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SMART SINGLE DOSE NANOBANDAGE FOR APPROPRIATE SKIN REGENERATION AND WOUND HEALING MONITORING

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Skin is considered to be the soft organ covering the whole human body in order to protect its anterior organs. Naturally, the skin has the ability to restore itself after being damaged due to injuries or burns. However, a scaffolding material is required for restoring and organizing the newly regenerated tissues especially in complicated diabetic injuries and burns. Although, a newly developed single dose nanofibrous bandages have been developed and proven to satisfy proper wound healing, some monitoring criteria could be added using smart materials to monitor the healing progress especially in diabetic wounds. The aim of study is to develop an external layer that changes its color from purple to blue after being applied over the wound. Then the color changes gradually according to the healing stage before returning back to its original color after complete healing. This smart material responds to the change in moisture content of the wound during the healing process. This will help the physician and the patient to monitor the healing process underneath the bandage without being removed and consequently minimize the possibilities of infection incidence. In addition, another adhesive layer containing smart liposomes incorporating antibiotic is added as the layer adhering to the wound. This layer has two fundamental functions. The first is that it is an adhesive layer that contains a neutralizing material for the high alkalinity of the diabetic wounds thus it will help in enhancing the rate of healing process. Additionally, the smart liposomes respond actively towards the presence of bacteria (*S. aureus*) by releasing the incorporated antibiotic. This is advantageous in that the antibiotic will not be released or consumed unless the bacterial infection was detected so this will help in prohibiting development of bacterial resistance.

BIOGRAPHY

Isra H Ali is currently working as a Research Associate at Center for Material Science (CMS) and Assistant Lecturer at material science and nanoscience programs in Zewail City of Science and Technology, Egypt since June 2014. Her research focuses on designing and fabricating smart Bionanomaterials for drug delivery and regenerative medicine especially in bone and skin regeneration. Some of the results obtained from her "Smart wound dressing" project have been published in ACS materials and Interfaces (IMF 8). Also, she has been working in a project for development of biodegradable drug loaded Ocusersts. The preliminary results have just been accepted in Nanomedicine Journal (IMF 5). Both projects have been presented in a number of conferences and exhibitions where they got prizes and certificates of recognition such as Best Poster award during 10th Biomaterials Congress, Canada in 2016 and a Gold Medal in 46th Inventions Exhibition, Geneva in 2018.

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