Pre-organoid Era

Modern Organoid

Induced pluripotent stem cells (iPSCs)

Researchers could isolate pluripotent stem cells from mouse embryos for the first time in 2001. In 2006, Shinya Yamanaka’s team at Kyoto University, also referred to as iPS cell or iPSC, is a cell taken from a living organism and then modified back into an embryonic-like, pluripotent state. First developed from mouse skin cells by Yamanaka’s team, these undifferentiated cells could be differentiated into any cell type in the body, including heart, liver, blood, muscle, and skin. The 1980s saw significant advances in development, and the current decade to include various organs and tissues and organs at the 3D level.

History of Organoid Research:

Organoid innovation is at the forefront of translational research, advancing our understanding of molecular mechanisms and disease. Its impact is especially important in cancer research, where organoid models are providing a more accurate representation of human cancer biology. Organoids have allowed us to study the genetic and molecular changes that occur during cancer development, leading to improved therapies. They are giving us a clearer understanding of how cancer cells respond to treatments, leading to the development of personalized medicine. Current advances in iPSC technology are providing us with the ability to generate organoids from any organ, allowing us to study the biology of organ-specific diseases.

Functional Organs

Advances in Organoid Research

The Importance of Organoids in Cancer Research

The advent of human induced pluripotent stem cells (iPSCs) presents unprecedented opportunities to generate human disease models at the organ level. These models can be used to study the cellular and molecular mechanisms of disease, providing insights into disease progression and potential therapeutic targets. One of the key advantages of organoids is their ability to recapitulate the complexity of human tissues and organs, allowing for the study of disease interactions.

Research, as the cell-matrix interactions were investigated in the context of organoid development. The 1980s saw significant advancements in development, and the current decade to include various organs and tissues at the 3D level.