Bone marrow niches and HSC fates
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Self-renewing and multipotent hematopoietic stem cells (HSCs) generate all mature blood cells. Adult HSCs exist in highly specialized bone marrow niches. These niches have crucial roles in regulating the fate of HSCs in terms of quiescence, mobilization into circulation and differentiation in response to steady-state and emergency cues. HSC fate is influenced by diverse types of stromal and hematopoietic cells that make up the bone marrow niche and provide signals in the form of soluble factors, direct cell-cell contact and cell-surface ligands. In stress conditions, such as during an inflammatory response, bone marrow niches respond by regulating the balance of downstream HSC fates. In the case of myeloid malignancies, bone marrow niches can be remodelled to create an environment that supports malignant stem cells but impairs the maintenance of normal HSCs. Understanding the signalling pathways of the bone marrow niche will pave the way towards targeting of HSCs, as well as more general insights into stem cell regulation and the function and composition of stem cell niches.