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"CHARACTERIZING THE LOCAL AND SYSTEMIC ADAPTIVE IMMUNE RESPONSES TO PROTEASE ALLERGENS"

By

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Infection, Immunity and Inflammation Program
M.S. Biology, 2017, St-Joseph's University, Philadelphia, PA
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Wednesday, April 2nd, 2025
Cancer Center, G1196
11:00 A.M.

Join Zoom presentation
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ABSTRACT

Many environmental allergens are known to possess protease activity, but the outcome of the hosts adaptive immune response to protease allergens remains incompletely understood. Papain is a cysteine protease found in papaya latex and is commonly used as an experimental allergen. Papain induces potent type 2 inflammation upon primary exposure in the skin and lungs in mice, leading to the development of type 2 adaptive immunity including differentiation of papain-specific Th2 cells and B cells producing anti-papain antibodies. However, surprisingly little is known about how papain-specific adaptive immunity modulates host responses to papain upon re-exposure. We found that intraplantar injection of papain in naive mice induced acute edematous inflammation in the footpad that resolved within 24 hours. In contrast, re-exposure of these mice to papain in a different paw led to an attenuation of acute edema but paradoxically prolonged footpad inflammation lasting up to three days at the site of re-exposure. The challenged mice also exhibited hypothermia, indicating a systemic response to a local challenge. Notably, the proteolytic activity of papain is required to drive local edema, whereas papain-specific antibodies are responsible for the modulation of the local response and hypothermia in a mast cell-dependent manner. Inactivated papain was capable of inducing hypothermia without causing local edema in papain-immunized mice. However, when remotely administered, it attenuated acute edema but protracted inflammation in the footpad that was induced by a structurally unrelated protease. These data demonstrate that the pre-existing adaptive immunity to allergens can modulate protease-induced local inflammation in an antigen-nonspecific manner.