Obtaining universal neurons and cardiomyocytes

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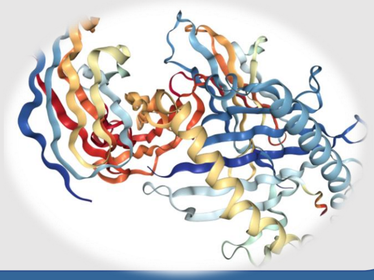
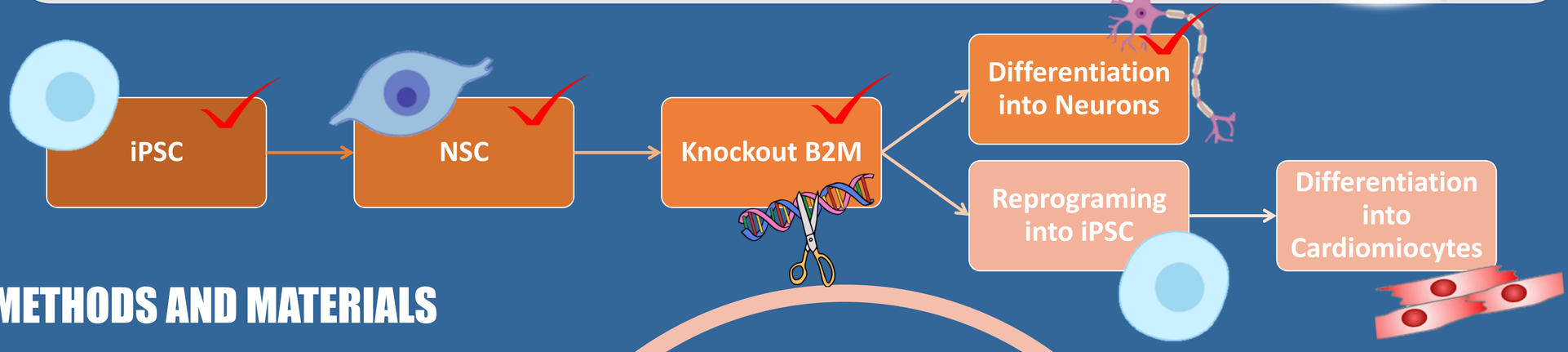
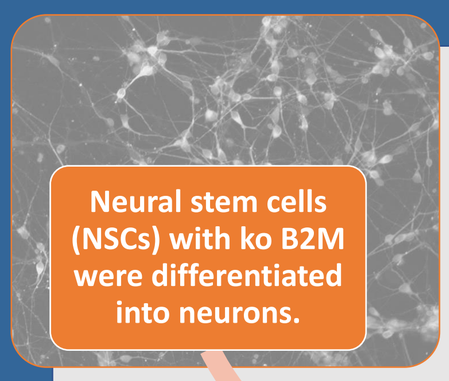
INTRODUCTION

β-2 microglobulin is part of the MHC (major histocompatibility complex), which is responsible for binding antygen derived from own proteins or from pathogens and transferring the antigen presentation to the cell surface for recognition by appropriate T cells. Removal (knock-out) of the gene encoding β-2 microglobulin (B2M) causes the lack of an immune response from the immune system in relation to cells with B2M, thanks to which the cells acquire the feature of universality with potential therapeutic use in relation to neurodegenerative diseases, strokes or myocardial infarctions.





METHODS AND MATERIALS



Neural stem cells (NSCs) with ko B2M were differentiated into neurons.

Morphology

Cells were observed under a microscope

- **Microtubule-associated protein 2 (MAP2) - neuron-specific cytoskeletal proteins that play a role in defining and stabilizing neuronal morphology during neuronal development and**
- **Glial fibrillary acidic protein (GFAP) - a type III intermediate filament (IF) protein that is expressed in many types central nervous system (CNS) cells, including astrocytes and ependymal cells during development.**

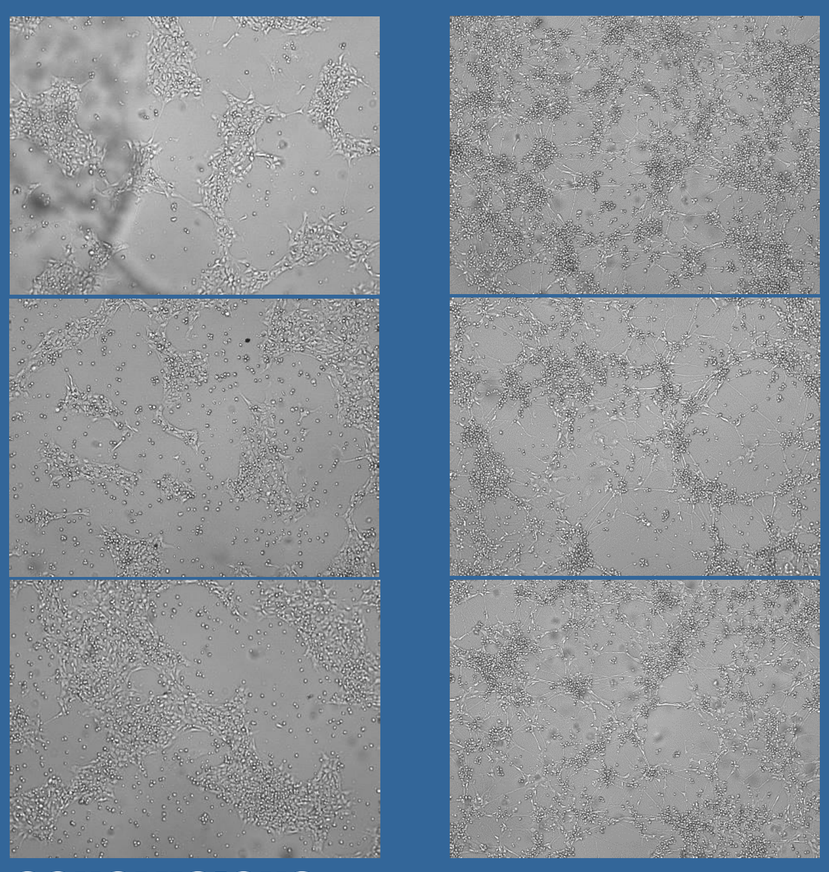
Immunocytochemistry

RESULTS

Morphology:

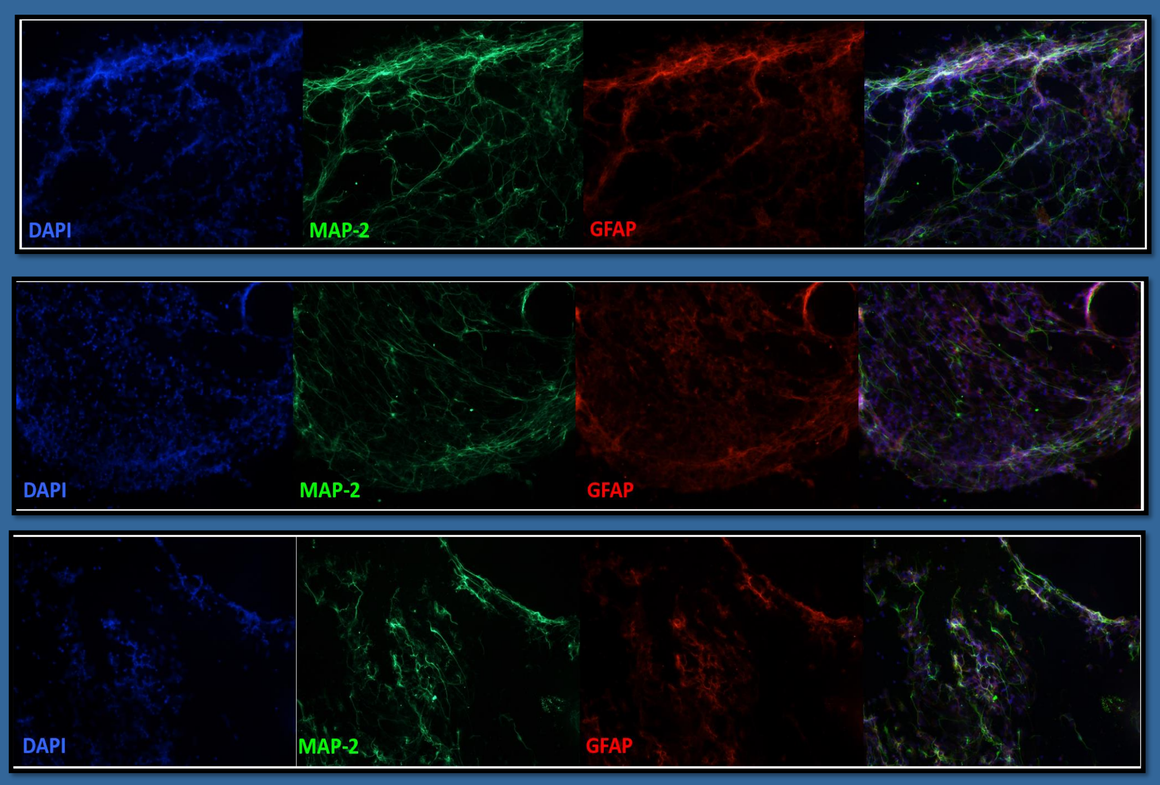
Based on microscopic photos, it can be assumed that neurons were obtained as a result of differentiation

Dzień 3 **Dzień 14**



Immunocytochemistry:

Based on the results obtained, the identity of the cells obtained as a result of reprogramming can be confirmed. MAP-2 confirms that neurons have been obtained, while GFAP confirms the identity of astrocytes.
As a result of reprogramming, both neurons and astrocytes were obtained



CONCLUSIONS

- **We managed to obtain universal neurons**
- **Optimization of the protocol is required to increase the efficiency of obtaining neurons**

SCIENTYFIC ACHIVEMENTS

1. Immunohistochemical detection of EGFRvIII in glioblastoma - Anti-EGFRvIII antibody validation for diagnostic and CAR-T purposes.
Rutkowska A, Strózik T, Jędrychowska-Dańska K, Zamerska A, Jesionek-Kupnicka D, Kowalczyk T, Och W, Szóstak B, Tręda C, Włodarczyk A, Kierasińska-Kałka A, Wasiak T, Ciunowicz D, Rieske P, Stoczyńska-Fidelus E. DOI: 10.1016/j.bbrc.2023.149133

2. The Complex Journey of Targeting the RAS in Oncology
Katarzyna Wasiak1,2, Damian Ciunowicz1,2, Amelia Kierasińska-Kałka1,2, Marta Węgierska1,2, Marcin Pacholczyk1,3, Piotr Rieske1,2, Ewelina Stoczyńska-Fidelus1,4
Under revision since 05.01.2024

3. Obtaining cardiomyocytes with trisomy 21 by reprogramming epithelial cells from renal tubules:
Damian Ciunowicz, Ewelina Stoczyńska Fidelus, Piotr Rieske, Juvenes Pro Medicina 05.2024

REFERENCES

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PLoS ONE 11(5): e0154726. doi:10.1371/journal.pone.0154726.

2. Winiecka-Klimek M, Smolarz M, Walczak MP, Zieba J, Hulas-Bigoszewska K, Kmieciak B, Piaskowski S, Rieske P, Grzela DP, Stoczynska-Fidelus E.

SOX2 and SOX2-MYC Reprogramming Process of Fibroblasts to the Neural Stem Cells Compromised by Senescence.

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