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Pharmacokinetic-model based microfluidic multi-organ-on-a-chip for testing whole-body response to xenobiotic compounds

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Due to the difficulty of directly testing animal or human subjects, cell-based *in vitro* model systems are widely used in pharmaceutical industry. However, currently available *in vitro* systems are far from a faithful reproduction of an organism. For example, the effect of a xenobiotic compounds is tested *in vitro* by incubating a monolayer of cells in the presence of the drug, whereas in human body the drug goes through a dynamic process of metabolism and excretion, which result in complex whole-body response. Combination of microscale technology, mathematical PK modeling can contribute to developing an *in vitro* model system that mimics the human body better. Herein, we introduce the concept of combining microfluidics with mathematical modeling that allows us to test the dynamics of multi-organ response to xenobiotic compounds. Termed as 'multi-organ-on-a-chip', this device has multiple chambers for different organs, which are connected by microfluidic channels mimicking blood circulation. Being a physical realization of a Physiologically-Based Pharmacokinetic (PBPK) model, this type of device can contribute to improving the accuracy of screening for pharmaceutical and health-promoting compounds.

Biography

Jong Hwan Sung has completed his PhD from Cornell University and Postdoctoral studies from Biological and Environmental Engineering at Cornell University. He is an Assistant Professor in Hongik University. He has published more than 30 papers in reputed journals.

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