective associations between a priori dietary patterns adherence and kidney function in an elderly Mediterranean population at high cardiovascular risk
Authors: Valle-Hita;Díaz-LópezA;Becerra-TomásN;Martínez-GonzálezMA;RuizGarcíaV;CorellaD;GodayA; AlfredoMartínezJ;Alonso-GómezAM;WärnbergJ;VioqueJ;RomagueraD;López-MirandaJ;EstruchR;TinahonesFJ;Lapetra J;Serra-MajemL;Cano-bañezN;TurJA;Rubín-GarcíaM;PintóX;Delgado-RodríguezM;Matía-MartínP;VidalJ;MasFontaoS;DaimielL;ROsE;ToledoE;SorlíJV;RocaC;Abetel;Moreno-RodriguezA;Crespo-OlivaE;Candela-GarcíaI;MoreyM;Garcia-RiosA;CasasR;Fernandez-GarciaJC;Santos-LozanoJM;Diez-EspinoJ;Ortega-AzorínC;ComasM;ZuletMA;Sorto-SanchezC;Ruiz-CanelaM;FitóM;Salas-SalvadóJ;BabioN
Date: 26-28/10/2021
Country: Virtual Event
Type of communication: Poster
Web: https://simposio.ciberobn.es/

Congress: EUVEN 1st Congress
Title: The anti-tumoral profile of an octopus tachykinin peptide in melanoma of BRAF mutation is mediated by the structural conformation in the neurokinin 1 receptor-binding domain A Long-lasting Metabolic Memory elicited by Short Cycles of Very Low-Calorie Intake
Authors: Maria P. Ikonomopoulou
Date: 14-16/09/2021
Country: Virtual Event
Type of communication: Oral Communication
Web: https://www.euven-congress.eu/

Congress: EUVEN 1st Congress
Title: Unravelling the cytotoxic mechanism of the Octpep-1 venom-derived peptide in BRAF(V600E) mutated melanoma and its synergy with mTORC1 and ERK inhibitors
Authors: Javier Moral-Sanz, Ana Vela-Sebastian, Manuel Fernandez-Rojo, Jeremy Potriquet, Andreas Brust, Patrick Wilhelm, Taylor B Smallwood, Richard J Clark, Bryan G. Fry, Paul F. Alewood, John J. Miles, Jason P Mulvenna, Maria P. Ikonomopoulou
Date: 14-16/09/2021
Country: Virtual Event
Type of communication: Poster (Flash talk)
Web: https://www.euven-congress.eu/

Congress: EUVEN 1st Congress
Title: Cholesterol modulates the cytotoxicity of Gomesin in melanoma of BRAF mutation
Authors: Ana Vela-Sebastian, Javier Moral-Sanz, Sergey Kurdyukov, Andreas Brust, Patrick Wilhelm, Paul F. Alewood, G. Gregory Neely, Evelyne Deplazes, María P. Ikonomopoulou
Date: 14-16/09/2021
Country: Virtual Event
Type of communication: Poster (Flash talk)
Web: https://www.euven-congress.eu/

Congress: CIISE2021
Title: Metabolic adaptations induced by Short Cycles of Very Low-Calorie Intake
Authors: Alberto Diaz-Ruiz
Date: 14-16/09/2021
Country: Murcia, Spain
Type of communication: Oral Communication
Web: https://ciise.es

Congress: 14th Congress of the International Society of Nutrigenetics/Nutrigenomic
Title: Trimethylamine N-oxide (TMAO) modulates the expression of cardiovascular disease related microRNAs and their targets.
Authors: Laura Díez-Ricote, Paloma Ruiz-Valderrey, Víctor Micó, Joao Tomé Carneiro, Alberto Dávalos, José M Ordovás, Lidia Daimiel
Date: 26-28/09/2021
Country: Rumania (Virtual Event)
Type of communication: Poster
Web:https://iuns.org/events/isnn-2021-14th-congress-of-the-international-society-of-nutrigenetics-nutrigenomics-2/

Congress: 14th Congress of the International Society of Nutrigenetics/Nutrigenomics
Title: Diverse effects of pterostilbene and resveratrol in gastrointestinal physiology after feeding rats a high-fat high-fructose diet
Authors: I. Milton-Lastkibar, L-J. Marcos-Zambrano, S. Gomez-Zorita, A. Fernández-Quintela, E. Carrillo de Santa Pau, J.A. Martínez, M.P. Portillo.
Date: 26-28/09/2021
Country: Rumania (Virtual Event)
Type of communication: Poster
Web:https://iuns.org/events/isnn-2021-14th-congress-of-the-international-society-of-nutrigenetics-nutrigenomics-2/

Congress: 14th Annual Congress of the International Society of Nutrigenetics/ Nutrigenomics (ISNN congress)
Title: Activation of thermogenesis and mitochondrial function by natural extracts to relieve the metabolic stress and inflammation associated to obesity
Authors: M. Reguero, M. Gómez de Cedrón, A. Bouzas, G. Reglero, J.C. Quintela, A. Ramírez de Molina
Date: 26-28/09/2021
Country: Timisoara, Rumania
Type of communication: Poster
Web: https://iuns.org/events/isnn-2021-14th-congress-of-the-international-society-of-nutrigenetics-nutrigenomics-2/

Congress: VIII Social Communication of Science Congress (CCSC21)
Title: Picture Your Microbes: Un proyecto de acción participativa y cocreación para empoderar a los ciudadanos en las decisiones de salud nutricional
Authors: Laura J. Marcos-Zambrano, Silvia Garcia, Sheyla Ordoñez, Enrique Carrillo de Santa Pau
Date: 29/09/2021-01/10/2021
Country: Barcelona, Spain. Virtual Event
Type of communication: Oral Communication
Web: https://aecomunicacioncientifica.org/ccsc21/

Congress: III BioinfoCAM Meeting
Title: Detection of Food Drug interactions using natural languague processing techiniques in the context of FNS-Cloud project
Authors: Marco Garranzo Asensio, Teresa Laguna Lobo, Enrique Carrillo de Santa Pau
Date: 21/10/2021
Country: Madrid, Spain
Type of communication: Oral Communication
Web: https://express.adobe.com/page/daTL3n6GyMo1Q/

Congress: III BioinfoCAM Meeting
Title: De-novo assembly and comparative transcriptomics of the Body Wall of Wild and Farmed Sea Cucumber Isostichopus badionotus
Authors: Martín-Hernández, R.; Rodríguez-Canul, R.; Kantún-Moreno, N.; Olvera-Novoa, MA.; Medina-Contreras, O.; Garikoitz-Legarda, C.; Triviño, JC.; Zamora-Briseño, JA.; May-Solis, V.; Poot-Salazar, A.; Pérez-Vega, JA.; Gil-Zamorano, J.; Grant, G.; Dávalos, A.; Olivera-Castillo, L.
Date: 21/10/2021
Country: Madrid, Spain
Type of communication: Oral Communication
Web: https://express.adobe.com/page/daTL3n6GyMo1Q/

Congress: 3rd Traslacional Hepatology Meeting (AEEH)
Title: Long- but not short-term adaptations promoted by cycles of limited food intake are influenced by diet.
Authors: Alberto Diaz-Ruiza,b, Tyler Rhinesmitha, Laura C.D. Pomattoa, Nathan L. Pricea, Farzin Eshaghia, Margaux R. Ehrlicha, Jacqueline M. Moatsa, Melissa Carpentera, Annamaria Rudderowa, Sebastian Brandhorstc, Julie A. Mattisond, Miguel A. Aona,e, Michel Berniera, Valter D. Longoc,f and Rafael de Caboa,b
Date: 22-23/10/2021
Country: Alicante, Spain
Type of communication: Oral Communication
Web: https://ww2.aeeh.es/2021/09/3reunionhepatologia

Congress: XIX SEBC Congress
Title: Plasma Membrane Redox System, at the crossroad of metabolism, aging and cancer
Authors: Alberto Diaz-Ruiz1,2 I Michael Lanasa1 I Joseph Garcia1 I Miguel Calvo-Rubio1,3 I Jose Manuel Villalba3 I Placido Navas4 I Michel Bernier1 I Rafael de Cabo1,2
Date: 26-29/10/2021
Country: Alicante, Spain
Type of communication: Oral Communication
Web: http://www.xixcongresosebc.com

Congress: IV Congress of Food, Nutrition and Dietetics: Personalized Nutrition and Precision Dietetics
Title: Ultra-processed foods: evaluation of their classification, consumption and associated epigenetic fingerprints
Authors: Martinez-Perez C, San-Cristobal R, Climent-Mainar C, Daimiel L, Ordovas JM
Date: 23-26/11/2021
Country: Madrid, Spain
Type of communication: Oral Communication
Web: https://www.congresoand.com/2021/index2.asp

Congress: IV Congress of Food, Nutrition and Dietetics: Personalized Nutrition and Precision Dietetics
Title: Nutrigenetic testing as a tool for precision feeding
Authors: Espinosa-Salinas Isabel, Fernandez-Cabezas Jorge, Fernandez-Diaz Cristina M., Reglero Guillermo, Martinez J.Alfredo, Ramirez de Molina Ana
Date: 23-27/11/2021
Country: Madrid, Spain
Type of communication: Oral Communication
Web: https://www.congresoand.com/2021/index2.asp

Congress: 6th Disease Maps Community Meeting (DMCM 2021)
Title: Reconstruction of a context-specific metabolic model SW620 colorectal cancer cell line to study the metabolic effect of rosemary extract
Authors: Jordi Roma Pi, Miguel Ponce de León, Enrique Carrillo de Santa Pau, Alfonso Valencia
Date: 29-30/11/2021
Country: Rostock, Germany
Type of communication: Oral Communication
Web: https://disease-maps.org/DMCM2021

Congress: XIII Spanish Drug Discovery Network Meeting (SDDN Meeting)
Title: Leveraging cheminformatics and machine learning in the analysis and design of bioactive compounds: foods, metabolites, and drugs
Authors: Sánchez-Ruiz, A.; Gil-Pichardo, A.; Kaya, I.; Colmenarejo, G.
Date: 29-30/11/2021
Country: Madrid, Spain
Type of communication: Poster
Web: https://www.lanavemadrid.com/actividad/xiii-sddn-meeting/

Congress: SFET Meeting 2021
Title: Lipids & cholesterol mediate the cytotoxicity of gomesin peptides
Authors: Moral-Sanz, J., Kurdyukov, S., Vela-Sebastián, A., Dekan, Z., Kremsmayr, T., Muttenthaler, M., Alewood, P.F.A., Neely, G.G., Deplazes, E., Ikonomopoulou, M.P.
Date: 09-10/12/2021
Country: France (Virtual Event)
Type of communication: Oral Communication
Web: http://sfet.asso.fr/international/

Congress: Singapore Society for Mass Spectrometry (SSMS Day 2021)
Title: A new approach to dissect the molecular basis of abnormal brain intercellular communication in schizophrenia.
Authors: C Lorca; X Gallart-Palau; A Serra
Date: 09-10/12/2021
Country: Singapur
Type of communication: Oral Communication
Web: https://www.ssms.org.sg/

Congress: UIC Annual diabetes and Obesity Research Day
Title: PPAR gamma expression in hepatocytes contributes to increase hepaticfibrosis independently of steatosis when nash is induced after establisheddiet-induced obesity.
Authors: Dr. Samuel Man Lee, Dr. Alberto Diaz-Ruiz, Jose Muratalla and Dr. Jose Cordoba Chacon,
Date: 10/12/2021
Country: Chicago, EE. UU.
Type of communication: Poster
Web: https://chicago.medicine.uic.edu/departments/academic-departments/medicine/endocrinology-diabetes-metabolism/uic-diabetes-and-obesity-research-day/

Congress: III International Conference La Valse-Food Network and VI Simposium Chia-Link 2021
Title: C. quinoa to modulate innate myeloid cells in the induction of obesity
Authors: José Moisés Laparra Llopis, Claudia Monika Haros
Date: 15-17/11/2021
Country: Santiago de Chile, Chile
Type of communication: Oral Communication
Web: https://www.cyted.org/es/calendario/iii-conferencia-internacional-del-grupo-la-valse-food-y-vi-simposio-chia-link-1

3.3.2. Invited & plenary talks

Speaker: Dr. Alberto Davalos
Title: Biomaterials and Tissue Engineering
Event: Postgraduate Summer Course. University of Concepción (Chile)
Date: 18-21/01/2021
City & Country: Madrid, Spain
Type: Training

Speaker: Dr. Susana Molina
Title: What is a PCR and how it is applied to Food and nutrition research?
Event: International Day of Woman a Girls in Science. School: IES Europa, Rivas-Vaciamadrid
Date: 08/02/2021
City & Country: Madrid, Spain
Type: Presentation

Speaker: Dr. Pablo J. Fernández Marcos
Title: What is cancer and what can we do from research to fight it?
Event: AECC Seminar
Date: 10/03/2021
City & Country: Madrid, Spain
Type: Conference

Speaker: Dr. Cristina María Fernández
Title: Science in femenine
Event: International Day of Woman a Girls in Science. Politécnico Cristo Rey Institute (Valladolid)
Date: 11/02/2021
City & Country: Valladolid, Spain
Type: Presentation

Speaker: Dr. José Mª Ordovás
Title: Nutrition for a healthier life- the role of precision nutrition. Opportunities and challenges of Foodtech for the Innovation and entrepreneurship ecosystem of Madrid
Event: MIDE
Date: 08/04/2021
City & Country: Madrid, Spain
Type: Presentation

Speaker: Dr. Rodrigo San Cristóbal
Title: Integration of dietary, behavioral, phenotypic and nutrigenetic information in precision nutrition
Conference: IX CODiNuCoVa
Event: D-Nutricionists for the change: towards the Food of the future
Date: 17/04/2021
City & Country: Valencia, Spain
Type: Presentation. Closing talk.

Speaker: Dr. José Mª Ordovás
Title: Nutrition and Genes
Event: XXV International Days of practical Nutrition
Date: 20-22/04/2021
City & Country: Madrid, Spain
Type: Presentation.

Speaker: Dr. Alberto Díaz-Ruiz
Title: Food Solutions to Target Molecular Drivers of Healthy Aging
Event: Food Solutions (Food FE) Kick Off
Date: 29/04/2021
City & Country: Madrid, Spain
Type: Presentation

Speaker: Dr. Francesco Visioli
Title: Industrial explotation of Mediterranean Diet
Event: Master of Innovation and Food development
Date: 11/05/2021
City & Country: Spain
Type: Presentation

Speaker: Dr. Francesco Visioli
Title: Dairy and heart health
Event: International Dairy Federation Nutrition Symposium
Date: 11/05/2021
City & Country: Spain
Type: Presentation

Speaker: Dr. Laura J Marcos Zambrano
Title: Today we talk about… Microbiota
Event: Expert Meeting. Association of celiac and gluten sensitive of Madrid.
Date: 12/05/2021
City & Country: Madrid, Spain
Type: Presentation

Speaker: Dr. Lidia Daimiel Ruiz
Title: Impact of lifestyle interventions on molecular hallmarks of aging
Event: 1st International virtual congress on Exercise, Aging and Health
Date: 13-14/05/2021
City & Country: Cádiz, Spain
Type: Presentation

Speaker: Dr. María José Barrero
Title: Epigenetics meets immuno-oncology
Event: XI Annual Chromatin and Epigenetics symposium
Date: 14/05/2021
City & Country: Barcelona, Spain
Type: Presentation

Speaker: Dr. Francesco Visioli
Title: Omega 3 fatty acids between light and shadow: new acquisitions
Event: Congress of the Italian Society of Phytotherapy
Date: 22/05/2021
City & Country: Spain
Type: Presentation

Speaker: Dr. Francesco Visioli
Title: Poly)phenols and health: setting the record straight
Event: Science and Wine 2nd edition
Date: 02-03/06/2021
City & Country: Spain
Type: Presentation

Speaker: Sara Castillo Alonso
Title: The story of unfolding food to increase trust-
Event: AnnualFoodAgenda-EIT Food 2021 ECSITE Conference (European Network Science Centres & Museums)
Date: 10/06/2021
City & Country: Bilbao, Spain
Type: Presentation

Speaker: Dr. José Mª Ordovás
Title: Food 4 Future
Event: Food 4 Future
Date: 15-17/06/2021
City & Country: Bilbao, Spain
Type: Presentation

Speaker: Dr. Enrique Carrillo de Santa Pau
Title: Food and drug interaction: Understanding of bioactive compounds in foods. Making existing and emerging food nutrition security data and tools FAIRer
Event: FNS-Cloud Symposium. 6th International ISEKI-Food Conference
Date: 21/06/2021
City & Country: Online
Type: Presentation

Speaker: Dr. Cristina Ramírez Hidalgo
Title: Role of miRNAs as molecular links between Diabetes and Alzeimer´s Disease
Event: Radio programme "Researcher around the world " Libertad FM
Date: 01/07/2021
City & Country: Madrid, Spain
Type: Presentation

Speaker: Dr. Cristina Ramírez Hidalgo
Title: Intake markers: the road to objetivity in the dietary record
Event: IV Food, Nutrition and Dietetics Congress
Date: 01/07/2021
City & Country: Madrid, Spain
Type: Presentation

Speaker: Dr. Maria Jesús Lastasa
Title: E_Breakfast with Autonomous University of Madrid
Event: E_Breakfast
Date: 07/07/2021
City & Country: Virtual
Type: Presentation

Speaker: Dr. Iñaki Milton-Laskibar
Title: Gut microbiota induced by pterostilbene and resveratrol in high-fat-high-fructose fed rats: putative role in steatohepatitis onset
Event: EUSKAMPUS. Stilbenes, bioactive molecules with interest for health. New opportunities for nutraceutical and food industry
Date: 08/07/2021
City & Country: Virtual
Type: Conference

Speaker: Dr. Pablo José Fernández Marcos
Title: Molecular perspectives on short-term fasting as a nutritional strategy against aging-related diseases
Event: IIB Scientific Talks
Date: 09/07/2021
City & Country: Madrid, Spain
Type: Presentation

Speaker: Dr. Alberto Diaz-Ruiz
Title: Myoinositol, at the crossroad of metabolism, energy restriction and aging. Stilbenes, bioactive molecules with interest for health. New opportunities for nutraceutical and food industry
Event: Workshop
Date: 07/08/2021
City & Country: Bilbao, Spain
Type: Presentation

Speaker: Dr. Francesco Visioli
Title: Olive oil and health. Influence of the phenolic fraction EVOO: Health, marketing and Pairing
Event: Andalusia International University. Summer School
Date: 23/08/2021
City & Country: Jaen, Spain
Type: Presentation

Speaker: Dr. Francesco Visioli
Title: Supplements active on cholesterol absorption
Event: 11th Probiotics, Prebiotics & New Foods, Nutraceuticals, and Botanicals for Nutrition & Human and Microbiota Health
Date: 12-14/09/2021
City & Country: Rome, Italy
Type: Presentation

Speaker: Dr. Enrique Carrillo de Santa Pau
Title: Food Nutrition and Security Cloud: A case usage of NLP technologies to extract food–drug interactions from scientific and clinical texts
Event: Proceedings of the Iberian Health and Food Language Technologies workshop
Date: 21/09/2021
City & Country: Online
Type: Presentation

Speaker: Dr. Francesco Visioli
Title: Front-of-Package Labels: finding the balance between science and politics
Event: Spirits Europe
Date: 22-24/09/2021
City & Country: Warsaw, Poland
Type: Presentation

Speaker: Dr. Alfredo Martínez
Title: Polyphenols as modulators of gut microbiota composition
Event: 14th Congress of the International Society of Nutrigenetics/Nutrigenomics
Date: 26-28/09/2021
City & Country: Virtual
Type: Conference

Speaker: Dr. José Mª Ordovas
Title: Translating Omics into Practice
Event: American Nutrrition Association
Date: 01/10/2021
City & Country: Chicago, EEUU
Type: Conference

Speaker: Dr. Enrique Carrillo de Santa Pau
Title: Developments on food-drug interactions in the framework of the Food Nutrition Security Cloud (FNS-Cloud)
Event: International Istanbul Technical University Molecular Biology and Genetics Student Congress'21
Date: 01-03/10/2021
City & Country: Turkey, Istanbul (Online)
Type: Conference

Speaker: Dr. Enrique Carrillo de Santa Pau
Title: Alert classification system for food/diet drug interactions: Task 5.4.3
Event: Food Nutrition & Security Cloud Meeting
Date: 03/10/2021
City & Country: Online
Type: Conference

Speaker: Dr. José Mª Ordovas
Title: Personalised Nutrition: from data collection to implementation
Event: ILSI Annual Symposium 2021 – Nurturing the next generation
Date: 05/10/2021
City & Country: Chicago, EEUU
Type: Conference

Speaker: Dr. Maria Jesús Latasa
Title: Round table on entrepreneurship based in Innovation at public institutions
Event: South Summit 2021
Date: 05-07/10/2021
City & Country: Spain
Type: Presentation

Speaker: Dr. Aida Serra
Title: Adaptogens and cognitive health. Session section IV health, Food and Enviroment
Event: Health and Food
Date: 06/10/2021
City & Country: Barcelona, Spain
Type: Presentation

Speaker: Dr. José Mª Ordovas
Title: Global Nutrition
Event: SEK-UCJC International Advisory Board
Date: 11/10/2021
City & Country: Madrid, Spain
Type: Conference

Speaker: Dr. Enrique Carrillo de Santa Pau
Title: Machine Learning & Microbiome for Precision Nutrition
Event: Grand Challenges of Data-Intensive Science in microbiome & metagenome data analysis and training
Date: 14/10/2021
City & Country: Italy (Online)
Type: Presentation

Speaker: Dr. José Mª Ordovas
Title: Precision Nutrition and Healthy Aging symposium "Personalized Nutrition- Science or Fiction.
Event: The National committee of nutrition and food science at the Royal Swedish Academy of Sciences,
Date: 19/10/2021
City & Country: Stockholm, Sweden
Type: Conference

Speaker: Dr. Pablo J. Fernandez-Marco
Title: Molecular study of short-term fasting as a nutritional strategy against diseases associated with aging.
Event: I Biology in nutrition Conference
Date: 23/10/2021
City & Country: Valencia, Spain
Type: Presentation

Speaker: Dr. Esther Cuadrado, Lorena Carrillo, Carolina Rodríguez, Sara Castillo
Title: Food Imaginarium: Virtual reality to fight against childhood obesity in educative centers
Event: CEIP Leopoldo Calvo Sotelo
Date: 25/10/2021
City & Country: Spain (Online)
Type: Presentation

Speaker: Dr. Cristina Ramírez Hidalgo
Title: The figure of research mentoring: from training to research practice
Event: Conference on Training Strategies for the promotion of scientific research. Andalusian School of Public Health
Date: 26/10/2021
City & Country: Granada, Spain
Type: Presentation

Speaker: Dr. J. Alfredo Martínez
Title: Personalized, community and global nutrition from IUNS
Event: XIX Latin American Nutrition Congress: Virtual Congress SLAN 2021
Date: 31/10/2021-04/11/2021
City & Country: Online
Type: Conference

Speaker: Dr. J. Alfredo Martínez
Title: Genomics and microbiota as elements of personalization in the treatment of obesity.
Event: XIX Latin American Nutrition Congress: Virtual Congress SLAN 2021
Date: 31/10/2021-04/11/2021
City & Country: Online
Type: Conference

Speaker: Dr. José Mª Ordovas
Title: Nutrigenomics
Event: FORO LÁCTEO 2021
Date: 04/11/2021
City & Country: Oviedo, Spain
Type: Conference

Speaker: Dr. Esther Cuadrado, Laura Marcos, Lorena Carrillo, Carolina Rodríguez
Title: To farm to fork, your sustainable menu
Event: Science Week. CEIP Asturias
Date: 05/11/2021
City & Country: Spain (Online)
Type: Presentation

Speaker: Dr. José Mª Ordovas
Title: What is precision Nutrition and how it has evolved over the years?
Event: Challenges and Opportunities in Personalized Nutrition
Date: 08/11/2021
City & Country: Online
Type: Conference

Speaker: Dr. José Moisés Laparra Llopis, Claudia Monika Haros
Title: C. quinoa to modulate innate myeloid cells in the induction of obesity
Event: IIII International Conference La Valse-Food Network and VI Simposio Chia-Link 2021
Date: 15-17/11/2021
City & Country: Santiago de Chile, Chile
Type: Oral Communication

Speaker: Dr. José Mª Ordovas
Title: Sensibility when eating: balance and variety
Event: Nutrition and Health Event. FIAB
Date: 16/11/2021
City & Country: Online
Type: Conference

Speaker: Dr. José Mª Ordovas
Title: Precision nutrition: hype or hope for effective interventions to reduce obesity?
Event: Landing Page Obesity Clinic
Date: 17/11/2021
City & Country: Bogotá, Colombia
Type: Conference

Speaker: Dr. Ana Ramírez de Molina
Title: Precision Nutrition as new health strategy
Event: Feed your genes: How diet affects gene expression
Date: 18/11/2021
City & Country: Spain (Online)
Type: Presentation

Speaker: Dr. Alberto Diaz-Ruiz
Title: Intake, Calorie Restriction and Aging
Event: XVII Congress SEEDO
Date: 17-20/11/2021
City & Country: Malaga, Spain
Type: Presentation

Speaker: Dr. Alberto Diaz-Ruiz
Title: Plasma Membrane Redox System, at the crossroad of Metabolism, Aging and Cancer
Event: V GEIRLI Seminar
Date: 24/11/2021
City & Country: Malaga, Spain
Type: Presentation

Speaker: Dr. Pablo J. Fernandez-Marcos
Title: Molecular bases of the relationship between nutrition and aging
Event: IV Food, Nutrition and Food Congress
Date: 24/11/2021
City & Country: Madrid, Spain
Type: Presentation

Speaker: Dr. Alberto Diaz-Ruiz
Title: Metabolic modulation of circadian rhythm through energy restriction
Event: IV Food, Nutrition and Food Congress
Date: 23-26/11/2021
City & Country: Spain (Online)
Type: Presentation

Speaker: Dr. Iñaki Milton Laskibar
Title: Metabolic modulation of circadian rhythm through energy restriction
Event: IV Food, Nutrition and Food Congress
Date: 23-26/11/2021
City & Country: Spain (Online)
Type: Presentation

Speaker: Dr. Víctor Micó Moreno
Title: Nutritype and Nutri-index for a nutritional precision advice.
Event: IV Food, Nutrition and Dietetics. Personalized Nutrition and precision dietetics
Date: 23-26/11/2021
City & Country: Online
Type: Presentation

Speaker: Dr. Aida Serra
Title: Circular Economy and the potential Benefit os science for new Food
Event: Seminar of the Young Academy of Spain 2021. Young people, knowledge and 2030 agenda.
Date: 29/11/2021
City & Country: Barcelona, Spain
Type: Presentation

Speaker: Dr. Iñaki Milton Laskibar
Title: Nutritional health in XXI Century
Event: XXX SEÑ Scientific Meeting
Date: 01-02/12/2021
City & Country: Online
Type: Presentation

Speaker: Dr. José Mª Ordovas
Title: Precision Nutrition: the future nutrition pillar
Event: 9th Mexican Congress of Nutrition. Innovation in nutrition for global health 2030
Date: 02/12/2021
City & Country: Cancún, México
Type: Conference

Speaker: Dr. José Mª Ordovas
Title: The importance of circadian rhythm in metabolic health
Event: Nutrition and Endocrinology International Congress 2021
Date: 03/12/2021
City & Country: Cancún, México
Type: Conference

Speaker: Dr. Pablo J. Fernandez-Marcos
Title: Molecular perspectives of short-term fasting as a nutritional strategy during cancer development and management
Event: INSERM external seminars
Date: 10/12/2021
City & Country: Montpellier, France
Type: Presentation

Speaker: Dr. Cristina Ramírez Hidalgo
Title: Post-transcriptional regulation of metabolism and implication in human diseases
Event: Doctorate seminar in the training área of IMIBIC institute 3rd degree research seminar
Date: 12/12/2021
City & Country: Córdoba, Spain
Type: Seminar

Speaker: Dr. Francesco Visioli
Title: Brief history of polyphenols from extra virgin olive oil and their positive healthy effects
Event: Campo Universitario de Jaén. Health and flavor awards 2022
Date: 14/12/2021
City & Country: Spain (Online)
Type: Presentation

Speaker: Dr. Isabel Espinosa-Salinas
Title: Nutrition and genetics: Personalized Food
Event: Course "Actualization on Natural Sciences Edition XXV"
Date: 15/12/2021
City & Country: Spain
Type: Presentation

Speaker: Dr. Alberto Diaz-Ruiz
Title: Protective hepatic mechanisms of ER and Potential ER-drivers: a 2-way story
Event: Liver Seminars
Date: 15/12/2021
City & Country: Spain (Online)
Type: Presentation

3.4. Memberships in organizing committes

International

1. **International Union of Nutritional Sciences (IUNS)**. J. A. Martínez (President).

2. **International Society of Nutrigenetics/Nutrigenomics (ISNN).** J. A. Martínez (Member).

3. **International Society of Nutrigentics/Nutrigenomics**. Lidia Daimiel (Board of directors).

4. **Journal: Frontiers in Cardiovascular Medicine.** Cristina M. Ramírez Hidalgo (Review Editor)

5. **Journal: Biomolecules.** Cristina M. Ramírez Hidalgo (Scientific Comittee reviewer)

6. **Journal of Biochemistry and Cell Biology.** Cristina M. Ramírez Hidalgo (Scientific Comittee reviewer)

7. **Journal of Frontiers in Cell and Developmental Biology.** Cristina M. Ramírez Hidalgo (Scientific Comittee reviewer)

8. **Journal of Molecular Sciences (IJMS).** Cristina M. Ramírez Hidalgo (Scientific Comittee reviewer)

9. **Journal of Metabolic Brain Diseases.** Cristina M. Ramírez Hidalgo (Editorial reviewer)

10. **Journal Molecular Therapy - Nucleic Acids.** Cristina M. Ramírez Hidalgo (Editorial reviewer)

11. **Metabolic Physiology (specialty section of Frontiers in Physiology).** Cristina M. Ramírez Hidalgo (Editorial reviewer)

12. **BMC Cardiovascular Disorders (Springer nature).** Cristina M. Ramírez Hidalgo (Reviewer Evaluator). Berlín (Alemania).

13. **Brain Research Bulletin (Elsevier).** Cristina M. Ramírez Hidalgo (Reviewer Evaluator). Amsterdam (Holanda).

14. **European Society of Clinical Microbiology and Infectious Diseases.** Laura J Marcos- Zambrano (Member). EU.

15. **Master in Food Systems.** Maria Jesús Latasa (MFS Steering Committee, MFS Operational Board, MFS Graduate Conference). International.

16. **HEADLINES.** Maria Jesús Latasa (Consortium partners committee)

17. **GFVP.** Maria Jesús Latasa (Consortium partners committee)

18. **Food Solutions (FoodFE).** Maria Jesús Latasa (Consortium partners committee)

19. **XKIC Human Capital.** Maria Jesús Latasa (Consortium partners committee)

20. **We Lead Food 2021.** Maria Jesus Latasa and Ana Ramírez de Molina (Consortium partners committee)

21. **DFG-Network Epigenomic Profilling in paediatric lymphoid leukaemias-perspectives fordiagnostics, prognosis and therapy.** Enrique Carrillo de Santa Pau (Member). Germany).

22. **LifeTime.** Enrique Carrillo de Santa Pau (Individual Supporter).

23. **CA18131-Statistical and machine learning techniques in human microbiome studies.** Enrique Carrillo de Santa Pau (MC Substitute) and Laura J Marcos- Zambrano (WG Member).

24. **Nutrients.** J. Esther Cuadrado Soto (Reviewer Board Member of MDPI)

25. **International Biometrics Society.** Gonzalo Colmenarejo (Member)

National

1. **Agencia Española de Seguridad Alimentaria y Nutrición (AESAN).** J. Alfredo Martínez (Member of the scientific committee of the report on Nutritional Reference Intakes for the Spanish population).

2. **Agencia Española de Seguridad Alimentaria y Nutrición (AESAN).** J. Alfredo Martínez (Member of the scientific committee of the report on the impact of the consumption of "ultra-processed" foods on consumers' health).

3. **Spanish Federation of Societies of Nutrition, Food and Dietetics (FESNAD).** J. Alfredo Martínez (Member).

4. **Centre for Networked Biomedical Research on the Physiopathology of Obesity and Nutrition (CIBER-Obn).** J. A. Martínez (Member).

5. **Spanish Nutrition Society (SEN).** R. San Cristobal (Member).

6. **Spanish Agency for Food Safety and Nutrition (AESAN).** R. San Cristobal (External contributor to the report on Nutritional Reference Intakes for the Spanish population).

7. **Scientific and Technical Committee of the State Research Agency.** José Mª Ordovás (Member)

8. **Spanish Society of Arteriosclerosis.** Lidia Daimiel.

9. **Spanish Society of Community Nutrition.** Lidia Daimiel.

10. **Official College of Nutritionists of Madrid.** Laura Berninches (Communication Vowel)

11. **TransBIoNet.** Enrique Carrillo de Santa Pau (Member).

12. **Madiabetes.** Enrique Carrillo de Santa Pau (Member).

13. **Spanish Society of Bioinformatics and Computational Biology.** Enrique Carrillo de Santa Pau (Member, board of directors and vocal training).

14. **Biostatnet.** Gonzalo Colmenarejo (Member).

15. **Catalan Association in Food Sciences.** Aida Serra (Member).

16. **Official College of Pharmacists of Madrid.** J. Esther Cuadrado Soto (Member)

17. **Spanish Drug Discovery Network.** Andrés Sánchez-Ruiz (Member)

18. **Royal Spanish Society of Chemistry.** Andrés Sánchez-Ruiz (Member of the Specialized Group of Chemistry and Computer Science National Scientist)

19. **Biostatnet (Madrid's Node).** Gonzalo Colmenarejo (Member)

20. **Royal Spanish Chemistry Society.** Gonzalo Colmenarejo (Member of the specialized group in chemistry and computation)

21. **Spanish Drug Discovery Network.** Gonzalo Colmenarejo (Member)

22. **Scientist Returned to Spain (CRE).** Cristina Ramírez (Program Coordinator)

23. **Grants for R+D+i projects, under a competitive concurrence regime, aimed at universities and public entities, carried out by the Ministry of Economic Transformation, Industry, Knowledge and Universites of the Junta de Andalucía.** Cristina Ramírez (Scientific Committee)

3.5. Awards

1. European Society of Clinical Microbiology and Infectious Diseases (ESMID). **Dr. Laura J Marcos Zambrano.**

2. Beer and Health. Beer and Health Publication Award. **Dr. Victor Micó.**

3. Featured scientist in the Ranking of Word Scientist of Standfort University. **Dr. Jose Mª Ordovás.**

4. The Univesity of Queensland. Honorary Associate Professor. **Dr. Maria Ikonomopoulou.**

3.6. Seminars

1. *"Overcoming limitations in ultra-processed food research: a new UPF consumption assessment tool".* **Celia Martínez,** Postdoctoral Researcher of Nutritional Genomics and Epigenomics Group. March 2021.

2. *"Circulating bilirubin: A protective metabolite against type 2 diabetes and fatty liver?"* **Dr. Jose Luis Santos Martín.** May 2021.

3. *"Glial cells in metabolic control".* **Dr. Julie Chowen.** June 2021.

4. *"Plasma Membrane Redox System, at the crossroad of Metabolism, Aging and Cancer"* **Dr. Alberto Díaz-Ruiz.** Nov 2021.

5. *"Molecular perspectives of short-term fasting as a nutritional strategy during cancer development and management".* **Dr. Pablo J. Fernández Marcos**. Dec. 2021.

6. *"Regulación postranscripcional del metabolismo e Implicaciones en enfermedades humanas".* **Dr. Cristina Ramírez Hidalgo** Dec 2021.

7. *"Protective hepatic mechanisms of ER and Potential ER-drivers: a 2-way story".* **Dr. Alberto Diaz-Ruiz.** Dec 2021.

4. Technology offer

4.1. Patents

Patent title: Biocompatible extracellular vesicles obtained from fermented food industry by-products, compositions and applications thereof
Inventors and authorship percentage: Dr. Aida Serra (40%); Dr. Xavier Gallart-Palau (40%); Cristina Lorca (5%) and Dr. Elisabet Vilella (15%).
Participating entities (owners): IMDEA Food, Institut d'Investigació Sanitaria Pere Virgili – Hospital Universitari Institut Pere Mata (IISPV-HUIPM) and Ciber Consortium.
Application No.: EP21382983.1.
Registration date: 02/11/2021.
EU Patent Attorney: Herrero y Asociados Madrid (H&A).

4.2. Spin-offs

Technology- Based Companies promoted by IMDEA Food and the Autonomous University (UAM) of Madrid (UAM) for the the industrial and commercial exploitation of innovations derived from the IMDEA Food and UAM in the field of precision nutrition, that is to say in the design and application of effective nutritional strategies in the improvement of health, adapted to the genetic profile of people and their lifestyle or physiological situation.

Precision ForHealth S.L. (P4H)
Technology- Based Company recognized by Agreement of the Delegate Committee of the IMDEA Food's Board of Trustees on December 11, 2017, and Knowledge Based Company of the Autonomous University of Madrid, recognized by agreement of the Government Council of the UAM. Dated on November 17, 2017 and constituted on February 2018.

Forchronic S.L.
Technology-Based Company promoted by IMDEA Food and the Autonomous University of Madrid constituted on March 2019.

5. Training, communication and outreach

5.1. Defended Theses

Title: Physical activity, frailty, physical function and mortality in the elderly.
Student: Sara Higueras Fresnillo
Advisors: Dr. David Martínez Gómez
Date of defense: 24/06/2021
URI: http://hdl.handle.net/10486/697143

Title: Genetic and environmental determinants of nutritional status in a group of schoolchildren in the city of Madrid. GENYAL project for the prevention of chilhood obesity.
Student: Helena Marcos Pasero
Advisors: Dr. Viviana Loria Kohen and Dr. Guillermo Reglero
Date of defense: 08/07/2021

Title: Non-coding RNAs modulated by dietary bioactive compounds
Student: Diana Carolina Mantilla Escalante
Advisors: Dr. Ana Ramírez de Molina and Dr. José Carlos Quintela
Date of defense: 28/07/2021

5.2. Internships/visiting students

Title: Nutritional and pharmacological synergies: application in preclinical cancer models
Student: Silvia Costa
Advisor: Dr. Alberto Díaz-Ruiz
Visiting student from: UAM (Extracurricular Internships)
Period: 10/01/2020 – 31/01/2021

Student: Physiological effects of a moringa plant extract on healthy ageing in preclinical models
Student: Paula Ostos Arellano
Advisor: Dr. Alberto Díaz-Ruiz
Visiting student from: UFV
Period: 09/11/2020 – 16/07/2021

Student: Carmen Mazarío Gárgoles
Advisor: Maria E. Rodriguez Garcia-Rendueles
Visiting student from: UFV (PFG)
Period: 01/02/2021 - 30/06/2021

Student: Belén Fernández Requena
Advisor: Dr. Alberto Dávalos
Visiting student from: UAH (Extracurricular Internships)
Period: 01/02/2021 - 15/09/2021

Student: Silvia García Caballero
Advisor: Dr. Laura J Marcos Zambrano
Visiting student from: EFA Valdemilanos Training Center
Period: 01/02/2021 - 19/02/2021

Student: Sheyla Karina Ordoñez Cabascango
Advisor: Dr. Laura J Marcos Zambrano
Visiting student from: EFA Valdemilanos Training Center
Period: 01/02/2021 - 19/02/2021

Student: Graciela Velasco Ares
Advisor: Dr. Moisés Laparra Llopis
Visiting student from: UAM (Extracurricular Internships)
Period: 08/02/2021 - 25/05/2021

Student: Daniel Gonzalez Ledesma
Advisor Dr. Pablo Fernández Marcos
Visiting student from: UAM (Profesional Instenships)
Period: 08/02/2021 - 25/05/2021

Student: Patricia Bermúdez Gómez
Advisor: Cristina Ramírez Hidalgo
Visiting student from: UAM (Profesional Instenships)
Period: 08/02/2021 - 25/05/2021

Student: Natalia Casaus Perez de Vargas
Advisor: Lidia Daimiel Ruiz
Visiting student from: UAM (Profesional Instenships)
Period: 08/02/2021 - 25/05/2021

Student: Andrea Garcia Cardete
Advisor: Dr. Marta Gómez de Cedron Cardeñosa,
Visiting student from: UAM (Profesional Instenships)
Period: 08/02/2021 - 25/05/2021

Student: Andrea García Cardete
Advisor: Dr. Marta Gómez de Cedrón Cardeñosa
Visiting student from: UAM (Profesional Instenships)
Period: 08/02/2021 - 25/05/2021

Student: Ines Cuesta Gil
Advisor: Dr. Isabel Espinosa
Visiting student from: UAM (Profesional Instenships)
Period: 08/02/2021 - 25/05/2021

Student: Lucas Morató Nieto
Advisor: Dr. Pablo Fernández Marcos
Visiting student from: UFV
Period: 08/02/2021 - 30/05/2021

Student: Andrea del Saz Lara
Advisor: Dr. Alberto Dávalos
Visiting student from: UCLM (Doctorate)
Period: 08/02/2021 - 31/08/2024

Student: Andrea del Saz Lara
Advisor: Dr. Alberto Dávalos
Visiting student from: UCLM (Doctorate)
Period: 08/02/2021 - 31/08/2024

Student: Alba Cristina Cano Martín
Advisor: Dr. Alberto Díaz-Ruiz
Visiting student from: UAH
Period: 17/02/2021 - 27/09/2024

Student: Irati Torre
Advisor: Dr. Maria Oikonomopoulou
Visiting student from: UAM
Period: 22/02/2021 - 30/04/2024

Student: Aitana Herrera Azcona
Advisor: Dr. Moisés Laparra Llopis
Visiting student from: U. Rovira i Virgili
Period: 22/02/2021 - 01/06/2021

Student: M. Campo Medina Martinez
Advisor: Dr. Lidia Daimiel Ruiz
Visiting student from: U. Rovira i Virgili
Period: 22/02/2021 - 01/06/2021

Student: M. Campo Medina Martinez
Advisor: Dr. Lidia Daimiel Ruiz
Visiting student from: UIV (TFM)
Period: 08/03/2021 - 24/06/2021

Student: Miriam del Mar Merchán Camacho
Advisor: Dr. Maria Barrero
Visiting student from: UC3M
Period: 15/03/2021 - 15/07/2021

Student: Lidia Amigo Morán
Advisor: Dr. Lidia Daimiel Ruiz
Visiting student from: UAM
Period: 18/03/2021 - 28/05/2021

Student: Adriana Uriarte Navarrete
Advisor: Dr. Marta Gómez de Cedrón
Visiting student from: UCM (Extracurricular Instenships)
Period: 12/04/2021 - 30/05/2021

Student: Jorge Parra Asensio
Advisor: Dr. Isabel Espinosa
Visiting student from: UAM (Extracurricular Instenships)
Period: 12/04/2021 - 01/06/2021

Student: Ana María del Carmen Baeza Soler
Advisor: Dr. Elena Aguilar
Visiting student from: UAM
Period: 12/04/2021 - 01/06/2021

Student: Alicia Méndez Huerta
Advisor: Lidia Daimiel Ruiz
Visiting student from: CEU San Pablo University
Period: 03/05/2021 - 02/07/2021

Student: María Martínez Rodríguez
Advisor: Dr. Lidia Daimiel Ruiz
Visiting student from: CEU San Pablo University
Period: 05/05/2021 - 18/06/2021

Student: Mustafa Fevzi Karagoz
Advisor: Dr. Lidia Daimiel Ruiz
Visiting student from: Erasmus+. Gazi University (TURKEY)
Period: 28/06/2021 - 31/08/2021

Student: Ana Belén Alonso Aguado
Advisor: Dr. Pablo Fernández Marcos
Visiting student from: AECC Scientific Foundation
Period: 31/08/2021 - 01/07/2021

Student: Hatim Boughanem
Advisor: Dr. Alberto Dávalos
Visiting student from: Hospital U. de la U. de Málaga (Research Internship)
Period: 01/07/2021 - 30/09/2021

Student: Marina Reguero
Advisor: Dr. Mª Jesús Latasa
Visiting student from: Estancia RIS Fellowships de EIT Food (Doctorate Student)
Period: 01/07/2021 - 31/12/2021

Student: Adrian Bouzas
Advisor: Dr. Mª Jesús Latasa
Visiting student from: Estancia RIS Fellowships de EIT Food (Doctorate Student)
Period: 01/07/2021 - 31/12/2021

Student: Francisco Javier Valero Regalón
Advisor: Dr. Pablo Fernández Marcos
Visiting student from: UAM
Period: 19/07/2021 - 11/08/2021

8. Student: Meryem Göktaş Ölmez
Advisor: Dr. Lidia Daimiel Ruiz
Visiting student from: Erasmus +. Dicle University (Turkey) Practical internship.
Period: 30/08/2021 - 05/11/2021

Student: Esther Mª Durán Mateos
Advisor: Dr. Fernández Marcos
Visiting student from: CEU San Pablo University
Period: 01/09/2021 - 30/09/2022

Student: Lydia Bares López
Advisor: Dr. Mª Jesus Latasa Sada
Visiting student from: UCA (RIS Fellowships EIT Food)
Period: 01/09/2021 - 31/12/2021

Student: Sandra Canelles Ortiz
Advisor: Dr Pablo Fernández Marcos
Visiting student from: CIBERobn (Research Internships)
Period: 06/09/2021 - 01/10/2021

Student: Elena Xisela Yáñez martínez
Advisor: Dr Pablo Fernández Marcos
Visiting student from: UFV
Period: 06/09/2021 – 04/02/2022

Student: Belén Hertogs Alciturri
Advisor: Dr Moises Laparra
Visiting student from: UCM
Period: 07/09/2021 – 08/10/2022

Student: Oscar Geovanny Enríquez Martínez
Advisor: Dr Lidia Daimiel Ruiz
Visiting student from: Universidade Federal do Espirito Santo (Brasil)
Period: 16/09/2021 – 14/12/2022

Student: Blanca Lacruz Pleguezuelos
Advisor: Dr Laura Judith Marcos Zambrano
Visiting student from: UAM (TFM)
Period: 04/10/2021 – 21/01/2022

Student: David Atuahene
Advisor: Dr Carolina Maestre Ferrín
Visiting student from: UAM (EIT Food Master Thesis)
Period: 30/06/2021

Student: Julio Ricardo Rueda
Advisor: Dr Moises Laparra
Visiting student from: National Council for Scientific and Technical Research (Argentina). Collaboration postdoctoral stay (CONICIT)
Period: 12/10/2021-12/11/2021

Student: Belén Porta Díaz
Advisor: Dr Moises Laparra
Visiting student from: UCM
Period: 13/10/2021-12/11/2021

Student: Sara Escalona Fernández
Advisor: Dr Moises Laparra
Visiting student from: UCM
Period: 13/10/2021-12/11/2021

Student: Claudia Camarero Hoyos
Advisor: Dr Maria Oikonomopoulou
Visiting student from: TFM (Pharmacology Master)
Period: 18/10/2021-18/07/2022

Student: Anna Carrera Salinas
Advisor: Dr Laura Judith Marcos Zambrano
Visiting student from: Institut d'Investigació Biomèdica de Bellvitge (IDIBELL)
Period: 25/10/2021-29/10/2021

Student: Claudia Camarero Hoyos
Advisor: Dr Maria Oikonomopoulou
Visiting student from: TFM (Pharmacology Master)
Period: 18/10/2021-18/07/2022

Student: Larissa Almenara
Advisor: Dr Alfredo Martínez
Visiting student from: Federal University of Rio de Janeiro
Period: 02/11/2021-01/12/2021

Student: Karina Santos
Advisor: Dr Alfredo Martínez
Visiting student from: Federal University of Rio de Janeiro
Period: 02/11/2021-30/11/2021

Student: Ester del Castillo Ruiz
Advisor: Dr Judit Gil Zamorano
Visiting student from: UAM (TFG)
Period: 02/11/2021-30/06/2022

Student: Elena Diaz Rubio
Advisor: Dr Ana Ramírez de Molina
Visiting student from: spin-off FORCHRONIC (Torres Quevedo Doctorate)
Period: : 15/11/2021

Student: Lara Pérez Martínez
Advisor: Dr Ana Ramírez de Molina
Visiting student from: spin-off FORCHRONIC (Torres Quevedo Doctorate)
Period: 15/11/2021

Student: Lucas Morató Nieto
Advisor: Dr Pablo Fernandez Marcos
Visiting student from: Niño Jesús Hospital
Period: 15/11/2021

Student: Lucas Morató Nieto
Advisor: Dr Mª del Carmen Lopez de las Hazas/ Alberto Dávalos
Visiting student from: FIMABIS
Period: 22/11/2021

5.3. Teaching in masters and other courses

Master

1. *Implementation of the Worshop local 3.* EFSET. EIT Food 2021. Dr. Mª Jesús Latasa

2. *Implementation of the Worshop local 4.* EFSET. EIT Food 2021. Dr. Mª Jesús Latasa

3. *Industry challenges in Food Systems.* EFSET. EIT Food 2021. Dr. Mª Jesús Latasa

4. *Personalized Functional Foods.* Master in Food Systems -UAM. Dr. Cristina M. Ramírez

5. *Personalized Nutrition is coming.* Master in Food Systems -UAM. Dr. Enrique Carrillo de Santa Pau

6. *Effect of the microbiome over CRC onset and progression.* Master in Food Systems -UAM. Dr. Laura J Marcos Zambrano

7. *Analysis of Single Nucleotide Polymorphisms (SNP) from human samples.* Master in Food Systems -UAM. Dr. Susana Molina Arranz

8. *Hands-on: Metagenomics approaches for studying microbiota with MGnify database, taxonomic and functional analysis of microbiome data.* Master in Food Systems – UAM. Dr. Laura Marcos

9. *Module: Personal Nutrition and Chronic Diseases Block: Molecular Oncology.* International Master in Food Systems -UAM. Dr. Ana Ramirez de Molina, Dr. Marta Gómez de Cedrón and Silvia Cruz Gil

10. *Personal Nutrition and Chronic Diseases. Block: Personalized Functional Foods.* Master in Food Systems-UAM. Dr. Alberto Diaz-Ruiz

11. *Personalized Nutrition is coming.* Master in Food Systems – UAM. Dr. Enrique Carrillo de Santa Pau

12. *Design and implementation of nutritional intervention studies.* Master in Food Systems – UAM. Dr. María Isabel Espinosa Salinas

13. *Nutritional interventions related to personalized nutrition.* Master in Food Systems – UAM. Dr. María Isabel Espinosa Salinas

14. *Analysis of Single Nucleotide Polymorphisms (SNP) from human samples.* Master in Food Systems – UAM. Dr. Susana Molina Arranz

15. *Bioinformatics and Personalized Nutrition. Bioinformatics and Biology Master-* ISCIII. Dr. Enrique Carrillo de Santa Pau

16. *MFS Graduate Conferenc.* Master in Food Systems. Dr. Maria Jesus Latasa

17. *MFS Steering committe.* Master in Food Systems Dr. Maria Jesus Latasa

18. *MFS Operational Board.* Master in Food Systems Dr. Maria Jesús Latasa

19. *Epigenetics and epigenomics introduction. Bioinformatics and Biology Master-* ISCIII.Dr. María Teresa Laguna Lobo and Dr. Enrique Carrillo de Santa Pau

Courses

1. *Research on Aging. Kick-off Food Solutions (FoodFE).* Dr. María Jesús Latasa and Dr. Alberto Díaz

2. *AFA Project introduction. FoodUnFolded.* Lorena Carrillo

3. *IMDEA Food in the Horizon Europe Digital space for food Innovation. Digital Entreprise Show. Dr. Enrique Carrillo de Santa Pau*

4. *Do you want to synchonize your consumption on the earth? #RecirculaTuDieta - Annual Food Agenda Co-creation event.*

5. *Summer School organization. Global Food Venture - EIT Food.* Dr. Maria Jesús Latasa, Dr. Enrique Carrillo de Santa Pau and Carmen Hernández

6. *Learn to reduce the ultraprocessed consumption. Talk 2 Break Your Routine (EngAgeing)* Dr. Isabel Espinosa

7. *Mindful Eating. Talk 3 Break Your Routine (EngAgeing)* Dr. Isabel Espinosa

8. *Personalized Nutrition, the Food future. Talk 4 Break Your Routine (EngAgeing).* Isabel Espinosa

9. *Showcooking vegetable proteins -Taste the future of Food. Annual Food Agenda Event.* Lorena Carrillo

10. *Final Event Summer School. EFSET.* Dr. Maria Jesús Latasa

11. *Evaluation of Summer School. MFS EIT Food 2021.* Dr. Maria Jesús Latasa

12. *Evaluation de TFMs. MFS EIT Food 2021.* Dr. Maria Jesús Latasa

13. *Sustainable Food Parks in your neighborhorhood. AnnualFood Agenda.* Lorena Carrillo, Sonia Wagner, Cristina Mª Rodriguez

14. *Sustainable Food Parks in your neighborhorhood. 2021 Researcher´s Night.* Lorena Carrillo, Dr. Isabel Espinosa and Jorge Fernandez

15. *What do you do for the planet? 2021 Researcher´s Night.* Dr. Maria Jesús Latasa

16. *XKIC Human capital Workshop. Webinars Online Healthy Eating Didactic Unit.* Dr. Maria Jesús Latasa

17. *Food Imaginarium: Virtual reality to fight against childhood obesity in educational centers.* Esther Cuadrado

18. *Farm to fork, your susteinable menu with #AnnualFoodAgenda EIT Food. Science Week 2021.* Esther Cuadrado

5.4. Outreach

1. #RecirculaTuDieta co-creation sessions: *"¿Quieres sincronizar tu consumo con la tierra?"*. Annual Food Agenda Project (EIT Food). May 20th and June 2nd, 2021. Isabel Espinosa, Lorena Carrillo

2. Showcooking Proteínas Vegetales: *"Saborea la Comida del Futuro"*. Annual Food Agenda Project (EIT Food). June 28th, 2021. Lorena Carrillo, Sara Castillo

3. Workshop: *"Aprende a reducir el consumo de ultraprocesados"*. Engaging Project (EIT Food). May 27th, 2021. Isabel Espinosa, Carolina Rodríguez

4. Webinar: *Master in Food Systems*. (EIT Food). May 31st, 2021. Maria Jesús Latasa

5. Workshop: *"Mindful Eating o como comer puede ser también un acto consciente"*. Engaging Project (EIT Food). June 3rd, 2021. Isabel Espinosa, Carolina Rodríguez

6. Workshop: *"Nutrición personalizada, la alimentación del futuro"* Engaging Project (EIT Food). June 10th, 2021. Isabel Espinosa, Carolina Rodríguez

7. Workshop : *"Summer School"*. Global Food Venture (EIT Food). From May 5th to June 6th, 2021. Maria Jesús Latasa, Enrique Carrillo de Santa Pau, Carmen Hernández

8. Workshop: *"EFSET Summer School". EFSET Project (EIT Food).* June 28th and 29th, 2021. Maria Jesús Latasa

9. Parking Day: *"La alimentación sostenible aparca en tu barrio"*. Annual Food Agenda Project (EIT Food). September 17th, 2021. Isabel Espinosa, Sonia Wagner, Cristina Mª Rodriguez Lorena Carrillo, Sara Castillo, Carmen Hernández, Carolina Rodríguez

10. Noche Europea de los Investigadores de Madrid 2021. Workshop at school: *"Alimentarte bien impacta en ti y en el planeta"*. September 24th, 2021. Isabel Espinosa, Jorge Fernandez

11. Noche Europea de los Investigadores de Madrid 2021. Round Table: *"¿Qué haces tú para mejorar el planeta?"*. September 24th, 2021. María Jesús Latasa

12. Webinar cicle (5 sessions): *"WE Lead Food"*. RIS Professional Development Project (EIT Food). October 2021. Maria Jesús Latasa

13. Webinar cicle (3 sessions): *"X-KIC Human Capital Implementation – Healthy Nutrition"*. X-KIC Human Capital (EIT Food). September 27th - 28th, October 5th, 2021. Maria Jesús Latasa.

14. Workshop at School: *"Food Imaginarium Tomato Experience"*. FoodImaginarium Project (EIT Food). October 14th , 2021. Esther Cuadrado, Lorena Carrillo, Sara Castillo.

15. Semana de la Ciencia y la Innovación 2021. Workshop at School: *"Del campo a la mesa tu menú sostenible"*. Laura J Marcos Zambrano, Esther Cuadrado. November 5th, 2021

5.5. IMDEA Food in the media

EL PAÍS

Lo que a ti te sienta bien, a mí me hace engordar
Elpais.com 27/01/21

SER

onCOVinf seguimiento personalizado del paciente oncológico.
Cadenaser.com 26/01/2021

GNDIARIO

TeleMadrid

Investigadores madrileños lideran un ensayo para prevenir infecciones como el Covid-19 en pacientes con cáncer europress.es
El Independiente 07/01/2021
Fuenlabrada Noticias 07/01/2021
Noticias para Municipios 07/01/2021
GnDiario 10/01/2021
Telemadrid 06/02/2021

REVISTA:ALIMENTARIA

Proyecto Annual Food Agenda del EIT Food. Vídeo Consumo de azúcar
Revistaalimentaria.es 14/01/2021

EL ESPAÑOL

La inteligencia artificial cambia el modo de entender la comida y los restaurantes.
El Español 12/04/2021

THE JERUSALEM POST

Technion students win European Food competition with tasty innovations.
The Jerusalem Post 15/01/2021

capitalradio

El proyecto de Imdea Alimentación para reforzar el sistema inmunológico.
Capitalradio.es 18/01/2021

VIVA EL MUSCULO

Lipchronic. El suplemento que ayudaría a prevenir el Covid-19 en pacientes con cáncer
Vivaelmusculo.com 23/02/2021

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