

Basophils

Karen Buckland, Imperial College London, UK



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Basophils are a type of bone marrow-derived circulating leukocyte. They are highly granular mononuclear cells. Basophil differentiation from myeloid progenitors is driven by **IL-3** and their expression of **IL-3R α chain** (also known as CDw123) enables them to be distinguished from mast cells. Basophils make up less than 1% of leukocytes in humans but they are the only circulating leukocytes that contain **histamine** and they share many similarities with their tissue resident counterparts, the **mast cell**. Like mast cells, basophils become activated by antigen crosslinking of **Fc ϵ R1 receptor-bound IgE** to undergo rapid degranulation and release their cellular contents. In addition, basophils can be activated *without* IgE crosslinking by inflammatory mediators such as complement factors **C5a** and **C3a**, **MBP**, **PAF** and **chemokines**.

Basophil activation:		Cell surface molecules expressed by basophils:w		
Factors capable of activating basophils	Basophil secreted products	Cytokine Receptors (a.k.a. cluster of differentiation = CD)	Complement Receptors & Adhesion Molecules	Chemokine Receptors
IgE cross-linking of Fc ϵ R1 Complement fragments (C5a, C3a) Cytokines (IL-8) Chemokines (MCP-1, -2, -3, -4, eotaxin-1, -2, -3, MIP-1) Lipid mediators (PAF, PGD ₂ , PGE ₂ , PGI ₂)	Histamine Major basic protein (MBP) Tryptase chondroitin sulphate Charcot-Leyden crystal protein (CLP) IL-3, IL-4, IL-13 LTC ₄	IL-3R α (CDw123) IL-1RII (CD121b) IL-2R α (CD25) IL-5R (CDw125) GM-CSFR (CD116)	C5aR (CD88) CD40 CD35 CD11b CD11c	CCR1 CCR2 CCR3 CCR5 CXCR1 CXCR2 CXCR4

Basophils are recruited to sites of inflammation and they can be directly activated by a variety of pathogen-associated molecular patterns (**PAMPs**), as well as by IgE-crosslinking. When stimulated, basophils release their granule contents including histamine, and generate and release **LTC4**. In addition, activated basophils produce **cytokines**, most notably **IL-4** and **IL-13** but also **MIP-1 α** . Thus the physiological role of basophils is thought to be the release of cytokines, leukotrienes and histamine to aid immunity to pathogens. In particular, basophils are thought to be important in immune responses to parasites including tick and filarial worms.

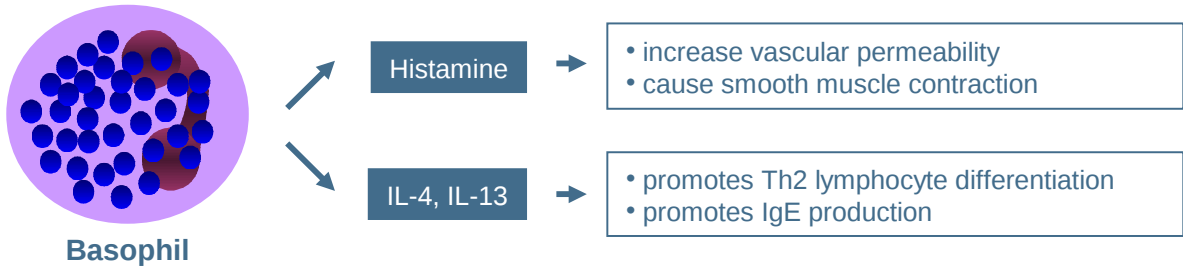
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cont.



Roles of the major effector mediators produced by basophils in allergic disease: e.g. allergic asthma



Basophils and mast cells have long been implicated in the pathogenesis of allergic disease as high levels of mediators common to both cell types are found in tissue locations relevant to allergic diseases. Basophils are also a source of the major Th2-driving cytokine, **IL-4**, early in immune responses. Basophils are rapidly recruited to the skin, lung or nose, following antigen challenge in humans, and are found in elevated numbers in asthma, allergic rhinitis, atopic dermatitis and nasal polyps. In these conditions recruited basophils participate in late phase reactions by the production and release of a number of mediators such as **histamine**, **LTC4** and **IL-4**. Thus basophils may fulfil pathological roles in both the onset and chronicity of allergic disease.