Circulating blood cells originate from one common cell in the adult bone marrow, hematopoietic stem cells. Understanding the mechanisms that determine hematopoietic stem cell fate is necessary to understand the pathology behind various hematopoietic diseases and improve the outcomes of stem cell therapies. The bone marrow (BM) microenvironment (i.e. the niche) governs the maintenance, proliferation, and differentiation of hematopoietic stem cells. Among the various niche factors influencing hematopoietic stem cell fate, the cytokine thrombopoietin, uniquely regulates hematopoietic stem cell self-renewal along as stem cell differentiation to megakaryocyte lineages. I have studied that mature megakaryocytes may act as niche cells to hematopoietic stem cells through the production of thrombopoietin (Nakamura-Ishizu et al, J Exp Med, 2015, Nakamura-Ishizu et al, BBRC, 2014). These studies indicated a close relation of hematopoietic stem cells and megakaryocyte lineage cells. We are therefore currently analyzing how thrombopoietin regulates the direct commitment of hematopoietic stem cells to megakaryocyte lineage.

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