Oncolipidomics: Why is lipidomic dysregulation pattern in blood similar for various cancers?

Fact Sheet

Project Information

**ONCOLIPID**

Grant agreement ID: 101095860

**DOI**

10.3030/101095860

**Funded under**

European Research Council (ERC)

**Start date**

1 August 2023

**End date**

31 July 2028

**Total cost**

€ 3,499,413.00

**EU contribution**

€ 3,499,413.00

**Coordinated by**

UNIVERZITA PARDUBICE

Czechia

Objective

Lipids are involved in numerous pathways of human metabolism that are related to pathological states. Alterations of lipid concentrations in the blood of cancer patients have been reported but the biological origin is still unknown. Deciphering the mechanisms of the lipid dysregulation mechanism could dramatically change oncology because it can open new avenues for cancer detection with subsequent effective treatment and drug development targeting dysregulated pathways. Early cancer diagnosis is one of the main unmet needs in medicine, which can improve the unfavorable prognosis of patients. The potential of lipidomics has not been fully explored yet, because analytical workflows have limitations in terms of accurate molar quantitation and insufficient coverage of the lipidome. Biologists predict up to
100,000 lipid species in nature, but current methods typically report less than 1% of this number. Here, we will develop novel approaches for quantitation of more than 2,000 lipids from >80 classes using 13C stable isotope labeled internal standards and ultrahigh-resolution methods in liquid or supercritical fluid chromatography, mass spectrometry, and ion mobility. The comprehensive characterization of lipidome will allow us to construct Cancer Lipidome Atlas (WP1). We will develop new Bayesian software for automated data processing and statistical evaluation applicable to the main lipidomic and metabolomic workflows (WP2). We will correlate lipidomics data with metabolomics, proteomics, and transcriptomics data to unravel why lipidomic dysregulation in blood has a similar pattern for various cancers (WP3). This strategy will be applied for the comparison of ten types of cancer with control samples in cell lines, animal models (mice and pigs), human samples (tissues and plasma), and extracellular vesicles. Our initial hypothesis is that the lower activity of CERS2 triggered by cancer cells can downregulate very long fatty acyl ceramides and other sphingolipids.

**Fields of science**

medical and health sciences > basic medicine > pharmacology and pharmacy > drug discovery

natural sciences > biological sciences > cell biology

natural sciences > biological sciences > biochemistry > biomolecules > lipids

medical and health sciences > clinical medicine > oncology

natural sciences > computer and information sciences > data science > data processing

**Keywords**

Cancer biomarkers  Lipidomic quantitation  Mass spectrometry  Chromatography

**Programme(s)**

HORIZON.1.1 - European Research Council (ERC)  MAIN PROGRAMME

**Topic(s)**

ERC-2022-ADG - ERC ADVANCED GRANTS
Call for proposal

**ERC-2022-ADG**

See other projects for this call

**Funding Scheme**

HORIZON-ERC - HORIZON ERC Grants

**Coordinator**

UNIVERZITA PARDUBICE

Net EU contribution

€ 3 499 413,00

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Links

Contact the organisation Website Participation in EU R&I programmes HORIZON collaboration network

Other funding

€ 0,00

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**Last update:** 10 August 2023

**Permalink:** https://cordis.europa.eu/project/id/101095860

European Union, 2023