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TENTACLES

TEmperature-responsive Nanogels for TArgeted delivery of miCroRNAs in wound heaLing and tissue rEgeneration applicationS

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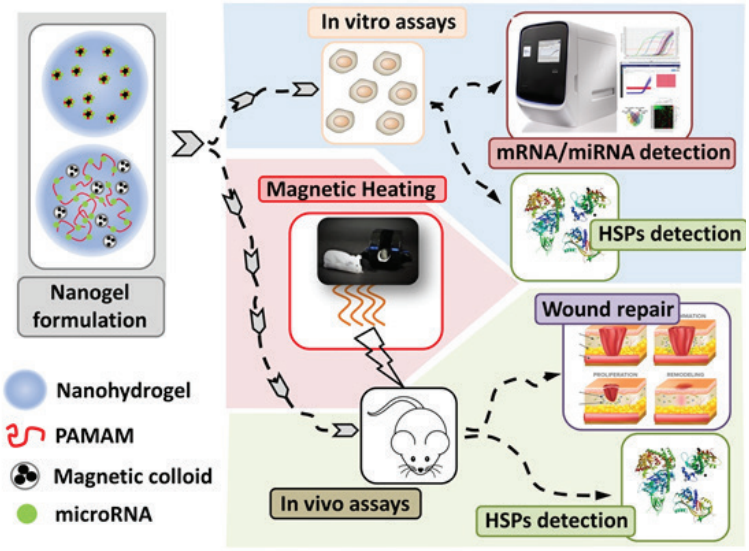

The development of novel therapeutically active wound dressings which provide the wound protection from 'environmental' effects as well as wound healing promotion has an advantageous potential for clinical applications. Nanotechnology-based materials incorporated into scaffolds allow the creation of nanocomposite smart materials with unique physicochemical and biological properties to promote skin regeneration. Our aim is to develop an innovative multifunctional nanogel that will integrate the protective and healing functions within one nanocomposite smart structure made by polymer-based nanohydrogel, iron oxide nanoparticles and targeted miRNAs.

The heating mediated by iron oxide nanoparticles will promote the induction of heat shock proteins (HSPs) involved in fibrogenesis and the production of extracellular matrix (ECM) production and transforming growth factor-β1 (TGF-β1), which is essential to fibrosis. Specific miRNA molecules will promote wound healing via expression/modulation of particular genes.

The proposed innovation could revolutionize wound healing therapeutical strategy particularly for diabetic or long stay recovered patients.