DIET, HEALTH AND DISEASE JOINT FUNDING ACTION: NUTRIMMUNE "Nutrition-responsiveness of the immune system: interplay between infectious diseases and diet-related metabolic diseases and the potential for food-based solutions"

The NUTRIMMUNE call was launched by JPI HDHL in February 2022. The aim of this call is to support transnational, collaborative research projects that gain a better understanding of the interactions between nutrition and immunity within the context of its interplay between infectious diseases and diet-related metabolic diseases. Research in this area is expected to provide insights that allow the development and scientific substantiation of intervention strategies for sustaining good health through all life stages and treating nutrition-related diseases.

In total, 24 research groups from 7 participating countries participate in this call. This Joint Funding Activity funds 6 projects with 5.9 M€.

DIYUFOOD

From diet to healthy immune system: understanding biological food paths to oppose metabolic syndromes and infectious diseases

WHAT

The DIYUFOOD project aims to better understand the associations between dietary patterns, metabolic syndromes, gut microbiome composition, and immune response.

WHO

The consortium includes 5 partners from 5 countries (China, France, Israel, Netherlands, United Kingdom)

HOW

The project will utilize extensive multi-omics and clinical data derived from four population-based cohort studies carried out in Israel, the Netherlands, the UK, and China. These studies encompass a wide range of ethnic backgrounds, dietary habits, and socioeconomic statuses. Through the application of mediation analysis within observational studies and Mendelian randomization (MR) analysis, which employs genetic variants as instrumental variables for causal inference, the project aims to unravel the underlying causal pathways.

FUNDING

DIYUFOOD receives approximately 0.84M€.

Project coordinator: **Eran Segal**
(Weizmann Institute of Science, Israel)

METARYL

Nutrition and aryl hydrocarbon receptor activation in mesenteric adipose tissue inflammation and intestinal surgical site infections in metabolic syndrome

WHAT

The METARYL project aims to investigate how nutrition affects wound healing and type 2 diabetes, with a focus on the essential amino acid trypotophan derived from dietary intake of protein-rich food.

WHO

The consortium includes 5 partners from 3 countries (France, Germany, Netherlands)

HOW

The project will investigate the influence of trypotophan metabolites on wound infection development, explore the connection between abdominal fat tissue inflammation and type 2 diabetes, and test dietary interventions to assist individuals in managing this issue.

FUNDING

METARYL receives approximately 1.06 M€.
Project coordinator: **Wouter de Jonge**
(Amsterdam university medical center, The Netherlands)

OBESIMM

Exploring the effects of time-restricted feeding on the immune function of obese individuals: a multi-omic approach

WHAT

The OBESIMM project aims to precisely define the effect that time-restricted feeding (TRF) exerts on the immune function of human obese individuals and how it impacts their immunocompetence.

WHO

The consortium includes 4 partners from 3 countries (France, Spain, United Kingdom)

HOW

An interventional study will be conducted involving obese human participants. These individuals will be exposed to a time-restricted feeding (TRF) diet to explore how this intervention reprograms their immune system to enhance their capacity to defend from infectious pathogens. The project will take a multidisciplinary appraoch that combines cytomics, transcriptomics, metabolomics, metagenomics and systems biology, in order to unravel potential mechanisms involved in the modulation of immunity and the improvement of adipose meta-inflammation by TRF.

FUNDING

OBESIMM receives approximately 1.25 M€.

Project coordinator: **Josep Villena** (Vall d'Hebron Research Institute (VHIR), Spain)

PreVegDiet

Prevention in prediabetic patients of infection's morbidity following a high fiber and vegetal protein diet

WHAT

The PreVegDiet project aims to study the influence of beneficial diets on the immune system of prediabetic patients and its potential to counteract infections.

WHO

The consortium includes 3 partners from 3 countries (Ireland, Spain, United Kingdom)

HOW

The project will use a clinical, an *in vitro* and an *in vivo* approach to study the influence of a seaweed supplement and a diet rich in components from a Mediterranean diet on a *Salmonella typhimurium* infection in prediabetic subjects. The study will assess immune system, inflammation, gut microbiota, bile acids, and perform metabolic and lipidomic analysis in different samples collected from the different cohorts of the study.

FUNDING

ProVegDiet receives approximately 0.86 M€.

Project coordinator: **Maria J. Rodríguez-Lagunas** (University of Barcelona, Spain)

RESIST-PP

A comprehensive study of the innate immune surveillance against infection during postprandial metabolism

WHAT

The RESIST-PP project aims to unravel the underlying mechanisms that lead to the induction of postprandial inflammation, the receptors involved in this process and the molecular details of immune cell activation in the context of infection defence.

WHO

The consortium includes 3 partners from 3 countries (France, Germany, Spain)

HOW

The project will assay serum and immune cells from human individuals from different retrospective and prospective cohorts at postprandial conditions and from septic patients. In vitro stimulation and challenge of purified immune cells with human pathogens followed by muti-omics analysis also will identify the molecular mechanisms of postprandial inflammation and its contribution to the risk of infectious diseases and its link to obesity in humans. Data will be validated in preclinical in vivo models to establish causality.

FUNDING

RESIST-PP receives approximately 1.05 M€.

Project coordinator: **Philippe Lesnik** (Sorbonne University, France)

JPI a healthy diet for a healthy life

More information:
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TransInf

The effect of diet on immune and vaccine responses in people living with obesity in transitioning communities

WHAT

The TransInf project aims to establish the cause-and-effect relationship between diet and immune function in people with obesity and contribute to the identification of specific foods and food-derived metabolites with beneficial immuno-modulatory effects.

WHO

The consortium includes 3 partners from 2 countries (France, Germany)

HOW

The TransInf project will enroll a new cohort of individuals with overweight/obesity and non-obese controls in Tanzania. This study includes immune profiling and omics measurements to investigate the impact of diet and obesity on immune responses to various pathogens. Additionally, a randomized dietary intervention study will explore the effects of a traditional plant-based diet and fermented banana beverage on obesity-related immune dysregulation and responses to pathogens and vaccines. Mechanistic insights will be gained through assessments of epigenetic modifications, intestinal B-cell homeostasis, telomere length, and whole blood transcriptome. Data from the new cohorts will be integrated with existing Human Functional Genomics Project cohorts, culminating in a predictive model for immune responses to microbes and pathogens.

FUNDING

TransInf receives approximately 1.27 M€.
Project coordinator: **Quirijn de Mast** (Radboud university medical center, The Netherlands)