Lipidomic Approach to Identify Patterns in Phospholipid Profiles in Atherosclerosis in ApoE Deficient Mice Infected with Chlamydia Pneumoniae

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Atherosclerosis is a sustained process in humans, therefore using animal models where more rapid changes helps for the study of this process. Apolipoprotein E knock out (apoE-KO) mice show impaired clearing of plasma lipoproteins and they develop atherosclerosis in a short time. Substantial evidence supports an association between atherosclerosis and infection with Chlamydia pneumoniae (CP).

Glycerophospholipids (PLs) as a major class of lipid. Changing of the level of PLs in tissue are associated with some disease such as Alzheimer's, Farber disease, Niemann-Pick disease, Gaucher disease. In addition the bioactive lysophospholipids and related sphingolipids (SM) contribute to the progression of different cancers.

According to chemical composition the main classes of PLs are the following, phosphatidylcholine (PC), phosphatidylethanolamine (PE), phosphatidylinositol (PI), phosphatidylserine (PS), phosphatidylglycerol (PG) and phosphatidic acid (PA) where the phosphate group is not derivatised.

Analysis of membrane PLs is challenging both in an identification and quantification point of view for analytical chemist because of the wide range distribution of PLs in tissues and the diverse behavior of different PL classes during the separation and detection process. Amphipathic property of PLs gives opportunity to use different LC techniques such as hydrophilic interaction chromatography (HILIC) as a novel chromatographic separation technique where the separation mechanism is based on variant polarity of head group of PLs.

The primary aim of this research is development of HILIC separation method and combining it with mass spectrometric measurement for qualitative and quantitative analysis of PLs from mouse plasma. The second goal is the application of the developed analytical method for PL profiling of plasma PLs in apoE knockout mice were infected with CP.