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강연제목:

인간 뇌 병리 모사를 위한 브레인 칩 기술

Brain-on-a-Chip Technology for Mimicking Human Brain Pathologies

Abstract:

Various types of testing models such as plastic dish-cultured cells, small animals, and large animals have been extensively utilized as an alternative model for humans in drug development. However, cell culture models lose the physiological relevancy and the animal models show inherent genetic heterogeneity with humans. For these reasons, the efficacy of drug candidates was occasionally exaggerated or their toxicity was underestimated. In this regard, bioengineers have developed human-brain-mimetic testing models. In this presentation, the human-brain-mimetic organ-on-a-chip model, human brain avatars, is presented. The human brain avatar models not only can mimic the cellular composition and functional aspect of the human brain but also reconstitute the microenvironment of brain tissue such as flow, mechanical properties, and molecular transport. By using the brain-on-a-chip model, various human-specific brain diseases can be modeled such as Alzheimer's disease, air pollution-mediated brain degeneration, and brain tumor. It is envisioned that the human brain avatar models can address the unmet needs of human-brain-specific testing platforms and thus help the drug development process.

Brief Biosketch

Dr. Kim is currently with the Brain Science Institute at KIST. He received his B.S. (2008), M.S. (2010), and Ph.D. (2014) from the School of Mechanical and Aerospace Engineering, Seoul National University, respectively. He spent 1.5 year as a post-doc in Brain Science Institute, KIST. He became a Senior Researcher at the same institution in 2016 and now a Principal Researcher from 2023. He is also an adjunct professor in Yonsei University. His research topic covers the development of the brain-on-a-chip platforms and their applications in the modeling of human brain diseases such as Alzheimer's disease, diabetic brain, air pollution-mediated neurodegeneration.