Vitiligo is a skin disease with 2 % prevalence in a worldwide population. It is characterised by loss or decrease in activity of epidermal melanocytes, which lead to skin and hair depigmentation. It has negative impact on psyche, social relationships of patients and reduces the protection of the organism against UV radiation. One of the treatment methods is autologous transplantation of melanocytes or suspension of melanocytes with keratinocytes. Use of the biocompatible membrane, which allows the cultivation of these cells with resulting transplantation on the depigmented lesion, could improve treatment and make it more efficient. The main goal of this work was to create the biocompatible membrane from nanofiber layers of polyvinylalcohol (PVA) which can stand as a carrier for cell transplants in vitiligo therapy.
PVA scaffolds were prepared by electrostatic spinning and later on modified by cold methane plasma (CH4) for lowering their hydrofility. Samples of modified nanofiber carriers were analysed according to their physical and chemical characteristics (visualization fiber morphology by SEM, XPS and surface Zeta potential analysis and contact angle). Consequently, adhesion, proliferation and metabolic activity of cultivating mice cell lines of melanocytes (Melan-a) and keratinocytes (XB2) were examined in vitro.
Results shows that short term CH4 plasma treatment has positive impact on adhesion, viability and proliferation of melanocyte and keratinocyte. Plasma modification increases the adhesion of melanocyte to the scaffold which was manifested by increased melanogenesis. Samples modified 5 minutes (PVA3) and 2,5 min (PAV6) with gas flow of 5 sccm in the plasma chamber were demonstrated as the most suitable samples for the cultivation of melanocytes and keratinocytes in vitro. Results showed that modified PVA nanofibers are suitable for cultivation of skin cells and have high potential for use in the treatment of vitiligo and other diseases.