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Abstract Title: PULP FICTION:DIRECT REPROGRAMMING OF DPSCS INTO NEURONS

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Üzemeltető: Google Fordító

ABSTRACT PREVIEW: PULP FICTION:DIRECT REPROGRAMMING OF DPSCS INTO NEURONS

PULP FICTION:DIRECT REPROGRAMMING OF DPSCS INTO NEURONS

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Submission Type: **Poster**

Presenter Career Status: **Presenting Author is a Student or Post-doctoral Fellow**

Abstract Status: **Complete / Locked**

Abstract

Track

New Technologies (NT)

Tissue Type:

Neural

Review Topic

- Modeling Development and Disease

Travel Award

- I would like to be considered for an ISSCR Travel Award

Abstract

Dental pulp is a connective tissue rich in nerves and blood vessels that houses progenitor cells, known as dental pulp stem cells (DPSCs). Due to their neural crest origin, DPSCs can be differentiated into neuronal cells under the right in vitro conditions. Our aim is to develop a novel stable, reproducible method to utilize the developmental potential of DPSCs using transdifferentiation, direct neuronal reprogramming. Our first experiments indicated that forced expression of the neuronal transcription factors *Ascl1*, *Brn2*, and *Myt1l* successfully transdifferentiated DPSCs into induced neurons (iNs). Moreover, optimized DPSC-iN conversion quantifiably met the efficiency and purity of standard fibroblast iNs, measured by automated high-content microscopy after immunostaining with mature neural markers (MAP2, TAU). Next, we reprogrammed and cultured DPSCs into transplantable 3D neurospheroid-like structures, with the administration of different culture conditions but with the same described direct reprogramming protocol. After 14 days of culturing, the spheroids showed mostly neuronal immunolabeling while some cells were positive for neural crest markers (HNK1, NF). We are currently characterizing and carefully

phenotyping our DPSC-iNs derived from 4 different donors by using immunostaining followed by automated high-content microscopy, mass spectrometry, qRT-PCR, bulk RNA-seq, patch-clamp electrophysiology and DNA methylation array. We are also planning to use sc-RNA-sequencing on DPSC-iNs after barcoding native DPSCs to identify and sort the dental pulp progenitor cells from the mesenchymal elements, using a novel lineage tracing methodology in combination with previously acquired multiomics data. These experiments will define neural crest-related cell subpopulations within the pulp and ensure a way to identify the ones with neurogenic potential. In summary, DPSC-iNs represent a novel methodology to study donor-derived neurons from an ethical, easily accessible cellular source. In combination with the unique developmental origin, DPSC-iNs provide a novel model for developmental diseases mainly affecting children and adolescents.

Funding Source

Keyword 1

direct reprogramming

Keyword 2

mesenchymal stromal cells

Keyword 3

induced neurons

Clinical Trial ID number

Presenting Author(s)



Bendeguz Sramko (he/him/his)

Position:

Medical Student

Department:

Institute of Translational Medicine

Organization:

Semmelweis University

Role:

Presenting Author

Gender Identity:

Man

Career Status

Trainee

Lab or Group Leader

Karolina Piracs PhD

Is the abstract submitter the presenter?

Yes

Co-Author(s)

1. Anna Abbas (she/her/hers)
2. Anna Földes
3. Kristóf Kádár
4. Ákos Zsembery
5. Karolina Pircs (she/her/hers)

Abstract Submission Agreement

ISSCR Abstract Submission Agreement

I agree

Inclusion of Human Subjects

Does the research described here involve stem cell-based or biologically-based regenerative treatments (e.g., platelet-rich-plasma, exosomes, etc) on human subjects? This category does not include the use of human samples (e.g., cell biopsies for iPS derivation, for laboratory use).

No

If you answered "No" to the first question, please enter "N/A" below.

If you answered "Yes" you must list the appropriate authorization: the institutional review board and/or national regulatory agency that reviewed it, the clinical trial reference numbers, and any other identifying information. Clinical trial results presented must have been conducted in accordance with the full regulatory requirements in your country.

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