

Abstract

Microelectrode arrays represent therapeutic approach to neurodegenerative diseases treatment. The development of electrode platforms is rather challenging due to the direct interaction of the material with neuronal tissue. Nanodiamond is one of the researched materials because of its biochemical properties: biocompatibility with many cell types, chemical inertness, high wear and corrosion resistance. During nanodiamond platforms development, biological research focuses on biocompatibility of used material with primary neurons and the evaluation of their adherence to the nanodiamond that is important for recording of electrical activity of neurons. Both, the biocompatibility as well as the adherence depend on the used nanodiamond, manufacturing, roughness, and surface modification. The amount of boron dopant enabling electric conductivity of nanodiamond is also important.

In my thesis, I have summarized research on biocompatibility and adherence of neural cells on behalf of above mentioned parameters. I discuss here the variability of experimental results in order to surface modification and cultured cells type. According to the research reports, it seems that neuronal cells prosper well and prefer to adhere to platforms covered with molecules of extracellular matrix or at least poly-lysine (enabling electrostatic interaction of neurons with the platform).

Keywords

nanodiamond, neuronal cell, biocompatibility, microelectrode array