



Report of UZH-KU Joint Research Project

Section 1

Project title:	Towards a universal solution: Editing iPSCs for stroke therapy
Project coordinator (KU) Name Position Faculty, department	Prof. Dr. Akitsu Hotta Associate Professor Center for iPS Cell Research and Application (CiRA), Kyoto University
Project coordinator (UZH) Name Position Faculty, department	Dr. Christian Tackenberg Group Leader and Scientific Head of Stem Cell Research Institute for Regenerative Medicine (IREM), University of Zurich
Period of project	From: 1.9.2021 To: ongoing
Project location	Institute for Regenerative Medicine, University of Zurich
No. of participants	[KU] Faculty members: Students: Others: [UZH] Faculty members: Dr. Ruslan Rust, Institute for Regenerative Medicine, UZH; Students: Others: *A participant list can be attached instead of completing the above section. The list should include the details above.
URL at which project outcomes can be viewed (e.g. workshop notifications/programs/reports, evidence of academic papers published or otherwise made available, etc.)	
Photographs with captions	Please submit digital files (such as JPEG or GIF files) of the photographs used in your report as attachments. The size of each image should be 4MB, so that it can be used for printed materials. Please ensure that none of the photographs submitted will cause any issues relating to portrait rights.



Section 2

Summary of the project (approx. 200 words)

*KU project leaders are required to submit a summary of the project in Japanese in addition to the English summary (approx. 400 characters).

Stem cell therapy has huge potential for brain regeneration after stroke. Autologous approaches are limited due to timely production, logistics, and high costs. Allogeneic cells on the other hand require immune suppression to protect the graft from immune rejection. Thus, the use of highly immune-compatible, so-called hypoinmunogenic or „universal“ cells, represents a highly promising approach.

In the proposed project, we aim to develop and preclinically validate universal iPSCs for cell therapy in stroke. This will be accomplished through a close collaboration between Dr. Ruslan Rust and Dr. Christian Tackenberg (IREM, University of Zurich), who are working on cell-based therapies following stroke, and Dr. Akitsu Hotta (CiRA, Kyoto University), who specializes in the generation of allogeneic, universal iPS cell lines.

As a first step, the legal framework for the cooperation has been created. Universal iPS cell lines have been transferred from CiRA to IREM and have been successfully adapted and expanded in cell culture. The obtained cells have been differentiated into neural progenitor cells (NPCs) which will be transplanted into stroked mice with a humanized immune system to determine the regenerative potential of universal NPCs following stroke.

幹細胞治療は、脳卒中後の脳再生に大きな可能性がある。しかし、自家細胞移植は、製造時間、調達、および高コスト等が課題となっている。一方、同種(他家)細胞は、移植片を免疫拒絶反応から守るために免疫抑制が必要である。したがって、免疫適合性の高い「低抗原性細胞」を用いることは、非常に魅力的なアプローチである。

このプロジェクトでは、脳卒中中の細胞治療のための低抗原性 iPSC を開発し、前臨床試験で検証することを目的としている。これは、脳卒中後の細胞治療に取り組んでいる Ruslan Rust 博士と Christian Tackenberg 博士、および低抗原性 iPS 細胞株を作製した堀田との密接な協力により進められる。

共同研究の第一段階として、契約の枠組みを整えた。低抗原性 iPS 細胞株を CiRA から IREM に提供し、細胞培養の適応および神経前駆細胞(NPC)への分化誘導に成功した。今後は脳卒中モデルのヒト化免疫マウスに移植し、再生能力を調べる予定である。