

PHARM D STUDENTS' GRADUATION RESEARCH PROJECTS 2019/2020



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EXPERIMENTAL RESEARCH

Development of Treatment for Cutaneous Leishmania Using a Nanotechnology Approach in Saudi Arabia: An Experimental Study

Background: Leishmaniasis continues to be a health challenge worldwide. At a domestic level, cutaneous leishmaniasis (CL) appears to be highly prevalent. To date, toxic effects of available medications and drug resistance call for alternative therapies. Recently, Aloe vera, a medicinal plant, was found to have both antimicrobial and antileishmanial activities. On the other hand, the implementation of nanotechnology in targeted drug delivery has been expanding at an astounding rate due to factors including increased therapeutic efficacy and low toxic potentials. Indeed, silver graphene oxide (AgGO), a commonly used nanomaterial, has a proven effectiveness against leishmania and a well-demonstrated tolerability.

Aims: We aimed to integrate both Aloe vera and AgGO nanoparticles, as our hypothesis was that a combination of the two would result in a superior antileishmanial activity against CL and would show lower toxicity profile.

Methods: Aloe vera-loaded AgGO nanocomposites were synthesized using an eco-friendly method and efficacy against CL was tested using Alamar Blue proliferation and cytotoxicity assay. Successful production of nanoparticles was confirmed using X-ray diffraction.

Results: X-ray diffraction showed that Aloe vera was able to successfully reduce AgGO to AgRGO, resulting in the formation of nanocrystals. When the newly developed nanocrystals were tested for cytotoxicity in RAW 264.7 cells, the data demonstrated a markedly lower cellular toxicity relative to AgGO alone.

Conclusions: our results suggest a promising therapeutic alternative to treating CL; however, further studies are warranted to ascertain this assumption. Future studies will primarily focus on testing the activity of our nanomaterial against the Leishmania parasite in vitro.