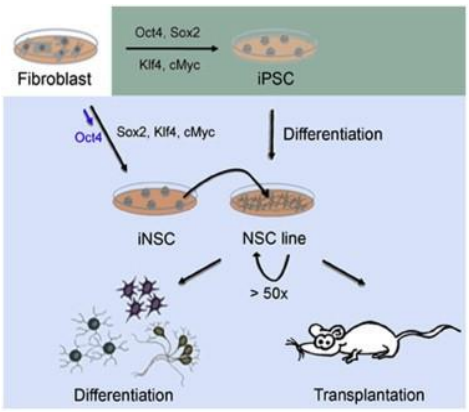
Induced Somatic Stem Cells

Reprogramming of somatic cells to neural stem cells

Invention

Since the pioneer work published by Takahashi & Yamanaka, the technique of reprogramming cells from a differentiated to an embryonic-like status has experienced an exploding development in regard to both techniques and applications. The most obvious application is the use in tissue regeneration. However, two key obstacles need to be overcome for clinical realization, i.e. risk of reprogrammed cells to develop neoplasiae as well as cumbersome and costly cell culture procedures. Therefore, it is imperative to develop cost-efficient methods with a lower the risk of cancer. The present invention has solved this problem by using a modification of the originally described method. Here, the transcription factors Sox2, cMyc and Klf4 are exogenously and stably expressed, whereas Oct4 is introduced with an exogenous transient expression system.



Graphical abstract taken from the publication by Thier et al. (2012)

Commercial Opportunities

This method is qualified to produce autologous neural stem cells that proliferate indefinitely and are able to re-differentiate into functional neural cells. The technology therefore applies to the tissue regeneration of neural tissue and disease modelling, especially in the central nervous system.

Current Status

A European and US patent application are pending. On behalf of the University of Bonn, PROvendis offers access to the technology under a License Agreement.

Relevant Publications

Their, M., et al. (2012) Direct conversion of fibroblasts into stably expandable beural stem cells. *Cell Stem Cell* 10: 473-9.

Lujan, E., *et al.* (2012) Direct conversion of mouse fibroblasts to self-renewing, tripotent neural precursor cells. Proc. Natl. Acad. Sci. USA 109(7): 2527-32.

Kim J, et al. (2011) Direct reprogramming of mouse fibroblasts to neural progenitors. *Proc. Natl. Acad. Sci.* USA 108(19): 7838-43.

Takahashi, K. & Yamanaka, S. (2006) Induction of pluripotent stem cells from mouse embryonic and adult fibroblast cultures by defined factors. *Cell* 126: 663-76.

An invention of the University of Bonn.

Competitive Advantages

- Method to generate personalized neural stem cells
- Reduced cancer risk due to transient reprogramming
- Cost-efficient reprogramming to neural stem cells due to short-cut

Technology Readiness Level

1 2 3 4 5 6 7 8

Technology validated in lab

Industries

- Medical Industry
- Pharmaceutical Industry

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