

### Development of microfluidic-based in vitro model of Gut-brain axis

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Recent research suggests that the intestinal environment can affect the brain. It has also been reported that exosomes, a type of vesicle released by cells, are involved in the exchange of substances between the gut and the brain. For this reason, research on the gut-brain axis is being actively conducted. Generally, animal models are used to study gut-brain axis. However, animal models have ethical, economic and convenience issues. Therefore, an in vitro model is needed to study the gut-brain axis. We developed an in vitro model of the gut-brain axis using a microfluidics-based chip that can co-culture gut epithelial cell line, Caco-2 and cerebrovascular cell line, bEnd.3, each representing the gut epithelium and blood-brain barrier, respectively. FITC-dextran and exosome diffusion experiment was performed to confirm that the material exchange between the gut and BBB occurred. Both cells were seeded in the chip and co-cultured for several days while maintaining their viability and phenotypes. This model is expected to be utilized in the study of the role of exosomes in the study of gut-brain axis.