Advances in Nanotechnology in Drug Delivery Systems for Burn Wound Healing: A Review

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Abstract

Burn wounds (BWs) are among the most complex injuries to manage, often leading to prolonged healing times, heightened infection risks, and significant scarring. Traditional therapies frequently fall short in addressing these challenges, highlighting the need for innovative solutions. Nanotechnology has emerged as a transformative approach in BWs care, offering advanced drug delivery systems that improve therapeutic outcomes. These systems, including nanoparticles, liposomes, micelles, and hydrogels, provide controlled drug release, enhanced stability, and targeted delivery of bioactive compounds. This review explores recent advancements in nanotechnology-based drug delivery for BWs, emphasizing their potential to promote faster healing, reduce infections, and minimize scarring.

Additionally, emerging technologies, such as stimuli-responsive nanomaterials and theranostic platforms, hold promise for personalized treatment approaches. By integrating these innovations, nanotechnology is paving the way for more effective, patient-centered BWs management strategies.

Author keywords

Antimicrobial agents; Burn wound healing; Drug delivery systems; Growth factors; Hydrogels; Liposomes; Nanoparticles; Nanotechnology; stimuli-responsive nanomaterials; Tissue regeneration

Indexed keywords

EMTREE drug terms

antiinfective agent; growth factor; hydrogel; liposome; nanomaterial; nanoparticle

EMTREE medical terms

burn; controlled drug release; drug delivery device; drug delivery system; drug therapy; human; infection risk; micelle; nanotechnology; nonhuman; personalized medicine; pharmaceutics; pharmacology; review; scar formation; scar tissue; therapy; tissue regeneration; wound healing

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