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The role of the basophil in allergic disease

Background

Basophils are comparatively rare cells and yet they display remarkable potential to contribute to both the symptoms of allergic inflammation as well as supporting pro-allergic (Th2-type) immunity. This is because, upon allergen stimulation, they rapidly release comparatively large quantities of histamine, leukotriene C_4 and inflammatory cytokines, including IL-4, IL-13 and possibly also TNF-alpha, as well as vascular endothelial growth factor. Despite this potential, there has been much controversy surrounding the importance of basophils in allergy.

Key message

Until recently, basophils were often considered as being largely redundant in their pro-allergic immunomodulatory functions, since in murine models of allergy their more numerous tissue fixed mast cell counterparts readily produce Th2-type cytokines; a situation which is rather different compared to the attributes of most human mast cells. However, in recent years, it has become apparent that basophils readily invade tissues affected by allergic inflammation and there is compelling evidence to show that they are a major early source of the archetypal allergic cytokines,

IL-4 and IL-13. Moreover, certain mouse models have also highlighted an important role for basophils in orchestrating chronic allergic inflammation as well as antigen presentation. This suggests that basophils may be directly involved in the early phase of allergen sensitisation as well as simultaneously providing the ideal environment for supporting Th2 responses. However, disagreements regarding basophils remain, since recent methods for depleting these cells in murine models of allergy and parasitic infection have delivered conflicting results.

Summary

Basophils are crucial early sources of IL-4 and IL-13 which play an important immunomodulatory role in supporting underlying pro-allergic immunity. These cytokines, as well as other inflammatory mediators, also allow basophils to contribute to the symptoms of allergic inflammation.

Conclusion

Basophils are capable of supporting ongoing allergic inflammation and Th2 immunity, although their ability to present antigens and act as orchestrators of adaptive immune responses to allergens remains controversial.

