

〈講 演〉

第49回日本香粧品学会(2024)・特別講演II

ヒューマンオルガノイド研究の可能性

武部貴則<sup>1, 2, 3, 4, 5, \*</sup>

**Promise of Human Organoid Technology**

Takanori TAKEBE<sup>1, 2, 3, 4, 5, \*</sup>

**Abstract**

Organoids are three-dimensional structures that self-organize from human pluripotent stem cells or primary tissue, potentially serving as a traceable and manipulatable platform to facilitate our understanding of organogenesis. Despite the ongoing advancement in generating organoids of diverse systems, biological applications of *in vitro* generated organoids remain as a major challenge in part due to a substantial lack of intricate complexity. The studies of development and regeneration enumerate the essential roles of highly diversified non-epithelial populations such as mesenchyme and endothelium in directing fate specification, morphogenesis, and maturation. Such human organoids allow for the study of direct and indirect inter-organ crosstalk recapitulating what is seen in health and disease. For example, we show *in vitro* modeling of the inter-coordinated specification and invagination of the human hepato-biliary-pancreatic (multi-organ) system in 3D stem cell culture, paving a way for the study of inter-organ connectivity failure such as biliary atresia. I herein summarize the evolving organoid technology at the cell-, tissue-, system-level complexity with a main emphasis on liver derivatives and discuss its state-of-art in disease modeling, drug discovery, tissue replacement therapy and personalized medicine.

**Key words:** stem cell, organoids, regenerative medicine, drug discovery.