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Mast cells signal their importance in health and disease

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Abstract

FcεRI is the primary receptor in mast cells that mediates allergic reactions by inducing rapid release of mediators, an adaptive immune response that might have evolved as a host defense against parasites and venoms. Yet it is apparent that mast cells are also activated through non-IgE receptors, the significance of which is just beginning to be understood. This includes the Mas-related G protein-coupled receptor X2, which might contribute to reactions to diverse antimicrobials and polybasic compounds, and the adhesion G protein-coupled receptor E2, variants of which are associated with familial vibratory urticaria and are activated by mechanical vibration. Similarly, mast cells have long been recognized as the main repository for histamine, heparin, and proteases. Recent evidence also points to new functions, modes of delivery, and mechanisms of action of mast cell proteases that add new dimensions to the roles of mast cells in human biology. In addition, exposure of mast cells to environmental cues can quantitatively and qualitatively modulate their responses and thus their effect on allergic inflammation. Illustrating this paradigm, we summarize a number of recent studies implicating the injury/tissue damage cytokine IL-33 as a modulator of allergen-induced mast cell responses. We also discuss the discovery of markers associated with transformed mast cells and new potential directions in suppressing mast cell activity.

Keywords: IL-33; Mas-related G protein-coupled receptor X2; adhesion G protein-coupled receptor E2; allergy; degranulation; mast cells; mastocytosis; tryptase.

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