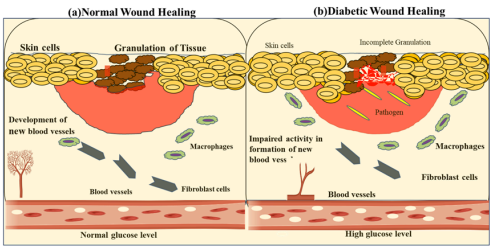
INTERNATIONAL JOURNAL OF NANO DIMENSION / VOL. 15 NO. 3 / ORIGINAL ARTICLE

10.57647/j.ijnd.2024.1503.17

Artificial intelligence for regular monitoring of diabetogenic wounds and exploring nanotherapeutics to combat the multifaceted pathophysiology

HTML PDF

1. Nano-Biotech Lab, Kirori Mal College, University of Delhi, India
2. Associate Professor, Department of Zoology, Allahabad University, Allahabad, India
3. Fellow, Delhi School of Public Health, Institution of Eminence, University of Delhi, India



Published 2024-06-15

How to Cite

Yadav, P., Singh, P., Yadav, M., Dangi, K., Kumar, K., & Verma, A. K. (2024). Artificial intelligence for regular monitoring of diabetogenic wounds and exploring nanotherapeutics to combat the multifaceted pathophysiology. *International Journal of Nano Dimension*, *15*(3). https://doi.org/10.57647/j.ijnd.2024.1503.17

More Citation Formats

Abstract

The multifaceted pathophysiology of diabetic wounds coupled with impaired diabetic wound healing remains a significant challenge for the medical community in the 21st century. Possibility of bacterial infections, insufficient vascular supply, increment in levels of oxidative stress, and abnormalities in defenses mechanism of antioxidant causes diabetic foot ulcers (DFU) that leads to significant morbidity. An effective treatment for diabetic wounds is still lacking. Chronic wounds are taking epidemic proportions, leading to an increased interest in exploring novel therapies to meet the challenges. Evaluating the progression in diabetic ulcers poses a major threat for the patients and clinician owing to logistics as irregular visits to the clinics. Unique properties of nanoparticles contain ultra-small size, increased surface-to-volume ratio, low cytotoxicity, enhanced cellular uptake, improved antibacterial activity, biocompatibility and biodegradability making their applications attractive against DFUs. Their potential for healing can be due to their superior antioxidant and anti-inflammatory activities. Further, nanoparticles are effective delivery vehicles for various small molecules, exosomes, metallic molecules, or conjugated with

numerous biomaterials- chitosan (CS), hyaluronic acid (HA) and smart hydrogels (HG) to enhance their healing efficacy against diabetic wounds. This review focuses on the futuristic and potential viewpoints of nanoparticles for the therapeutics of diabetic wounds/DFUs. Artificial intelligence (AI) tools and optical sensors can further contribute effectively for the monitoring procedures. Software based on AI technology plays crucial role in assessment and provide continuous care throughout the treatment. AI also helps to connect healthcare experts with larger number of patients at the same time. Nanotherapeutics represents a promising innovative strategy for targeted treatment that can change the landscape of wound healing, by providing a physiologically stable micro-environment for the thorough wound-healing process.

Keywords

DFUs, Diabetic/chronic wound, Nanoparticles, Optical sensors, Wound healing

HTML PDF

Quick Links

IJND Home
About
Current
Archives

For Authors
Journal Policies
Indexing and Abstracting
Submissions

OICC Press

Stroud Court
Oxford Road
Eynsham
Witney
Oxfordshire
OX29 4DA
GB

Follow OICC Press