**PROJECT RESUME**

**TITLE:** Collagen-nanohydroxyapatite gene-activated scaffolds as treatment platforms for 3D breast cancer bone metastasis

Gene therapy is a potential therapeutic for cancer treatment. However, effective gene delivery to abrogate tumour growth remains a crucial barrier to its clinical application. This study aims to develop and characterise a 3D in vitro culture model to simulate breast cancer bone metastasis, and to determine the efficacy of nanoparticle-mediated gene delivery as a competent anticancer platform. 2D cancer cell culture or animal xenograft models have traditionally been used to study tumorigenesis but both have various limitations. 3D cancer cell culturing addresses these limitations by enabling cells to respond to stimuli similar to in vivo biological systems. Collagen-based scaffolds have a 3D structure capable of recapitulating the native tumour geometry demonstrating their potential as extracellular matrix models. We hypothesise that collagen-nanohydroxyapatite scaffolds may serve as bone templates for the study of metastasis. These gene delivery scaffold-based models may serve as excellent tools for the development of novel treatments.

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