

Were HSCs Somehow Born from Bone to then Reside in the Marrow?

The answer to this question is *no*. Primitive hematopoiesis first occurs in the embryonic yolk sac; “definitive hematopoietic stem cells” (dHSCs), however, are born in the developing aortic portion of the aorta-gonad-mesonephros (AGM) from splanchnopleura mesoderm. Through developed vasculature, HSCs migrate to the fetal liver, where they rapidly proliferate and begin to generate progeny of the hematopoietic lineages (Mikkola and Orkin 2006; Al-Drees et al. 2015; Boulais and Frenette 2015). During this period, bones are taking shape and becoming vascularized, which establishes a pathway for HSCs to find their way to the bone marrow. The remarkable ability of HSCs to migrate through the circulatory system and find their tissue-specific destination is called homing. HSCs recognize the bone marrow as the environment to seed through the HSCs’ CXCL4 receptor sensing the chemokine CXCL12 (also known as Stromal-Derived Factor 1, or SDF1) expressed by osteoblasts and stromal cells of the marrow (Moll and Ransohoff 2010). A variety of adhesion proteins, such as E-selectins and VCAM1, also support HSC homing to the niche (Al-Drees et al. 2015).

Literature Cited

Al-Drees, M. A. and 6 others. 2015. Making blood: The haematopoietic niche throughout ontogeny. *Stem Cells Int.* 2015: 571893.
[PubMed Link](#)

Boulais, P. E. and P. S. Frenette. 2015. Making sense of hematopoietic stem cell niches. *Blood* 125: 2621–2629.
[PubMed Link](#)

Mikkola, H. K. and S. H. Orkin. 2006. The journey of developing hematopoietic stem cells. *Development* 133: 3733–3744.
[PubMed Link](#)

Moll, N. M. and R. M. Ransohoff. 2010. CXCL12 and CXCR4 in bone marrow physiology. *Expert Rev. Hematol.* 3: 315–322.
[PubMed Link](#)

All the material on this website is protected by copyright. It may not be reproduced in any form without permission from the copyright holder.