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Sommario/riassunto

Historically the study of the immune system and metabolism have been two very separate fields. In recent years, a growing literature has emerged illustrating how the multiple processes of cellular metabolism are intricately linked to several aspects of immune function and development. This Research Topic covers recent progress in the field now known as "Immunometabolism" and the role of metabolism in immune tolerance. Immune tolerance is operationally defined as a state where a host's immune system is balanced such that although self-reactive lymphocytes are present, they are kept in check by immune regulation. Perturbations to this homeostasis may result in self-reactive lymphocytes gaining the upper hand and mediating auto-immune disease. Maintenance of immune tolerance involves a large cast of different cell types including effector T cells, regulatory T cells, B cells, stromal cells, dendritic cells and macrophages. Intracellular pathways and individual enzymes of metabolism have been shown to be harnessed by cells of both the adaptive and innate immune system to allow particular immune functions to be achieved. Examples include metabolic enzymes serving 'moonlighting' functions in mRNA translation, gene splicing, and kinase activation. Other examples include the requirement for de novo fatty acid synthesis for differentiation into Th17 effectors and CD8 memory T cells or products of the TCA cycle promoting pro-inflammatory cytokine production. Likewise, the availability of extracellular metabolic substrates has a

large impact on the maintenance of local immune tolerance. For example, there are different requirements for glucose, glutamine and fatty acids for effector versus regulatory T cell development. Also tolerogenic dendritic cells mediate lowering of extracellular essential amino acids by their enhanced catabolism, promoting the induction of regulatory T cells. The purpose of this Research Topic is to provide an update on the current understanding of the multiple roles for metabolism in regulating the immune system.