

Laboratory for Human Organogenesis

Team Leader: Minoru Takasato, Ph.D. / Researcher: Rio Noto, M.D., Ph.D.

[Background/Objective]

This laboratory at RIKEN is focused on uncovering the developmental mechanisms of human mesoderm in the kidney by utilizing its unique technology that can generate hiPSC-derived kidney organoids from pluripotent cells *in vitro*. The capability of the CELL HANDLER™ was evaluated in the selection and isolation of target kidney organoids exhibiting specific morphological characteristics.

[Material and Methods]

Kidney organoids were generated in 50% Matrigel® domes produced in EZVIEW® culture plates, subjected to morphological imaging and were subsequently harvested directly from these domes by using the CELL HANDLER™.

[Observations obtained]

Morphological features of kidney organoids generated in Matrigel® domes were imaged and analyzed prior to harvesting. Organized structures, possibly resembling renal vesicles, were apparent in some organoids (Fig. 1A), while no such property was observed in others (Fig. 1B). Organoids of interest (Fig. 2A) were picked without contamination by adjacent organoids, thus showing a high degree of transfer fidelity by the CELL HANDLER™ (Fig. 2B), and were transferred to a 96-well cell culture plate (Fig. 3). These results demonstrate the usefulness of the CELL HANDLER™ in supporting kidney organoid research.

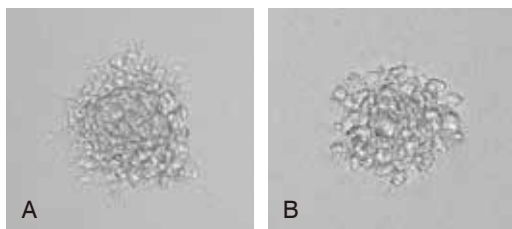


Fig. 1. Images of kidney organoids generated in the Matrigel® dome with (A) and without (B) possible renal vesicle structure.

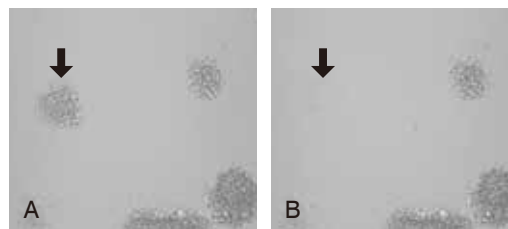


Fig. 2. Images of Matrigel® dome kidney organoids before (A) and after (B) picking by the CELL HANDLER™. Position of a picked organoid is indicated.



Fig. 3. Image of the harvested organoid.

[Acknowledgement]

Yamaha Motor would like to express its sincere thanks to Dr. M. Takasato and Dr. R. Noto for their guidance, experimental verification of the CELL HANDLER™ and for data they provided.

* "Matrigel" is a registered trademark of Corning Inc.. * "EZVIEW" is a registered trademark of AGC TECHNO GLASS CO., LTD..

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* The above are the results of experiments in our laboratory. The results may vary depending on the work environment, cell type and so on.



■ Laboratory for Lung Development and Regeneration

Team Leader: Mitsuru Morimoto, Ph.D. / Yasunori Enomoto, M.D., Ph.D.

[Background/Objective]

Research on the respiratory system at the RIKEN laboratory has focused on generating respiratory tissue organoids from mice. To develop an *in vitro* pathology model, uniform organoids are grown in semi-solid support such as Matrigel®. The spheroids are selected and isolated based on morphological assessment, which is an important requirement in 3D culture. The applicability of CELL HANDLER™ in this spheroid transfer process was evaluated by the RIKEN research group.

[Material and Methods]

Respiratory tissue organoids were generated in 75% Matrigel® domes in 24-well cell culture plates, subjected to morphological imaging and subsequently harvested directly from the domes using the CELL HANDLER™.

[Observations obtained]

Organoids which met pre-defined morphological criteria were identified (Fig. 1A), and were picked without contamination with adjacent organoids (Fig. 1B). A representative image of a single organoid transferred to a 96-well cell culture plate is shown in Fig. 2. These data confirmed that only selected organoids were reliably isolated by the CELL HANDLER™. In addition, growth of isolated organoids was observed (data not shown), indicating that no damage was sustained in the transfer process. These data obtained by morphology-based, direct harvesting of organoids from Matrigel® domes demonstrate the applicability of the CELL HANDLER™ in respiratory tissue organoid research.

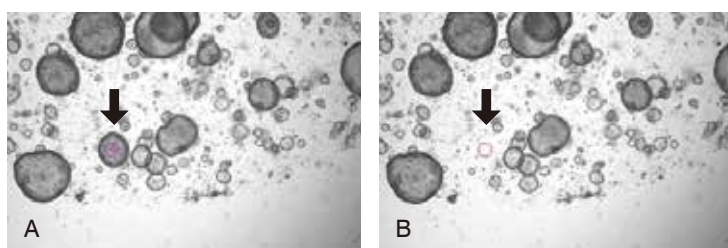


Fig. 1. Images of organoids generated in a Matrigel® dome before (A) and after (B) picking by the CELL HANDLER™. Position of the organoid of interest is indicated by an arrow.



Fig. 2. Image of the organoid harvested.

[Acknowledgement]

Yamaha Motor would like to express its sincere thanks to Dr. M. Morimoto and Dr. Y. Enomoto for their guidance, experimental verification of the CELL HANDLER™ and for data they provided.

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