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## Human mesenchymal stromal cells from various tissues differ significantly in their transcriptomes and physiology

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Mesenchymal stromal cells (MSC) hold great promise in regenerative medicine as they promote wound healing and tissue regeneration, and can differentiate into various mature cells such as osteoblasts, chondrocytes or adipocytes. Differentiated MSC have also been successfully transplanted for tissue repair. Many reports claimed that differentiation competent MSC could be obtained from virtually all sites of an adult donor. But in some cases the overall efficacy of MSC differentiation was low, at least in vitro. Others reported that MSC derived human term placenta in particular appear to have a low osteogenic differentiation potential. We therefore investigated the transcriptome of MSC from placenta (pMSC) and bone marrrow (bmMSC) using Affymetrix GeneChip arrays, followed by extensive bioinformatics. We explored the expression of distinct lineage markers and cell surface antigens, and the osteogenic, chondrogenic and adipogenic differentiation capacity of pMSC vs. bmMSC by quantitative RT-PCR, flow cytometry, and immunohistochemistry. We report that pMSC grown in vitro expressed a significantly different transcriptome than bmMSC. Among the factors expressed differently were osteogenic transcription factors, proteins of the extracellular matrix, integrins, and growth factors as determined by gene array. The differences in expression of osteogenic factors were confirmed by qRT-PCR, and osteogenic differentiation of pMSC and bmMSC was visualized by von Kossa and/or Alizarin Red staining and quantified. Chondrogenic or adipogenic differentiation did not significantly differ between pMSC and bmMSC. We conclude that MSC from different sites may display not only a significantly different transcriptome, but also may differ with respect to their differentiation capacities.

## Biography

Melanie L. Hart completed her Ph.D. at Rush University, Chicago, IL in 2002, followed by a postdoctoral fellowship at Harvard Medical School, Boston, MA (2002-2005). She was Senior Research Scientist in the Department of Anesthesiology and Intensive Care Medicine (2005-2008) and in the Center for Regenerative Medicine (2011-2012) at the University of Tübingen, Germany (UKT). She is now Associate Professor in the Department of Urology (UKT).

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