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The downregulated membrane expression of CD18 in CD34⁺ cells defines a primitive population of human hematopoietic stem cells

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Abstract

Background: CD18 is the common beta subunit of β_2 integrins, which are expressed on hematopoietic cells. β_2 integrins are essential for cell adhesion and leukocyte trafficking.

Methods: Here we have analyzed the expression of CD18 in different subsets of human hematopoietic stem and progenitor cells (HSPCs) from cord blood (CB), bone marrow (BM), and mobilized peripheral blood (mPB) samples. CD34⁺ cells were classified into CD18^{high} and CD18^{low/neg}, and each of these populations was analyzed for the expression of HSPC markers, as well as for their clonogenicity, quiescence state, and repopulating ability in immunodeficient mice.

Results: A downregulated membrane expression of CD18 was associated with a primitive hematopoietic stem cells (HSC) phenotype, as well as with a higher content of quiescent cells and multipotent colony-forming cells (CFCs). Although no differences in the short-term repopulating potential of CD18^{low/neg} CD34⁺ and CD18^{high} CD34⁺ cells were observed, CD18^{low/neg} CD34⁺ cells were characterized by an enhanced long-term repopulating ability in NSG mice.

Conclusions: Overall, our results indicate that the downregulated membrane expression of CD18 characterizes a primitive population of human hematopoietic repopulating cells.

Keywords: Hematopoietic stem cells, CD18, Integrins, Long-term repopulating cells

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