

EXIMIOUS

Mapping Exposure-Induced Immune Effects: Connecting the Exposome and the Immunome

Background

Immune-mediated, non-communicable diseases, such as autoimmune diseases, allergic diseases and asthma, are chronic disorders in which the immune system plays a pivotal role. The World Health Organisation (WHO) has highlighted the seriousness of autoimmunity and its association with exposure to the environment, but research on the underlying causes, mechanisms and prevention of these disorders remains an urgent need.

EXIMIOUS aims to deliver a new way of assessing the human exposome, i.e. the exposures to environmental factors that one experiences throughout life, and shed light on its association to immune-mediated diseases.

Objectives

The overall objective of EXIMIOUS is to bring about a new way of assessing the human exposome by combining innovative ways of characterizing and quantifying multiple environmental exposures (exposomics) and mapping exposure-induced immune effects (immunomics). New bio-informatics tools will be developed through the use of systems biology, artificial intelligence and machine learning that will first combine and then analyse the huge datasets that link exposome, immunome, and other omics data with clinical and socio-economic data. By exploring the entire pathway from exposome, to immune fingerprint, to disease during a person's lifetime (including prenatal exposures) we will better understand the factors that lead to exposure-related immune effects at different stages of people's lives and pinpoint the most critical forms of exposure and the groups of people most at risk in order to put in place the right preventative actions and policies at the individual, group and population levels.

EXIMIOUS focuses on 4 specific objectives, each part of one or more of the project's Work Packages (WP):

- Delineating the Exposome
- Mapping the Immunome
- Bio-informatics - Combining the exposome, immunome, clinical data and societal impact
- Creating a toolbox for researchers, policy makers and the general public (WP7)

Funding Programme:



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Project Duration:

01/01/2020-31/12/2024

Project Budget:

10.8 million euro

Project Website:

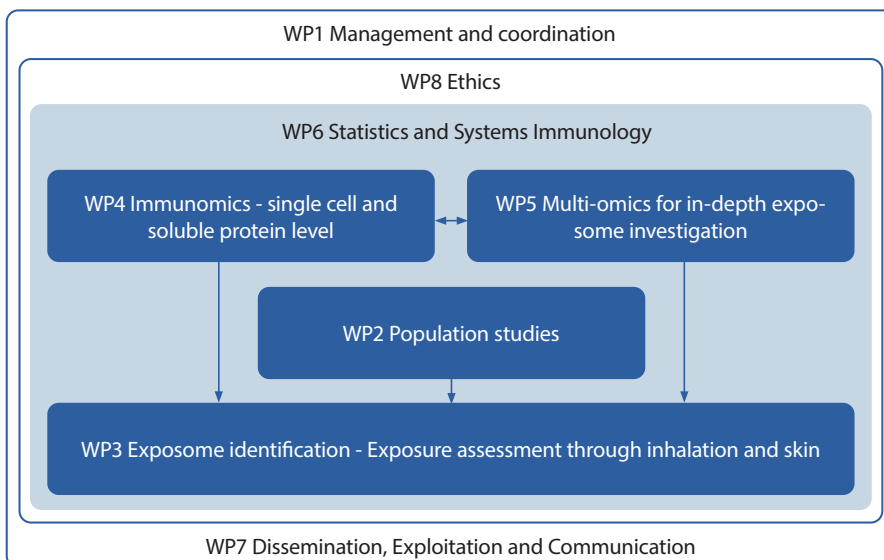
www.eximious-h2020.eu

European Human Exposome Network:

www.humanexposome.eu

Activities

EXIMIOUS follows a dual approach: on one hand it will assess the exposome of selected cohorts and then map the immunome of such cohorts, on the other hand it will assess the immunome of cohorts that have potentially exposure-related immune-mediated diseases to then map their exposome. The activities involved in such a dual approach are arranged into five main Work Packages (WP2-6), supported by WP1 that will oversee the smooth management and coordination of the project, WP7 dedicated to maximising the project's impact through effective dissemination, exploitation and communication activities as well as WP8 dedicated to project ethics.



Impact

The EXIMIOUS project will provide benefits to several stakeholder groups such as researchers, patients, clinicians, policy makers and regulators, and the general public as well as to Europe's research and innovation capacity. It will bring innovation in the environmental health sciences, by introducing novel techniques to overcome current limitations in exposure assessment, as well as developing new bioinformatics and management tools. The research outcomes of EXIMIOUS will be combined in a toolbox for use in different ways by all its stakeholder groups, enabling to conduct individual risk assessments and disease prediction as well as estimate the societal burden of environmentally triggered, immune-mediated disease.

Project Coordinator:

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Project Partners:

- Universiteit Hasselt, BE
- Folkehelseinstituttet, NO
- Det Nationale Forskningscenter Forarbejdsmiljø, DK
- Belgian Center For Occupational Hygiene, BE
- Interuniversitair Micro-Electronica Centrum, BE
- Université Catholique De Louvain, BE
- The Babraham Institute, UK
- The Queen's University Of Belfast, UK
- Region Hovedstaden, DK
- Biogenity IVS, DK
- Fundacio Hospital Universitari Vall D'hebron - Institut De Recerca, ES
- Aarhus Universitet, DK
- Universitatea De Medicina, Farmacie, Stiinte Si Tehnologie Din Targu Mures, RO
- acceloment AG, CH

Project Network:

EXIMIOUS is part of the European Human Exposome Network with:

- ATHLETE
- EPHOR
- EQUAL-LIFE
- EXPANSE
- HEAP
- HEDIMED
- LONGITOOLS
- REMEDIA