SECTION 2 DISORDERS OF IMMUNE-MEDIATED INJURY

376 Allergies, Anaphylaxis, and Systemic Mastocytosis

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The term *atopy* implies a tendency to manifest asthma, rhinitis, urticaria, and atopic dermatitis alone or in combination, in association with the presence of allergen-specific IgE. However, individuals without an atopic background may also develop hypersensitivity reactions, particularly urticaria and anaphylaxis, associated with the presence of IgE. Inasmuch as the mast cell is a key effector cell in allergic rhinitis and asthma, and the dominant effector in urticaria, anaphylaxis, and systemic mastocytosis, its developmental biology, activation pathway, product profile, and target tissues will be considered in the introduction to these clinical disorders.

The binding of IgE to human mast cells and basophils, a process termed *sensitization*, prepares these cells for subsequent antigen-specific activation. The high-affinity Fc receptor for IgE, designated FcεRI, is composed of one α, one β, and two disulfide-linked γ chains, which together cross the plasma membrane seven times. The α chain is responsible for IgE binding, and the β and γ chains provide for signal transduction that follows the aggregation of the sensitized tetrameric receptors by polymeric antigen. The binding of IgE stabilizes the α chain at the plasma membrane, thus increasing the density of FcεRI receptors at the cell surface while sensitizing the cell for effector responses. This accounts for the correlation between serum IgE levels and the numbers of FcεRI receptors detected on circulating basophils.