From human pluripotent stem cells, neural stem cells are produced.

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Introduction

Stem cells are at the forefront of cutting-edge research and hold tremendous promise for revolutionizing medicine and biotechnology. These unique cells possess the remarkable ability to differentiate into various specialized cell types, renew themselves through cell division, and play a crucial role in the development, growth, and repair of living organisms [1].

In the vast and intricate landscape of the human body, few cells are as remarkable and essential as neural stem cells. These specialized cells hold the key to unlocking the mysteries of the brain and the nervous system. Emerging from human pluripotent stem cells, neural stem cells possess the unique ability to differentiate into various neural cell types, offering tantalizing possibilities for both scientific research and therapeutic applications [2].

Human pluripotent stem cells, which include embryonic stem cells and induced pluripotent stem cells, serve as the foundation for generating neural stem cells. These pluripotent cells, with their extraordinary capacity for self-renewal and differentiation, provide a limitless source of material for studying the development and functioning of the human brain [3].

Human pluripotent stem cells (hPSCs) are a type of stem cell that possesses the remarkable ability to develop into any cell type within the human body. There are two main types of hPSCs - embryonic stem cells (ESCs) derived from early-stage embryos and induced pluripotent stem cells (iPSCs) created by reprogramming adult cells back into a pluripotent state. These pluripotent cells offer a virtually limitless supply of building blocks for various scientific endeavors, including the study of neural development and disorders [4].

The journey from pluripotency to neural specificity is a carefully orchestrated process that mimics the natural development of the human brain. Researchers utilize specific signaling molecules and growth factors to guide hPSCs along the path of neural differentiation. As the cells progress, they take on the identity of neural progenitor cells, also known as neural stem cell

The potential of neural stem cells lies in their ability to give rise to neurons, astrocytes, and oligodendrocytes – the building blocks of the nervous system. Through this transformative process, neural stem cells pave the way for new insights into neurodevelopmental disorders, neurodegenerative diseases, and brain injuries [5].

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