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Objective: Impaired differentiation from hair epithelial stem to progenitor cells is suggested to cause Androgenic Alopecia (AGA). Since miRNAs are involved in differentiation process, they have become of interest for diagnosis and therapy of hair loss. Therefore in this study we attempt to compare the microRNAs expression profile between normal and alopecia hair cells to identification microRNAs (miRNAs), which are responsible to convert hair patient stem to progenitor cells.
Materials and Methods: To test this hypothesis, we checked the presence of stem and progenitor cells by immunofluorescence in patient and normal samples from AGA. Cells expressing CD200, CD34, and CD49f were quantitated via flowcytometry. microRNA expression profile of normal and patient stem cells as well as normal progenitor cells were evaluated. To explore the role of miRNA candidate, human hair total cells were cultured and transfected with miRNA-mimic candidate.
Results: Immunofluorescence and Flowcytometry assessment showed that around 3.12±1.34 (n=27) and 4.11 ± 2.34 (n=13) cells are stem cells (CD200+CD49f+cd34-) in normal and patient samples respectively. Surprisingly progenitor cells (CD200-CD49f+cd34+) dramatically diminished from 31.96 ± 8.03 (n=27) in normal to 1.4 ± 1.09 in patient samples (n=13). And also miRNA profiling of sorted normal and patient stem as well as progenitor cells was reported for the first time. Basically, we found that 19 miRNAs were differentially expressed between normal stem and progenitor cells. Moreover 19 miRNAs were found to be differentially expressed between normal stem and patient stem cells using a cutoff of p-value < 0.05. And miR-324-3p displayed the most reduced expression in patient stem cells. Pathway analysis based on miR-324-3p targeted genes showed these targets are involved in some pathways such as: mitogen activated protein kinase (MAPK) and Androgen receptor signaling pathway. Overexpression of miR-324-3p in human cultured hair cells was demonstrated increasing the number of progenitor cells.
Conclusion: These study results suggest that miR-324-3p have the capability to "wake up" stem cells and convert them to progenitor cells in AGA. In regard to topical use of miRNA as a therapeutic approach in skin and hair, miR-324-3P could be an effective treatment for AGA in future.
Keywords: miRNA, Follicular, Bioinformatics

Ps-72: Using Herbal Preconditioning, Extract of Origanum Vulgare Protects The Mesenchymal Stem Cells from The Oxidative Stress

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Objective: One of the most important challenges in mesenchymal stem cells (MSCs) mediated cell therapy is their low survival rate following transplantation. Therefore, a great number of preconditioning studies have been conducted to potentiate the MSCs against stresses. This study was aimed at preconditioning of the MSCs by using the high concentrations of Origanum Vulgare extract to protect them against oxidative stress.
Materials and Methods: MSCs were isolated from the bone marrow of rat. Then, they were preconditioned with the high doses (80-0.625 mg/ml) of Origanum Vulgare extract for one hour. Following two days recovery period, MSCs were exposed to the half maximal inhibitory concentration (IC50) of hydrogen peroxide as an oxidative stress agent for four hours. After two days recovery again, MSCs survival and apoptosis were evaluated by using MTT and caspase 3 assays, respectively.
Results: Preconditioning of the MSCs with Origanum Vulgare extract at2.5mg/ml significantly increased the MSCs survival from 46% in H2O2-induced MSCs to 74% preconditioned-MSCs and significantly decreased their caspase 3 from 229% in H2O2-induced cells to 116% when they were preconditioned with Origanum Vulgare extract ($P<0.05$).
Conclusion: Herbal preconditioning with the higher doses of Origanum Vulgare can protect mesenchymal stem cells against oxidative stress and this strategy may be suggested to prevent the cell death in transplantation programs.
Keywords: Preconditioning, Herbal Extract, Origanum Vulgare, Mesenchymal Stromal Cells

Ps-73: Overexpression of MicroRNA-148b-3p Stimulates Osteogenesis of Human Bone Marrow-Derived Mesenchymal Stem Cells

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Objective: Bone formation process is controlled by many regulatory factors including microRNAs. MicroRNAs (miRNAs) are small non-coding endogenous RNAs which play crucial role in regulating gene expression in many aspects of bone development and metabolism. Beside the role of miRNA-148b in osteogenesis, miRNAs could be promising therapeutic agents in bone tissue formation. To evaluate the effects of miR-148b-3p on osteogenic activity, we introduced lentiviral-miR-148b-3p-expression vectors into human mesenchymal stem cells (hMSCs).