P033 Regulation of platelet-derived growth factor receptors by cell-matrix interactions in mesenchymal stem cells

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Human adult mesenchymal stem cells (MSCs) derived from bone marrow are multipotent somatic cells that have the potential to differentiate along osteoblast, chondrocyte, adipocyte and smooth muscle lineages, and thus provide exciting prospects for regenerative medicine. A major goal in utilising stem cells is defining how the pericellular extracellular matrix (ECM) and soluble factors control MSC fate. Specific ECM molecules contribute to tissue-specific niches that regulate MSC self-renewal or differentiation. Integrins mediate MSC adhesion to their surrounding ECM, and can also modulate the activity of growth factor receptor tyrosine kinases. We have examined which integrins are expressed by human MSCs, and how cell-matrix interactions regulate growth factor receptor signalling. MSC adhesion to specific vascular matrix molecules has been defined. Flow cytometric analysis demonstrated the cell surface expression of α_1, α_2, α_3, α_4, α_5, α_v, β_1, $\alpha_v\beta_3$, and $\alpha_v\beta_5$ integrins. The functional contributions of several of these receptors to MSC adhesion to selected vascular ECM molecules was confirmed using integrin-blocking antibodies. Cross-talk between this cell-matrix interface and platelet derived growth factor (PDGF) receptors was demonstrated in growth factor-independent PDGF-receptor tyrosine phosphorylation assays.
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