

Influencing immune cell metabolism and function

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Highly ordered interactions between immune and metabolic responses are evolutionarily conserved and paramount for tissue and organismal health. Historically, immunity and metabolism were considered separate and largely tangential disciplines. In the past several years, however, this paradigm has been shattered with the realization that cellular bioenergetics serves as both a sensor and fundamental effector of the immune response. Metabolic programming of immune cells is now thought to underlie many infectious and non-infectious disease states. Immunometabolism is an emerging field that investigates the interplay between immunological and metabolic processes. Interest in this field is gaining momentum due to the realization that incorrect metabolic remodeling underlies many aberrant immune responses, and that manipulating cellular metabolism can beneficially enhance or temper immunity. Genetics and environment dictate how an animal metabolizes the nutrients it consumes and shapes its growth, function, appearance, and overall health. The same principles hold true on the cellular level. Pathogen-derived or inflammatory signals drive macrophages and T lymphocytes of the immune system out of quiescence to rapidly modulate the expression of genes allowing them to acquire new functions. This presentation will provide a general overview on cellular metabolism in the programming of myeloid and lymphoid immune cells in immunity and disease. I will focus on the various aspects of immunometabolism, from mediators and signaling pathways to therapeutic opportunities. Further, I will discuss the mechanisms of metabolic control of immune response, and vice versa, in physiology and under metabolic, inflammatory & infectious stress.