

# Gels based on natural polymers containing silver nanoprisms for combined chemo/phototherapy of cancer

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Cancer therapy remains a major contemporary challenge due to the complexity and heterogeneity of tumour biology. In recent years, Nanotechnology has emerged as a promising approach in both cancer diagnosis and treatment with the development of multifunctional nanosystems capable of targeted delivery and therapeutic responsiveness [1–3]. In this regard, hydrogels have been extensively studied as drug delivery systems for cancer, due to their biocompatibility, physicochemical tailorability, ability to protect therapeutic agents and spatiotemporal control of their release [4]. The combination of liposomes containing plasmonic nanoparticles with polymeric matrices represents a particularly attractive strategy for enhancing drug delivery performance, offering the potential to minimise burst release and improve tissue localisation, as well as the capability of response to external stimuli [5]. These plasmonic lipogels allow multiple functionalities, including photothermia and controlled drug delivery, contributing to a multimodal therapeutic approach [6].

In this work, chitosan-based hydrogels and lipogels containing novel silver nanoprisms were developed and studied as multifunctional therapeutic agents, combining local chemotherapy and photothermia. The hybrid nanosystems were characterized and tested as nanocarriers for an anticancer drug, 5-fluorouracil. The results obtained are promising for the application of the new lipogels in multimodal cancer therapy, enabling the controlled release of antitumor drugs triggered by NIR laser light.

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