Hair follicle associated neural crest stem cells interact with mouse brain tissue

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Introduction

Hair follicle contains population of EPI-NCSCs (Epidermal Neural Crest Stem Cells) which can be isolated in culture and differentiated in neural direction. EPI-NCSCs can provide new available source of stem cells for autologous therapy of neurodegenerative diseases.

In this work we show how EPI-NCSCs interact with brain tissue.

Material and Methods

Results

Primary EPI-NCSCs cultures expressed NCSCs markers (nestin, neurotrophin receptor p75, sox10), neuronal and glial – specific markers (beta III tubulin, myelin basic protein), and stem cell marker – fibronectin.

Migration (upper fig.) and scattering (lower fig.) analyses showed that conditioned by embryonic tissue medium accelerated migration of EPI-NCSCs in the first two days, but then migration capacity significantly decreased in age depended manner.

Results

Analysis of ki67 expression showed that EPI-NCSCs proliferation activity diminishes in culture, but SC18.5E provides the rise of EPI-NCSCs proliferation over time.

Cultivation EPI-NCSCs on thick brain slices showed that during first 4 days primary HF-NCSCs proliferated actively, and to day 7 the proliferation level significantly decreased by more than 3 times. Also doublecortin expression was observed in some EPI-NCSCs.

Differentiated into neural direction EPI-NCSCs started to express NeuN (Neuron Nuclei) and doublecortin.

Transplanted into adult mouse brain EPI-NCSCs were alive at 21st day after transplantation, while differentiated EPI-NCSCs were alive at 28th day after transplantation.

Conclusions

Migration capacity of the HF-NCSCs corresponds to the stage but not type of neural tissue development present in co-culture, on the early stages migration is higher than on the later one.

In contrast, interaction with adult brain changes HF-NCSCs status and reduces proliferation.

Differentiated HF-NCSCs grafts survive longer in brain transplants and have higher opportunity for migration than primary ones.