Development and application of global lipidomic arrays to inflammatory vascular disease.

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Principal Investigators
Institution
Contact information of lead PI
Country

European Commission

Title of project or programme

Development and application of global lipidomic arrays to inflammatory vascular disease.

Source of funding information

European Commission FP7-Seventh Framework Programme

Total sum awarded (Euro)

€ 2,969,345

Start date of award

01/02/2014

Total duration of award in years

5.0

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords
Research Abstract
How lipids are regulated on a global scale during vascular inflammation is not known. Thus, a major challenge exists to describe and catalog the total lipidome, in particular enabling the identification of new biologically active lipids, and description of changes. This is analogous to ‘omics’ of DNA, RNA and protein, but instead describing diversity of lipids in tissue samples. Importantly, this would encompass not only knowns, but also the vast number of unknowns that have not yet been catalogued in any study so far. Here, new systems biology approaches that can be applied to many other diseases or samples, and integrated with transcriptomic or proteomic analyses will be developed. These would be used to characterize the global lipidome

during differentiation of immune cells, and in ex vivo samples from genomically-characterized inflammatory vascular disease. I hypothesize that development and application of “global lipidomic arrays” will define how lipids are regulated during vascular cell differentiation and inflammation, will identify new markers, and open up new therapeutic strategies.
These aims go beyond the current state of the art, and will be achieved by the following objectives that include novel interdisciplinary concepts and approaches:
1. Develop analytical methodologies using Fourier transform mass spectrometry and bioinformatics.
2. Develop approaches for structural identification, using high resolution MSn, high sensitivity NMR, and new computational methodologies.
3. Define the size and diversity of the mammalian cellular lipidome in human platelets (validation).
4. Characterize the global lipidome in (i) monocytes during differentiation from stem /yolk cells to resident, inflammatory or foam cells, (ii) plasma from samples genomically characterized for 14 separate risk alleles for cardiovascular and Alzheimer’s disease.
5. Develop an open access web-based resource for storage and curation of the results to allow others to mine the data.

Lay Summary
Further information available at:

Types:
Investments > €500k

Member States:
European Commission

Diseases:
Alzheimer's disease & other dementias

Years:
2016

Database Categories:
N/A

Database Tags:
N/A