PRESS RELEASE

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Rebirthel signs collaborative research agreement for the development of automated cell mass culture technology to spread allogenic T cell therapy

Kyoto - Rebirthel Co., Ltd. (Rebirthel) announced that it entered into a collaboration research agreement with Kyoto University and Hitachi, Ltd. (Hitachi) on January 6, 2023, for the development of automated cell mass culture technology to spread allogeneic T cell therapy[*1] for cancer treatment.

In recent years autologous cell therapy[*2] has been recognized as an effective treatment for certain diseases. Autologous cell therapy is a made-to-order treatment which uses the patient's own cells, therefore reducing the risk of rejection. However, there still exists several issues including cost and time consuming process.

Cell therapies are increasingly expected to treat cancers and other diseases. Allogeneic T cell therapy, in particular, merits attention as a future therapy as it can treat a large number of patients due to its universality. In this collaboration project, we developed an automated cell mass culture technology that can supply a larger quantity of homogeneous quality T cells to generalize allogeneic T cell preparation than autologous cell therapy.

Prof. Hiroshi Kawamoto, Director of Institute for Life and Medical Sciences, Kyoto University and his team have been carrying out research and development of off-the-shelf and universal T cell therapy and fundamental technologies for allogeneic T cell therapy that are globally patented. Most recently, his team achieved the required conditions for feeder-free cell culture[*3] of all processes.

Rebirthel was founded in October 2019 with the aim of providing novel treatments against cancer, infectious diseases, and other immune-related diseases. The strategy is based upon the technology of killer T cell regeneration from pluripotent stem cells, which was pioneered by Prof. Kawamoto. Rebirthel is planning two clinical trials using allogeneic killer T cells regenerated from iPS cells[*5]: one for leukemia at Kyoto University and the other for cytomegalovirus (CMV)[*6] at Fujita Health University. Furthermore, Rebirthel has been granted an exclusive global sub-licensable license for allogeneic T cell therapy from Kyoto University and has various collaboration research and licensing agreements with multiple pharmaceutical companies.

Rebirthel has started a collaboration research project with Kyoto University and Hitachi to add functionality to regenerate allogenic killer T cells from pluripotent stem cells into Hitachi's automated cell mass culture technology. Prof. Kawamoto stated "In this collaboration, we bring an innovative automated system to produce allogeneic T cells so that we can deliver homogeneous allogeneic cell preparation to patients quickly".

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*1 Allogeneic T cell therapy: This therapy uses cell preparations. Using pluripotent stem cells (cells derived from others, not from the patient himself/herself) such as iPS and ES cells as material, T cells are regenerated.

*2 Autologous cell therapy: This therapy collects the patient's own cells and gives them back after transducing and expanding.

*3 Feeder cells: Cells that support target cells to grow by providing nutrition and growth factors when culturing target cells.

*4 Killer T cell: A type of cell that specifically recognizes variant cells (e.g., cancer cells), viruses, and bacteria in the human body and controls immunity to attack and kill them. Allogeneic killer T cell are killer T cells regenerated from pluripotent stem cells - such as iPS and ES cells - through a special method.

*5 Cytomegalovirus (CMV): A type of virus that causes infectious diseases. In addition to congenital, it is transmitted by breast milk or by birth canal infection. Serious infections can be caused by reactivation of this virus after hematopoietic stem cell transplantation.

■ Kyoto University

Kyoto University is a leading research and educational institution in Japan and Asia. Its mission is to contribute to the harmonious coexistence of global society by taking on the challenge of solving multidisciplinary problems, while continuing and developing the academic culture of freedom established since its founding in 1897. The University has produced numerous Nobel Laureates and winners of prestigious international awards. Kyoto University has enormous research centers, facilities, and offices throughout Japan and abroad and provides a broad cross-disciplinary curriculum in the humanities and sciences at both the undergraduate and graduate levels.

The Institute for Life and Medical Science (formerly known as the Institute for Frontier Life and Medical Science) that carries out this collaboration research was formed by the merger of two institutes: the Institute for Virus Research, which was known for its groundbreaking research in medical science - including the discovery of the human leukemia virus - and for pioneering work in molecular biology, and the Institute for Frontier Medical Sciences, which had built an innovative foundation in regenerative medicine by establishing human embryonic stem cells (ES cells) and discovering induced pluripotent stem cells (iPS cells) and regulatory T cells. In April 2022, the Institute was renamed "The Institute for Life and Medical Science" with the aim of exploring new academic fields in medical and life sciences.

Kyoto University Open Innovation Institute is a research center that plans and conducts large-scale collaborative studies between organizations based on university-wide research themes and is the manager of this project.

■ Rebirthel Co. Ltd.

Rebirthel is a bio-venture originating from Kyoto University, established in October 2019 by Prof. Hiroshi Kawamoto, Director of the Institute for Life and Medical Science, Kyoto University. In recent years autologous cell therapy, which uses the patient's own cells, has been an effective treatment for certain cancers. However, it is not a perfect solution: it can only be used for the donor patient; it is a burden on the patient's body; treatment is time-consuming; the cost is high; and the heterogeneous quality. In addition, infectious diseases require rapid treatment, but autologous cell therapy cannot provide killer T cells immediately. As a result, there is currently no ongoing cell therapy for infectious diseases.

To solve these problems, Rebirthel provides a completely novel allogeneic immune cell therapy treatment. Specifically, this method uses pluripotent stem cells as a source material and regenerates them into immune cells that specifically recognize and kill cancers and viruses. It is now possible for regenerated antigen-specific immune cells to be utilized in the treatment of patients. We aim to realize universal, off-the-shelf killer T cell preparations produced via patented technologies to provide universal, rapid, low cost, and high-quality treatment options to patients.