

Researchers identify immune cells that fight parasites may promote allergies and asthma

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Millions of people in both the developing and developed world may benefit from new immune-system research findings from the University of Pennsylvania School of Veterinary Medicine.

The Penn Vet researchers, studying how the immune system operates, have discovered a previously unidentified cell population that may be the body's double-edged sword, fighting off parasitic infections but also causing the harmful immune responses that can lead to allergies and asthma.

This cell population, termed multipotent [progenitor cells](#), or MPP, appears to be activated in the context of allergies or infection with parasitic worms and may be one of the earliest cellular events in the developing [immune response](#). The research published by David Artis, assistant professor in the Department of Pathobiology at Penn Vet, and colleagues may identify an important process in the immune response to helminth parasites and allergies.

A better understanding of what regulates the development of this cell population and what promotes its activation and function may aid in the development of drugs.

The research could benefit two patient populations: Those in developing countries still wrestling with [parasitic worm](#) infections and those in more industrialized environments where parasites are less prevalent but where immune responses can run amok, leading to a higher prevalence of

allergies and asthma.

Millions worldwide struggle with health problems due to parasitic worms. These helminth worm parasites thrive in unsanitary conditions, in uncooked meat and in contaminated water. In more sanitary regions with fewer helminth parasites, the immune response that evolved to fight these infections may be redundant. It has been proposed that, due to reduced exposure to helminth parasites, the inactive immune response may inappropriately respond to substances like pollen, pollutants and some contents of food, resulting in exaggerated rates of asthma and allergy.

The National Institutes of Health estimates that as many as 40 to 50 million Americans suffer from allergic diseases. Consistent with this theory of redundancy, there are reports that show equatorial regions with an abundance of helminth parasites have populations that encounter lower rates of asthma and allergies.

"From an evolutionary perspective, it is likely that we evolved a complex immune response to fight parasitic worms, but our more sanitized environment no longer has this same population of parasites," Artis said. "This newly identified cell population could represent one of the earliest events in this type of immune response, which offers potential new targets for treatment of infection and allergic inflammation."

The research team demonstrated that a molecule called IL25, a member of the IL17 cytokine family, promotes the accumulation of a lineage-negative multipotent progenitor cell population in the intestine that promotes T cell responses associated with asthma and helminth infection. The resulting cell population gives rise to cells of macrophage and granulocyte lineages. The ability of IL25 to induce the emergence of an MPP [cell population](#) identifies a link between the IL17 cytokine family and extramedullary haematopoiesis and suggests a previously

unrecognized innate immune pathway that promotes TH2 cytokine responses at mucosal sites.

More information: The study is published in the current issue of *Nature*.

Provided by University of Pennsylvania

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