



## The expression of neurotrophic and differentiation factors in epidermal neural crest stem cells by fingolimod treatment

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### Abstract:

**Background.** Despite the unique abilities of epidermal neural crest stem cells (EPI-NCSCs), still there are limitations in using these cells in regenerative therapies in the central nervous system (CNS) diseases. Fingolimod, has shown promising effects on the proliferation, differentiation, and migration of neural stem cells. In the present study, we evaluated the effects of different concentrations of fingolimod on the viability of EPI-NCSCs and the expression level of several cellular markers and trophic factors.

**Methods.** The EPI-NCSCs were obtained from the bulge of hair follicles of adult rat whisker pads. Immunostaining against Nestin, DCX, SOX10, GFAP and  $\beta$ -III tubulin were carried out to verify EPI-NCSCs. 100 and 400nM concentrations treated cells after 24 and 120 hours were subjected to quantitative RT-PCR to evaluate the transcripts of neurotrophic factors and differentiation markers.

**Results.** 100nM fingolimod increased NT-3 expression levels after 24-hours, and 120 hours treatment at 400nM soared up BDNF to nearly six-folds. We also found that after 120 hours, the transcription level of NG2 increased with 100 nM fingolimod while 400nM upregulated the mRNA levels for PDGFR $\alpha$  and GAP43.

**Conclusion.** Fingolimod can be a promising agent to accompany EPI-NCSCs in CNS disorders to increase their efficiency, or as an additive in specific time points to culture media to guide their fate.

**Key words:** Fingolimod, EPI-NCSCs, Neurotrophic factors, Gene Expression, Cell fate

### Biography:

Safura Pournajaf, Neuroscience Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran with title The expression of neurotrophic and differentiation factors in epidermal neural crest stem cells by fingolimod treatment. Despite the unique abilities of



epidermal neural crest stem cells (EPI-NCSCs), still there are limitations in using these cells in regenerative therapies in the central nervous system (CNS) diseases. Fingolimod, has shown promising effects on the proliferation, differentiation, and migration of neural stem cells. In the present study, we evaluated the effects of different concentrations of fingolimod on the viability of EPI-NCSCs and the expression level of several cellular markers and trophic factors.

### Publication of speakers:

- Safura Pournajaf; Effect of Posture Training with Weighted Kypho-Orthosis (WKO) on Improving Balance in Women with Osteoporosis., 2014 Mar 6.
- Safura Pournajaf; Fingolimod increases oligodendrocytes markers expression in epidermal neural crest stem cells., 2020 Aug 26.
- Safura Pournajaf; Combination therapy with astaxanthin and epidermal neural crest stem cells improves motor impairments and activates mitochondrial biogenesis in a rat model of spinal cord injury., 2020 Mar 6.
- Safura Pournajaf; Perceptions of soil-eating and anaemia among pregnant women on the Kenyan coast., 1999 Apr.
- Safura Pournajaf; 25th Annual Computational Neuroscience Meeting 2016 Aug 18.

2nd Annual Congress on Cellular Therapies, Cancer, Stem Cell and Bio Medical Engineering, July 18, 2020, Vienna, Austria

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