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Characterization of mice and canine glial restricted precursor cells as the potential tools for cell based therapy in experimental models of amyotrophic lateral sclerosis

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Introduction: Amyotrophic lateral sclerosis (ALS) is a motor neuron disease with no available treatment that leads to death in less than five years after diagnosis. The experimental studies show a great potential of glial restricted progenitors (GRPs) in treatment of many neurodegenerative disorders, including ALS. One of the greatest advantages of GRPs is their ability to differentiate into both oligodendrocytic and astrocytic cell lineages that play a key role in supporting axon homeostasis and protection of motor neurons. Moreover, mature glial cells are also responsible for myelination processes.

Material & Methods: GRPs were extracted from brain and spinal cord of embryonic (E15) transgenic GFP mice (mGRPs) and (E30-35) dogs (dGRPs). Isolated cells were cultured in GRP designed medium (DMEM/F12+B27+N2+heparin+BSA+bFGF) in flasks coated Poly-L-lysine and laminin. GRPs were selected by medium composition and cultured up to the second passage. Both types of GRPs were characterized by immunocytochemistry analysis using the specific primary antibodies: A2B5, GFAP, PDGFRα, MBP, O4, Ng2, CNPase, Olig1, Olig2, Ki67 and CXCR4.

Results: Both type of cells, mGRPs and dGRPs show positive reaction with antibodies against early markers of glial progenitors (GFAP, Olig2, CNPase) and negative for mature oligodendrocytes (MBP). They reveal positive markers for proliferation (Ki67) and migration (CXCR4) abilities.

Conclusion: The current study shows that cells isolated from fetal nervous system, both mouse and canine have high ability to differentiate into glial progenitor cells. In the future studies, both lines will be used *in vivo* to assess their therapeutic potential in different experimental ALS mouse models.

Biography

Malgorzata Majchrzak, M.Sc. graduated from University of Medical Sciences in Poznan. In 2015, she joined the Mossakowski Medical Research Centre at Polish Academy of Sciences to seek a PhD degree in the field of neurobiology. Her PhD project in NeuroRepair Department of MMRC is concentrated on therapeutic potential of glial restricted progenitors in amyotrophic lateral sclerosis (ALS) treatment. She takes part in two international research projects funded by National Center for Research and Development in Poland: "Application of Glial Progenitors for Treatment of ALS" and "MRI-guided, intrathecal delivery of hydrogel-embedded glial progenitors for treatment of amyotrophic lateral sclerosis".

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