

Archives of Biotechnology and Biomedicine

Volume - 9, Issue - 1

Short Review

Published Date:-2025-01-31 12:13:00

[The Role of Mitochondria in Chronic Wound Healing \(Mitotherapy\): Signaling and Therapeutic Implications](#)

Mitochondria are essential intracellular organelles that significantly influence various cellular processes, including metabolism, stress response, and cell fate. Their precise regulation is crucial for maintaining both organelle and cellular homeostasis. Wound healing is a complex, multifactorial process that relies on the coordinated actions of multiple cell types and numerous cellular mechanisms. Dysregulation in this process can lead to chronic wounds, which pose substantial challenges for healthcare systems and present limited treatment options due to their intricate pathogenesis. Recent research has increasingly focused on the role of mitochondria in wound healing, revealing their involvement in critical processes such as metabolism, apoptosis, and redox signaling. Mitochondrial dynamics play a vital role in wound healing by adapting to cellular demands and environmental cues. Moreover, mitophagy, the selective degradation of damaged mitochondria, is crucial for maintaining mitochondrial integrity and function during the healing process. Mitochondria are not only pivotal in energy production but also in calcium homeostasis and the generation of mitochondrial reactive oxygen species, which are essential for signaling during wound repair. As wound healing progresses through distinct yet overlapping stages mitochondria facilitate the energy demands of repair and contribute to cytoskeletal remodeling necessary for wound closure. Understanding the multifaceted roles of mitochondria in wound healing could lead to novel therapeutic approaches for chronic wounds. Future research should prioritize investigating mitochondrial dynamics and functions in human tissues to develop targeted strategies for enhancing wound healing outcomes.
