公益財団法人 中谷医工計測技術振興財団
交流助成

2024年度　交流助成　成果報告（海外派遣）

2024年 11月 15日

所属：マイクロエンジニアリング専攻、京都大学
氏名：MA, Cheng

会議等名称　Miniaturized Systems for Chemistry and Life Sciences (μTAS 2024)
開 催 地　Montreal, Canada
時 期　October 13th-17th, 2024

1) **会議（研究会）の概要**

TThe 28th International Conference on Miniaturized Systems for Chemistry and Life Sciences (μTAS 2024) is a premier event in biomicrofluidics, encompassing a wide range of topics in micro-engineering. The conference highlights advances in diagnostics, drug screening, and disease modeling, attracting researchers engaged with cellular, organismal, and organ-on-chip studies. It covers diverse techniques, including cell capture, counting, sorting, single-cell analysis, and organ-on-chip technology.

Held in Montreal, Canada, μTAS 2024 offered an inspiring venue for scientists globally. With over 1,000 researchers in attendance and presenters selected through a rigorous review process, the conference provided an excellent platform for participants to showcase their work, receive valuable feedback, and explore the latest trends in microfluidics.

Notably, the conference featured talks from renowned researchers in the organ-on-chip field, including Prof. Roger Kamm from MIT, Prof. Dan Huh from UPenn, and Prof. Jennifer Lewis from Harvard. Their engaging presentations provided valuable insights and broadened my perspective on this evolving field.

2) **会議（研究会）で発表した研究テーマとその討論内容**

Title: A Proximal Tubule-on-Chip Model Incorporating Human Induced Pluripotent Stem Cell-Derived Kidney Organoids for Enhanced Functional Analysis of Renal Transporters

Summary: At the conference, we presented a proximal tubule-on-chip model (LTL+ PToC) developed using hiPSC-derived kidney organoids. The model significantly enhances the expression of key transporters, including OAT1, OAT3, and OCT2,

demonstrating superior transcellular transport efficiency and a strong potential for drug interaction prediction. This system effectively recapitulates in vivo physiological functions.

Discussion: During the poster presentation, I had the privilege of discussing my work with Prof. Roger Kamm from MIT. Our conversation was both insightful and inspiring, extending beyond my research topic to broader perspectives on the opportunities and future directions in the organ-on-chip field. His feedback and shared vision provided valuable insights for advancing this technology.

3) 出席した成果（ご自身の研究のみならず、他の研究者との交流を通じて得たものがあれば具体的に報告して下さい。）

An oral presentation from Prof. Dan Huh's group showcased a Placenta-on-a-Chip model. This innovative system recapitulates placental tissue using a 4-channel microfluidic design. In the device, a vascular network mimicking the fetal side is established in the lower layer, while a trophoblast cell layer representing the maternal side is formed in the upper layer. Metabolomic analysis revealed distinct responses to low- and high-dose cadmium exposure, highlighting a concentration-dependent inflammatory response.

Following the oral presentation, I had the opportunity to engage with the presenter during the poster session. We discussed the technical details of the model in greater depth, providing valuable insights into the methodologies and potential applications of their work.

4) その他

The plenary talk, "Building Vascularized Kidney Tissues for Drug Testing, Disease Modeling, and Therapeutic Use," delivered by Prof. Jennifer Lewis, was highly relevant to our current project. In her presentation, she highlighted the development of kidney organoid-on-chip models and their application in studying immune infiltration and disease modeling, particularly in Autosomal Recessive Polycystic Kidney Disease (ARPKD).

※最後に現地での交流の様子を撮った写真(２～３枚程度)がありましたら、簡単な説明を添えて、挿入してください。

公益財団法人 中谷医工計測技術振興財団
交流助成

Discussion during the poster presentation with other researchers.