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Přednáška: *In vitro* Characterization of Electroactive 3D Scaffolds and Electric Stimulation of Cells for Tissue Engineering

Anotace: Electroactive nanofibrous layers represent a promising class of materials for tissue engineering and regenerative medicine, owing to their structural resemblance to the extracellular matrix (ECM) and their ability to modulate cellular behavior through electrical and physicochemical properties. Previous studies have demonstrated that electrically conductive materials can significantly enhance cell adhesion, proliferation, and migration, even in the absence of external electrical stimulation (ES). The use of electroactive materials enables the simulation or even amplification of electrical signals naturally occurring within the human body, thereby promoting the regeneration of specific tissues.

In this study, the properties of carbon-based electroactive nanofibrous layers are investigated. The materials are analyzed in terms of structure using scanning electron microscopy (SEM), electrical conductivity, and surface characteristics. Biocompatibility is evaluated using the human dopaminergic neuronal cell line SH-SY5Y. Cell viability, proliferation, and differentiation are assessed. At the current stage, cellular responses are examined on materials without applied electrical stimulation. Upcoming experiments will investigate the effects of different ES parameters on cellular behavior.

The aim of this contribution is to present the current results of biocompatibility assessment of electroactive carbon-based materials intended for *in vitro* electrical stimulation of cells for tissue engineering and regenerative medicine applications.