**Macrophage plasticity and polarization in disease**

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Diversity and plasticity are hallmarks of cells of the monocyte-macrophage lineage. In response to interferons, Toll-like receptor engagement or IL-4/IL-13 signaling, macrophages undergo M1 (classical) or M2 (alternative) activation, which represent extremes of a continuum in a universe of activation states. Progress has now been made in defining the signaling pathways, transcriptional networks and epigenetic mechanisms underlying M1-M2 or M2-like polarized activation. Functional skewing of mononuclear phagocytes occurs in vivo under physiological conditions (e.g. ontogenesis and pregnancy) and in pathology (allergic and chronic inflammation, tissue repair, infection and cancer). However, in selected preclinical and clinical conditions coexistence of cells in different activation states and unique or mixed phenotypes has been observed, a reflection of dynamic changes and complex tissue-derived signals. The identification of mechanisms and molecules associated with macrophage plasticity and polarized activation provides a basis for macrophage-centered diagnostic and therapeutic strategies.