

TOXICITY STUDIES OF COMBINATION OF SILVER NANOPARTICLES AND CRYOGELS

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Introduction. The combination "cryogel + nanoparticles" allows developing a new type of wound dressing, where antimicrobial properties of silver nanoparticles made have been utilized. Previous reports have shown that the production of shaped nanoparticles and the incorporation onto cryogels is feasible [1-2]. This study investigates the toxicity of these constructs to primary human dermal fibroblast cells in context of possible clinical application.

Materials and methods. Samples of various shaped silver nanoparticles were prepared using the Turkevich method [3]. They have been functionalized with cysteamine by treating it with 10-3 M aqueous solution of cysteamine hydrochloride. Cysteamine-functionalized AgNP's have been conjugated to polyacrylamide cryogel using a cross-linker called glutaraldehyde. The prepared nanoparticles were placed into cultures of primary human fibroblasts. At 20, 27 and 44 hours the cells were enumerated.

Results. Acquired data indicate that there is no significant difference between control cultures and cultures containing silver nanoparticles of different shapes. This fact proves the feasibility of using silver nanoparticles for incorporation into the wound dressings, due to their non-toxicity to normal cells of human skin.

Conclusions. No significant difference was observed in the cell growth between control cultures and cultures containing either silver nanoparticles alone or cryogels with incorporated silver nanoparticles. The results presented here indicate that the silver nanoparticles in combination with cryogel are nontoxic to primary human dermal fibroblasts.

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References.

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