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# Facile engineering of aptamer–coupled silk fibroin encapsulated myogenic gold nanocomposites: investigation of antiproliferative activity and apoptosis induction

Original Research Paper Published: 27 April 2024



Volume 46, pages 871–885, (2024) [Cite this article](#)[Save article](#)[View saved research](#)**Biotechnology Letters**[Aims and scope](#)[Submit manuscript](#)

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## Abstract

Nanocomposites selectively induce cancer cell death, holding potential for precise liver cancer treatment breakthroughs. This study assessed the cytotoxicity of gold nanocomposites (Au NCs) enclosed within silk fibroin (SF), aptamer (Ap), and the myogenic *Talaromyces purpureogenus* (TP) against a human liver cancer cell (HepG2). The ultimate product, Ap-SF-TP@Au NCs, results from a three-step process. This process involves the myogenic synthesis of TP@Au NCs derived from TP mycelial extract, encapsulation of SF on TP@Au NCs (SF-TP@Au NCs), and the conjugation of Ap within SF-TP@Au NCs. The synthesized NCs are analyzed by various characteristic techniques. Ap-SF-TP@Au NCs induced potential cell death in HepG2 cells but exhibited no cytotoxicity in non-cancerous cells (NIH3T3). The morphological changes in cells were examined through various biochemical staining methods. Thus, Ap-SF-TP@Au NCs emerge as a promising nanocomposite for treating diverse cancer cells.

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