Evaluating the Potential of CD264 as an Effective Biomarker for Cellular Aging in Mesenchymal Stem Cells

Lewis, Amaris (School: Lusher Charter High School)

Mesenchymal stem cells (MSCs) present a high degree of clonal heterogeneity, making it difficult to identify which cells are capable of repopulating tissues versus those more prone to undergoing senescence. The purpose of this research is to find a potential cell surface biomarker for cellular aging so that stem cell cultures more indicative of a non-senescent phenotype may be identified despite genotypic variation. A recent research study associates cell surface receptor CD264 to oncogene senescence, and there is currently little knowledge regarding CD264 expression in mesenchymal stem cells. This study analyzes the colony-forming efficiencies of CD264+, CD264-, and parent populations of mesenchymal stem cells through growing cultures, immunolabeling using the anti-CD264 antibody-conjugated fluorophore PE to detect cell surface expression of CD264, and calculating proliferation potential as colony-forming units per 100 inoculated cells. Cells were derived from healthy adult volunteers through a bone marrow-harvesting program at a local university. At the end of experimentation, CD264- populations of MSCs exhibited the greatest degree of colony-forming efficiency, followed by the parent and CD264+ populations. Data was analyzed by conducting a two-tailed student's unpaired t-test between the CD264+ and parent populations, which yielded a p-value of 0.0020. This suggests that the presence of CD264 has a strongly negative correlation with cell proliferation and may be used to identify mesenchymal stem cell cultures more prone to becoming senescent, thus impeding their use in stem cell therapies.

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