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## Regeneration Strategy in Medicine using Wharton's Jelly Mesenchymal Stem Cells

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Wharton's Jelly is a special type of connective, gelatinous tissue located in the umbilical cord. Mesenchymal Stem Cells isolated from Wharton's Jelly (WJ-MSCs) are advantageous for cell-based therapy because of their self-renewal capacity in vitro, high plasticity and low immunogenicity. In addition, WJ-MSCs could be very useful for clinical application because they inhibit the immunological response and does not need a major histocompatibility match for allogeneic transplantation. Due to their properties i.e., the secretion of many proangiogenic factors, WJ-MSCs present an opportunity for effective regeneration of ischemic muscles by promoting endogenous angiogenesis.

The WJ-MSCs show the minimal criteria outlined for MSC by the International Society for Cellular Therapy. More than 90% of the population expresses specific mesenchymal markers such as CD90, CD 105, CD 73. Furthermore, WJ-MSCs are negative for hematopoietic antigens- CD45, CD3. The expression levels of specific surfaces markers have been analyzed using flow cytometry technique. The expression levels of specific proangiogenic factors (VEGF A, ANGPT, MMP-1, HIF 1 $\alpha$ , FGF 2, HGF) in WJ-MSCs was analyzed using Real-Time PCR.

In our study, we created a murine hindlimb ischemia model to test a new method of treating this disease and evaluate the regenerative capacity of Mesenchymal Stem Cells isolated from Wharton's Jelly. The vascular response in hindlimb ischemia model was evaluated by Laser Speckle-based perfusion measurements as well as histological quantification of arteriogenesis and angiogenesis. The results of our study have confirmed as well as the high differentiation potential of WJ-MSCs and their proangiogenic character that promote angiogenesis.

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### Biography:

Dr. Aleksandra Musiał-Wysocka is a PhD student at Department of Transplantation Institute of Pediatrics Jagiellonian University Medical College in Cracow. The subject of her research is the characteristic of mesenchymal stem cells isolated from Wharton's Jelly and the possibility of using them in regenerative medicine. The main goal of her study is to develop a new therapy for cardiovascular diseases using stem cells.