hTERT TRANSPECTED HUMAN ADIPOSE-DERIVED MESENCHYMAL STEM CELLS MAINTAINS ADIPOGENIC DIFFERENTIATION POTENTIAL AND EXPRESSED MSC MARKERS

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Background:
Human mesenchymal stem cells can be isolated from adipose tissue and expanded in culture while maintaining their multipotency. It is a potential cell source for tissue engineering and regenerative medicine. However, telomeres shorten with each cell division eventually leading to cell senescence during long-term in vitro culture. It was reported that cellular life span can be extended by the transfection of human telomerase reverse transcriptase (hTERT) gene. In this study, we aim to compare the adipogenesis capacity and CD markers expression of adipose derived-mesenchymal stem cells (AD-MSC) before and after transfection with the hTERT gene.

Material and methods:
AD-MSC isolated from aged patients (>55 years old) was transfected by plasmid containing the gene hTERT at passage 3. Flow cytometric analysis was performed using CD34, CD45, CD73, CD90 and CD105 on non-transfected and transfected AD-MSC. To investigate the adipogenic differentiation potential, both non-transfected and transfected AD-MSC at passage 5 was induced for adipogenesis followed by Oil Red O staining.

Results:
Transfection efficiency of 30% was achieved by nucleofection. Flow cytometric analysis showed that the transfected AD-MSC expressed CD73, CD90 and CD105 which is similar to that of non-transfected AD-MSC. Both showed no expression of haematopoietic markers CD45. The transfected AD-MSC still maintained the adipogenic differentiation potential in vitro based on Oil Red O staining.

Conclusion:
These results demonstrated that hTERT transfected AD-MSC maintains its mesenchymal properties.

Keywords:
Adipose-derived mesenchymal stem Cells, transfection, hTERT, tissue engineering