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Global Metabonomic Profiling of Bioactive Lipid Mediators and their Central Role in Immune Dysfunction

Noah Isakov*

Department of Medicine, University of Basel, Switzerland

DESCRIPTION

Lipids are water-insoluble organic compounds with diverse metabolic and non-metabolic functions. Not only do they represent efficient energy substrates, they are also part of a network of soluble mediators at the interface of the metabolic and immune systems in several inflammatory diseases (Rheumatoid Arthritis, Inflammatory Bowel Disease and Atherosclerosis). The liver is unique in that it provides a balanced immune tolerance against exposure to bacterial components from the gut that migrates through the portal vein and lymphatic system. This balance is severely disrupted in liver failure syndromes such as acute liver failure and acute chronic liver failure. In these syndromes, researchers recently focused on bioactive lipid mediators through global metabonomic profiling, revealing a central role for these mediators in the immune dysfunction seen in liver failure syndromes, sepsis and subsequent disease. It explains the frequent occurrence of organ failure. Among endogenous bioactive lipids, the mechanistic effects of three classes (Eicosanoids, Prolytic Lipid Mediators and Lysophospholipids) in the pathophysiological regulation of liver failure syndromes are the subject of this narrative review. In addition, the therapeutic potential of the lipid immune pathway has been described.

Inflammation is an immune response that acts like a contained fire that is preemptively ignited as a defensive process in infection or any type of tissue injury and is naturally extinguished upon repair or termination of the injury. However, sustained and uncontrolled immune responses act like wildfire, promoting chronic inflammation, unresolved tissue damage, and ultimately chronic disease. An extensive network regulates all immune processes. They are secreted with the aid of using essentially all cells concerned in inflammatory approaches and represent the essential infrastructure that triggers, coordinates and confines inflammatory mechanisms. However, those molecules also are deeply concerned withinside the adverse transition from acute to persistent infection, be it for chronic or immoderate motion of pro-inflammatory lipids or for the impairment of the capabilities accomplished with the aid of using resolving ones. As a count of fact, bioactive lipids were linked, to date, to numerous persistent diseases, which include Rheumatoid Arthritis, Atherosclerosis, Diabetes, Cancer, Inflammatory Bowel Disease, Systemic Lupus Erythematosus, and a couple of sclerosis. This evaluate summarizes contemporary expertise at the involvement of the primary lessons of endogenous bioactive lipids-specifically classical eicosanoids, pro-resolving lipid mediators, lysoglycerophospholipids or sphingolipids, and endocannabinoids withinside the cell and molecular mechanisms that result in the pathogenesis of persistent disorders.

Endogenous bioactive lipids are a part of a complicated community that modulates a plethora of cell and molecular approaches concerned in fitness and disease, of which infection represents one of the maximum distinguished examples. Inflammation is triggered when chemical, mechanical, or microbial damage occurs and serves as a well-conserved defense mechanism that eliminates the source of damage and restores tissue function. However, excessive inflammatory signalling or impairment of pro-inflammatory or anti-inflammatory signalling pathways leads to chronic inflammation, a hallmark of chronic pathologies. All major classes of endogenous bioactive lipids, Eicosanoids, Specialized Pro-Soluble Lipid Mediators, Lysoglycerophospholipids, and Endocannabinoids have been implicated in Cancer, Diabetes, Atherosclerosis, Asthma, autoimmune diseases, and neurodegeneration.

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CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

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Corresponding author Noah Isakov, Department of Medicine, University of Basel, Switzerland, E-mail: NoahIsakov73@gmail.com

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