

Nanostructured surfaces

Effects of structured magnetic substrate on proliferation and adhesion of cell culture.

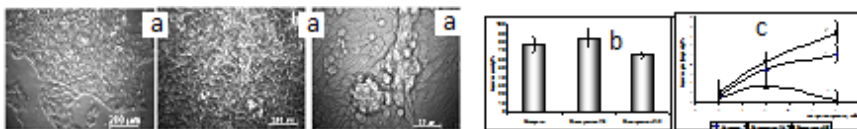
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To solve the problems of medicine and biotechnology, integration of different areas of science is required. This applies to physics, chemistry, biology and medicine. The use of external magnetic field as a parameter which influences the growth of cells in a 3D space having the properties of natural living organisms is very promising.

Magnetic substrates, created by a combination of permanent magnets on the basis of magnetically hard material with a substrate having a textured surface made of soft magnetic material, allow setting topography of magnetic field in a space within a certain range. The topography influences the proliferation and adhesion of a 3D cell culture. These parameters determine biological characteristics of cell cultures under conditions of volume growth. This is one of the basic requirements for obtaining the necessary properties of biological tissue for application in medical practice.



a) cell culture; b) Index of cell culture adhesion c) Index of cell culture proliferation

Samples of graft epithelium-like cell cultures of pig embryo kidney were used for the experiment under external magnetic field. The results have shown that adhesion of cells, their morphology and proliferation rate are determined both by the magnitude of magnetic field and the direction of its gradient. Maximum cell attachment is achieved when the gradient of magnetic field coincides with the direction of cell growth.

