Unraveling the mechanisms regulating innate immune responses to identify functional biomarkers for inflammatory diseases

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ABSTRACT

Innate immunity is the first line of the organism's defense to pathogens and tissue damage insults, which is inherited and is functional upon birth. Even though innate immunity has been long considered non-adaptive, recent evidence indicates that macrophages, central mediators of innate immune responses, can build memory, also known as trained immunity. Trained immunity is shaped by infectious or non-infectious signals and changes from birth to adulthood and throughout life. Among signals that modulate innate immune responses are those of insulin. Using genetically modified mice we have shown that active insulin signals, which oscillate through the day, support robust innate immune responses, while defective signaling, occurring in the context of diabetes and other inflammatory diseases, result in defective innate immune responses. Our results showed that evaluating the fitness of innate immune responses can provide useful prognostic or diagnostic tools for inflammatory and infectious diseases.