

### Gut-on-a-chip with 3-D hydrogel structure to simulate intestinal absorption

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A drug screening technology by using gut-on-a-chip has evolved rapidly in recent years. Now 3-D model mimicking the intestinal environment as an in vivo is required. Because 2-D model reproducing the intestinal environment is physiologically different from realistic environment. A villi of small intestine was reproduced via novel hydrogel microfabrication technique, and vascular channel was added to the hydrogel villi structure. Mechanisms of drugs absorbed into the bloodstream through the villi have been simulated. Caco-2 cell, intestinal epithelial cell, was cultured on the villi made of collagen hydrogel to reproduce the environment similar to the intestine. The kinetics of diffusion process from the villi to the bloodstream in the microfluidic device was measured and analyzed through the mathematical modeling.