Cell types involved in allergic asthma and their use in *in vitro* models to assess respiratory sensitization.

Toxicology in Vitro 22 (2008) 1419–1431

S. Verstraelen[1*], K. Bloemen[1*], I. Nelissen[1], H. Witters[1], G. Schoeters[1], R. Van Den Heuvel[1]

[1]Centre of Expertise in Environmental Toxicology, Flemish Institute for Technological Research (VITO), B-2400 Mol, Belgium

[*] These authors have the same contribution to this review

Abstract

This review first describes the mechanism and cell types involved in allergic asthma, which is a complex clinical disease characterized by airway obstruction, airway inflammation and airway hyperresponsiveness to a variety of stimuli. The development of allergic asthma exists of three phases, namely the induction phase, the early-phase asthmatic reaction (EAR) and the late-phase asthmatic reaction (LAR). In the induction phase, antigen-presenting cells play a major role. Most important cells in the EAR are mast cells, and during the LAR, various cell types, such as eosinophils, neutrophils, T cells, macrophages, dendritic cells (DCs), and cells that endow structure are involved. In occupational asthma, this immunological mechanism is involved in 90% of the cases. The second part of this review gives an overview of *in vitro* models to assess the hazardous potential of high- and low-molecular weight chemicals on the respiratory system. In order to develop a good *in vitro* model for respiratory allergy, the choice of appropriate cell types is important. Epithelial cells, macrophages and DCs are currently the most used models in this field of research.