عنوان مقاله:

Chitosan-based nano-scaffolds as antileishmanial wound dressing in BALB/c mice treatment: Characterization and design of tissue regeneration

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خلاصه مقاله:

Objective(s): Rapid healing of cutaneous leishmaniasis as one of the most important parasitic diseases leads to the decrease of scars and prevention of a great threat to the looks of the affected people. Today, the use of nano-scaffolds is rapidly increasing in tissue engineering and regenerative medicine with structures similar to the target tissue. Chitosan (CS) is a bioactive polymer with antimicrobial and accelerating features of healing wounds, which is commonly used in biomedicine. This study aimed to investigate the effects of CS/polyethylene oxide (PEO)/berberine (BBR) nanofibers on the experimental ulcers of Leishmania major in BALB/c mice.Materials and Methods: CS/PEO/BBR nanofibers were prepared by the electrospinning method, and their morphology was examined by SEM, TEM, and AFM. Then, water absorption, stability, biocompatibility, porosity, and drug release from nano-scaffolds were explored. Afterward, 28 BALB/c mice infected with the parasite were randomly divided into control and experimental groups, and their wounds were dressed with the produced nano-scaffolds. Finally, the effect of nanobandage on the animals was investigated by macroscopic, histopathologic, and in vivo imaging examinations.Results: The prepared nanofibers were completely uniform, cylindrical, bead-free, and biocompatible with an average diameter of 94±12 nm and had appropriate drug release. In addition, the reduced skin ulcer diameter (P=0.000), parasite burden (P=0.003), changes in the epidermis (P=0.023), and dermis (P=0.032) indicated significantly strong effectiveness of the produced nano-scaffolds against leishmania ulcers. Conclusion: Studies showed that CS/PEO/BBR nanofibers have a positive effect on the rapid healing of leishmania ulcers. Future studies .should focus on other chronic ulcers treatment

کلمات کلیدی:

Bandages, Berberine, Drug-delivery system, Nanostructures, Wound healing