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Technology Offer

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Generation of induced pluripotent stem cells with one or two reprogramming factors

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Background

The cellular identity of mature cells that are confined in a specialized genetic expression profile can be overcome by introducing just a few genes that encode for so-called reprogramming factors [1]. By means of this intervention, also known as reprogramming, the cells then become pluripotent and represent induced pluripotent stem cells (iPS cells) [1]. Nowadays, numerous new cell culture models have been established based on reprogramming protocols that yield iPS cells. Such cell culture models have become important research tools for basic research and can often have screening applications in biomedical research.

Technology

Researchers of the Max-Planck-Institute for Molecular Biomedicine, Prof. Schöler and his team from the Department of Cell and Developmental Biology, have developed a novel approach to induce pluripotency of somatic cells. When working with multipotent neural stem cells (NSCs), they realized that in certain genetic backgrounds, cell reprogramming can be achieved by ectopic expression of just two transcription factors [2, 4]. Further, Prof. Schöler and his team were able to demonstrate that for a certain scenario, exogenous expression of just one transcription factor (Oct4) is required and sufficient for NSC reprogramming [3, 4]. To summarize, they present new cell reprogramming protocols based on introducing a minimal number of transcription factors by means of exogenous expression, that, at the same time, take advantage of sufficient endogenous expression levels of other reprogramming factors in the targeted cell line [2, 3, 4]. Since the expression of oncogenes at unnatural levels in the targeted cell line can thereby be avoided, this new approach considerably advances the protocols that have been described in the context of early cell reprogramming procedures that establish pluripotency.

Patent Information

A priority establishing patent application has been filed in 2008. There are certain patent rights covering this technology (Title: Generation of Induced Pluripotent Stem (iPS) Cells): EP2297300B1, EP3293258B1, US9556454B2, CN102066556B (publication numbers).

Literature

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