

신장과 장기칩

미시간 대학교 의공학교실¹, 분당서울대학교 내과²

김세중^{1,2}, Shuichi Takayama¹

Organ-on-a-chip and the Kidney

Sejoong Kim^{1,2}, Shuichi Takayama¹

Department of Biomedical Engineering¹, University of Michigan, Ann Arbor, MI, U.S.A.

Department of Internal Medicine², Seoul National University Bundang Hospital, Seongnam, Korea

Traditional approach to the pathophysiology is advancing, but still has many limitations that arise from the real biologic systems and its associated physiological phenomena being too complicated. Microfluidics is a novel technology developed in the engineering field, which provides new options that may overcome these hurdles. Microfluidics handles small volumes of fluids and may apply to various applications, such as DNA analysis chips, other lab-on-a-chip analysis, micro-propulsion, and micro-thermal technologies. Among them, organ-on-a-chip applications allow fabrication of minimal functional units of a single organ or multiple organs. Relevant to the field of nephrology, renal tubular cells have been integrated with microfluidic devices for making kidneys-on-a-chip. Although still early in development, kidneys-on-a-chip are showing potential to provide a better understanding of the kidney to replace some traditional animal and human studies, particularly as more cell types are incorporated towards development of a complete glomeruli-on-a-chip.

Key words: Microfluidics, Organ-on-a-chip, Kidney