

제 68회

ORGAN ON A CHIP 기술교류회

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제목

신약독성 평가를 위한 인간줄기세포 기반 오건온어칩

Human stem cell based organ-on-a-chips for new drug development

초록

Organ-on-a-chip systems integrate microengineering, microfluidics, and biomimetic principles to create organ-level physiological simulation platforms for disease research and drug screening. These organ-on-a-chip systems can bridge the gap between preclinical and clinical outcomes. Specifically, drug toxicity is the most frequent cause of early termination of clinical trials. Lack of efficient drug toxic predicting models and can lead to the post-market withdrawal of drugs, which results in the loss of human and financial resources. Therefore, novel organ-on-a-chip models that can improve the predictability of drug toxicity need to be developed to overcome this problem.

In this presentation, I will talk about organ-on-a-chip systems that primarily target drug toxicity testing and will divide my talk into two parts. First, I will show you the heart-on-a-chip I have recently developed. This microfluidic heart-on-a-chip mimics the structure and function of the myocardium using human induced pluripotent stem cell (iPSC)-derived cardiomyocytes. Drug cardiotoxicity tests were performed via this system observing the morphology, beating rate, and viability of the cardiomyocytes. The other one is the neuron-on-a-chip for neurotoxicity tests. Neurons and astrocytes were differentiated from human stem cells, and then co-cultured in the chip, and MeHg (a neurotoxicant) was applied to confirm the effectiveness of the neuron-on-a-chip as an alternatives to animal neurotoxicity testing. As a results, I believe that these heart- and neuron- on a chip devices will be a useful platform for new drug development.

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