Type I interferon is critical for the homeostasis and functional maturation of type 3 T cells

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Th2 cell metabolism

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T helper cells undergo rapid proliferation upon activation and differentiate into cells producing high levels of cytokines. This requires large amounts of energy. Metabolic pathways such as glycolysis are important for the development of functional T helper cell subsets, but molecules in the glycolytic pathway have also been found to have targeted effects on T helper cell effector functions. Type 2 T helper cells are characterized by their production IL-5 and IL-13 and are involved in immune responses to parasites, and in allergies. The role of metabolism for the development and function of Th2 cells is not very well understood. In this study we aim to determine the levels of glycolysis of in vitro generated Th2 cells and to investigate the role of glycolysis for the effector function of Th2 cells. We used the Seahorse XF Analyzer to measure levels of glycolysis. We used both in vitro differentiated T helper cells and cells from inflamed mouse lungs. Expression of cytokines and metabolic markers was assessed by flow cytometry.

We show that in vitro generated Th2 cells require active glycolysis for the production of IL5 and IL13 as addition of 2-DG impaired secretion of these cytokines. Th2 cells were also more glycolytic and possessed greater glycolytic capacity than other in vitro generated T helper cell subsets. We believe that this link between glycolysis and Th2 function and a general better understanding of Th2 metabolism will lead to novel strategies for the treatment of asthma and allergies in the future.

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Type I interferon is critical for the homeostasis and functional maturation of type 3 γδ T cells

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Type I IFN (IFN-I) is highly expressed during viral infection and many autoimmune pathologies such as SLE and psoriasis. In addition, IFN-I is important to maintain the homeostasis of a number of different immune populations. Our aim was to identify whether IFN-I regulates type 3 γδ T (γδT3) cells. We found that IFNαβ inhibits the activation of γδT3 cells following treatment with cytokines such as IL-23 and IL-7 and abrogates their ability to produce IL-17 during viral infection. Despite this inhibitory role, γδT3 cells that are deficient in type I IFN receptor (IFNAR) signaling display anergic behavior. Such γδT3 anergy is characterized by failure to induce skin inflammation and unresponsiveness to cytokine stimuli. Moreover, IFNAR deficient mice display deregulated γδT3 homeostasis due to a neonatal maturation defect. In conclusion, our data show that tonic type I IFN signaling during neonatal and adult life is required for the full maturation and pro-inflammatory function of γδT3 cells, however acute type I IFN production during viral infection acts as a γδT3 inhibitor.