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Mesenchymal stem cell expansion with small molecules

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Mesenchymal stem cells are present in the adult body; they can self-renew themselves and exhibit multipotency. They can differentiate to bone, fat, chondrocyte and other various cell types under specific conditions. They are a great candidate for transplantation-based therapies with their immunomodulatory abilities, differentiation potentials and because of their easy accessibility. They can be obtained from different tissue types including; bone marrow, adipose tissue, umbilical cord etc. Isolation of MSCs is easy but there are major challenges on mobilization, expansion, understanding the differentiation mechanism. If these challenges overcame, MSCs show great potential for experimental and clinical applications. In this study, author has focused on expansion of mouse bone marrow-MSCs, with small molecule treatment. She has selected the effective molecules conducting WST-1 assay, pyronin y/hoechst staining, cell cycle analysis, apoptosis analysis and settled on four different molecules. First and most effective molecule is a GSK-3 inhibitor that stabilizes free cytosolic β-catenin and inhibits differentiation. Second one is a p38-MAPK inhibitor. The goal after this study is to carry this knowledge to therapeutic field.

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