

Abstracts (Poster Presentation)

Inhibition of MicroRNAs Promotes Osteogenic Differentiation Potential of Mesenchymal Stem Cells Derived from Human Placenta

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Abstract

Introduction: Mesenchymal stem cells (MSCs) are multipotent stem cells that have a regenerative function. They can be classified into several cell types, including osteoblasts, adipocytes, and chondrocytes. MSCs can be isolated from the placenta with a non-invasive procedure. However, the osteogenic differentiation potential of MSCs derived from the placenta (PL-MSCs) is not very efficient. The investigation for improving the osteogenic differentiation potential of PL-MSCs is important for the application of PL-MSCs in the clinical field. MicroRNA, including miR-21, miR-27b, miR-29a, and let-7b, plays an important role as a post-transcriptional regulator in various processes. However, there is restricted data regarding the role of miRNA on osteogenic differentiation of PL-MSCs.

Objectives: This study is intended to investigate the role of miR-21, miR-27b, miR-29a, and let-7b on the osteogenic differentiation of PL-MSCs.

Methods: MSCs were isolated from the placenta using enzymatic digestion. The expressions of miRNAs during osteogenic induction were measured using quantitative real-time PCR. After transfection with anti-miRNA, the osteogenic differentiation potential was determined using alkaline phosphatase activity, alizarin red staining, and osteogenic gene expression.

Results: The results showed that miR-21, miR-27b, miR-29a, and let-7b were down-regulated during osteogenic differentiation of PL-MSCs. After the transfection with anti-miRNAs, the ALP activity was significantly increased compared with PL-MSCs cultured in an osteogenic differentiation medium without anti-miRNAs, especially on days 21 and 28. In addition, alizarin red staining and the expression of osteogenic markers were up-regulated when compared with the control group.

Conclusions: The data obtained from this study demonstrated that the inhibition of miR-21, miR-27b, miR-29a, and let-7b could enhance the osteogenic differentiation potential of MSCs derived from the placenta.

Keywords: Mesenchymal stem cell, MicroRNAs, Osteogenic differentiation, Alkaline phosphatase

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