1. Record Nr. UNINA9910137091503321

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Titolo	The metabolic challenges of immune cells in health and disease
Pubbl/distr/stampa	Frontiers Media SA, 2015
Descrizione fisica	1 online resource (80 p.)
Collana	Frontiers Research Topics
Soggetti	Medicine and Nursing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia

Sommario/riassunto

Obesity and its co-morbidities, including atherosclerosis, insulin resistance and diabetes, are a world-wide epidemic. Inflammatory immune responses in metabolic tissues have emerged as a universal feature of these metabolic disorders. While initial work highlighted the contribution of macrophages to tissue inflammation and insulin resistance, recent studies demonstrate that cells of the adaptive immune compartment, including T and B lymphocytes and dendritic cells also participate in obesity-induced pathogenesis of these conditions. However, the molecular and cellular pathways by which the innate and adaptive branches of immunity control tissue and systemic metabolism remain poorly understood. To engage in growth and activation, cells need to increase their biomass and replicate their genome. This process presents a substantial bioenergetic challenge: growing and activated cells must increase ATP production and acquire or synthesize raw materials, including lipids, proteins and nucleic acids. To do so, they actively reprogram their intracellular metabolism from catabolic mitochondrial oxidative phosphorylation to glycolysis and other anabolic pathways. This metabolic reprogramming is under the control of specific signal transduction pathways whose underlying molecular mechanisms and relevance to physiology and disease are subject of considerable current interest and under intense study. Recent reports have elucidated the physiological role of metabolic reprogramming in macrophage and T cell activation and differentiation,

B- and dendritic cell biology, as well as in the crosstalk of immune cells with endothelial and stem cells. It is also becoming increasingly evident that alterations of metabolic pathways play a major role in the pathogenesis of chronic inflammatory disorders. Due to the scientific distance between immunologists and experts in metabolism (e.g., clinicians and biochemists), however, there has been limited cross-talk between these communities. This collection of articles aims at promoting such cross-talk and accelerating discoveries in the emerging field of immunometabolism.