

## **CHARACTERISATION OF STRO-1 EXPRESSION ON HUMAN MESENCHYMAL STEM CELLS**

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Mesenchymal stem cells (MSCs) have been isolated from numerous sources since they were first identified in the late 60s. The most extensively studied MSCs are those derived from the bone marrow, with their occurrence estimated to be 0.01-0.001% of the total bone marrow mononuclear cells. The multipotentiality of MSCs makes this cell population an interesting tool regarding its application into various areas of regenerative medicine.

Various techniques have been used to directly isolate MSCs from the bone marrow. The most common method is adherence to tissue culture plastic. However, selective antibody marker profiles indicate such populations are heterogeneous whilst no single cell surface marker has been identified which can define the multipotent stem cells. Among the range of monoclonal antibodies employed to enrich for MSC population, the IgM STRO-1 has been shown to give a 100-fold enrichment whilst clonal population derived from the STRO-1 positive fraction can be induced to differentiate into the tri-lineage signature profile of MSCs.

This study aims to further characterise the expression of STRO-1 on bone marrow MSCs isolated by adherence to tissue culture plastic. The expression of STRO-1 on MSCs is heterogeneous with varying levels of expression on the positive population as determined by immunofluorescence and flow cytometry. The proportion of cells expressing STRO-1 decreases with increasing passage number and STRO-1 is highly modulated during differentiation. The down-regulation of STRO-1 upon expansion resulted in a decrease in the adipogenic and osteogenic differentiation potential of the MSCs. Furthermore, MACS-sorted bright STRO-1 positive population showed a more pronounced differentiation potential than the dull population.

These results confirm the existence of sub-populations of cells within cultures of MSCs isolated from the bone marrow. The number of STRO-1 expressing cells is modulated with increasing passage number and upon differentiation and could potentially dictate the fate of the MSCs. These data suggest the STRO-1 antigen may be involved in the maintenance of stemness of MSCs.