

Contribution of Innate Immune Memory from Environmental Exposures to Outcomes in Respiratory Health

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Abstract

Asthma is a prototypical complex immune disorder with most commonly identified risk alleles explaining only a small fraction of asthma's overall heritability. It is widely accepted that asthma susceptibility results from interactions between genetic risk factors and environmental factors, such as exposures to air pollution, allergens, and respiratory viral infections. Recently, it has been shown that innate immune cells have immunological memory of past exposures of infections and injury, resulting in augmented immune response to a secondary stimulus via epigenetic and metabolic mechanisms. This 'trained immunity' though beneficial in infectious contexts can be maladaptive in chronic immune diseases. In this proposal, we will utilize a systems immunology approach to investigate the contribution of innate immune memory from environmental exposures to air pollutants, allergens and virus on innate immune cell function and assess how sustained alterations in the chromatin landscape of innate immune cells prime for asthma pathogenesis.