

Approaches to Manipulate Neural Differentiation

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Abstract

Since life expectancy has been increased in many parts of the world due to advance in modern medicine, neurodegenerative diseases and tissue degeneration such as Alzheimer's disease and nerve injury therefore represent a major public health issue worldwide. These degenerative conditions can be accumulated as parts of stem cell dysfunctions, which lead to an inability to maintain homeostasis of the body. Toward regenerative medicine, scientists have been trying to understand how tissues in our body can be regenerated by stem cells. Alongside with research in stem cell and regenerative biology, cell therapy using autologous sources such as patient-specific stem cells have been developed for treatment of many diseases. Human pluripotent stem cells have provided an excellent tool to study human development and diseases. In addition, because of their ability to give rise to all cell types in the body, they have been considered as an ideal resource in regenerative medicine. Moreover, they can also be used in high-throughput screenings of pharmacologically beneficial compounds for inducing self-renewal or differentiation. In my talk, I will present our works aiming at induction of neural differentiation of human pluripotent stem cells by using genetic manipulation and high-throughput screening of neural induction compounds. These approaches, either individually or combined, can be further developed to control neurogenesis of exogenous or endogenous neural stem cells for regenerative medicine.

Keyword High throughput screening, human pluripotent stem cells, neural differentiation

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