

YOUNG RESEARCHERS IN LIFE SCIENCES

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Perspective of using magnetic 3D spheroids for tissue engineering

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Multicellular spheroids are ordinary and widely used 3D-cell culture systems. Nowadays, there is developing of the methodology for the creation of 3D spheroids. So, we applied the method of hanging drops. This methodology could be applied in tissue engineering, drug screening and in nanomedicine. An important achievement is the use of various nanomaterials, mainly nanoparticles in medical research. Various cell lines were used for formation of multicellular spheroids: Human cervical carcinoma cells (HeLa), Human lung adenocarcinoma epithelial cells (A549), Human hepatocyte carcinoma cells (Hep3B) and mesenchymal stem cells (MSK). We found the ability of spheroids formation from two types of cells in the same time – from HeLa and A549. During seven days we observed the evolution of spheroids formed from cells coated by magnetic nanoparticles. Magnetic nanoparticles were synthesized from iron oxide and stabilized with poly(allylamine) - PAH (MNPs-PAH). Under the gravitation force in the hanging drops the cellular aggregates were formed after 24 hours and the compact spheroids were formed after 48 hours. We could move the spheroids in a given direction using a constant magnet. Thanks to this ability the spheroids from one or more cell lines maybe used as material for implants.

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