

Alveolar macrophage plasticity and interplay with epithelial cells

Division of Allergy and Clinical Immunology, Seoul National University College of Medicine

Hye-Ryun Kang

Since first described in 1893, macrophages have been known as “phagocytes” for a long time. In the lung, macrophages are the most abundant immune cells which reside in the lung interstitium (interstitial macrophage) and alveoli (alveolar macrophage) or are recruited to organs upon inflammatory stimuli. Although the origin of lung macrophages is still unclear, recent studies suggest that these macrophages are either differentiated from blood monocytes or proliferated from resident macrophages. Macrophages are extremely heterogeneous and presenting both inflammatory and anti-inflammatory functions. Recent reports suggest that lung macrophages orchestrate termination and resolution of inflammation. They also initiate parenchymal repair processes. The unique tissue location and function of alveolar macrophages distinguish them from other macrophage populations and suggest that it is important to classify macrophages according to the site that they occupy. The airway microenvironment influences on alveolar macrophage phenotype, function and turnover. Alveolar macrophages are in close contact with the respiratory epithelium and epithelia cells make the direct and indirect influences on alveolar macrophages. There are diverse modes of macrophage-epithelial crosstalk. In allergic airway inflammation, allergens activates lung epithelial cells and innate immune cells and subsequent release of a variety of cytokines eventually polarize macrophages into specific subtype; M1 and M2 macrophages play distinct roles in inflammation and tissue remodeling by secreting different inflammatory mediators. M1 is generally considered to be proinflammatory, M2a induced by IL-4, IL-13, fungal and helminthic infection, M2b and M2c subtypes predominately participate in tissue remodeling and fibrosis. Significant progress revealed pathophysiology and role of macrophage in allergic inflammation, a great deal of questions still remain to be answered.