

Progenitors of postnatal mesoderm derivatives in the microvascular system

The predominant paradigm of postnatal progenitors of mesoderm derived tissues is provided by the notion of mesenchymal stem cells (MSC). Originally identified as a multipotent population of stromal cells within the bone marrow stroma, mesenchymal stem cells are currently thought of as an ubiquitous population of cells defined by the ability to generate surrogate differentiated cell types upon artificial induction in culture, and by the expression of an array of surface antigens in culture. In fact, neither property reliably identify tissue progenitors in postnatal tissues. We have previously identified the anatomy and surface phenotype of the archetypal "MSC", which coincides with a population of adventitial cells in the wall of bone marrow microvessels. Using the same approach of phenotype-based prospective isolation, we have now identified a system of distinct, tissue-specific committed progenitors in the microvascular wall in many tissues. These data provide a novel view of so-called "MSC", in which committed tissue specific progenitors replace the former ubiquitous multipotent "MSC". Committed progenitors are recruited to microvascular process through dynamic events that can be modeled in vivo, paving the way to elucidating the underlying molecular mechanisms of self-renewal, activation, and recruitment to tissue repair of local progenitors.