Verdin Lab

The Verdin Lab studies how metabolic and epigenetic pathways regulate immune aging, chronic inflammation, and resilience to age-related disease. Aging progressively reshapes immune-cell function, leading to two major and interconnected problems: a decline in protective immunity and the development of persistent, low-grade inflammation. These changes can reduce the ability of the immune system to respond effectively to infection, vaccination, and physiological stress, while at the same time promoting inflammatory signaling that contributes to tissue dysfunction and age-related disease. The lab focuses on the metabolic mechanisms that drive these changes. Particular areas of interest include NAD metabolism, sirtuin signaling, mitochondrial function, and other pathways that connect cellular metabolism with immune-cell activity and inflammatory responses. These metabolic systems are closely linked to epigenetic regulation, cellular stress responses, and the maintenance of immune-cell identity and function. By understanding how these pathways become altered with age, the lab aims to identify mechanisms that are not only associated with immune aging but can also be therapeutically targeted.

A central concept underlying the lab's work is that the aging immune system may be modifiable rather than irreversibly dysfunctional. The Verdin Lab therefore combines mechanistic studies of immune and metabolic pathways with translational approaches designed to identify interventions that can restore healthier immune function. The long-term goal is to develop metabolic therapies that rejuvenate the aging immune system, reduce chronic inflammation, and improve immune resilience. By targeting the biological pathways that connect metabolism, immunity, and aging, the lab seeks to promote healthier immune function across tissues and ultimately extend healthy lifespan.