Hosseinpouri Arghavan*, Mohammadi Mahdi, Obeidi Narges

MSc of Cellular and Molecular Biology , Persian Gulf University, Bushehr, Iran

Wound healing is a complex biological process that depends on the condition of the wound, the patient›s health and physical and chemical support. The discovery of natural ingredients has proven to be remarkable for ideal skin regenerating, including highly diverse marine macromolecules, which are a great source of tissue Engineering substitute for wound healing. So far, research has proven that marine derivatives of macromolecules such as chitin, chitosan and fucoidan have the potential to significantly accelerate the process of wound healing and tissue regeneration. Fucoidan is a sulfated polysaccharide found in the algae cell walls. Reports have demonstrated that fucoidan has a remarkable role in wound healing and skin formation replacing tissue engineering. Fucoidan derived from the Fucus vesiculosus species and the chitosan composite film has been shown to improve skin wound, including the regeneration of papillary forms of the skin, epithelial reformation, and the rapid closure of the rabbit›s wound surface. Similar results have been obtained from chitosan-fucoidal hydrogels that effectively protect against Rat›s wound Studies have shown that UV-B induces MMP-1, which fucoidan inhibits its expression at the level of mRNA and protein. The results have shown that algae fucoidan has a potential role in reducing the risk of some inflammatory pathologies, including degradation of extracellular matrix by MMP-1. Fucoidan attach to the fibroblast growth factor and protect them from proteolysis. It seems that its therapeutic mechanism, due to the binding of its glycosaminoglycan, to steromal derived factors (SDF-1), is a precursor to brain stimuli that can contribute to angiogenesis with vascular endothelial growth factor and fibroblast growth factor Therefore, Fibroblast growth factor-2 containing fucoidan-chitosan hydrogel microcomplexes are effective and available for ischemic diseases. In general, extraction of bioactive compounds such as algal derived sulfate polysaccharides can play an important role in the development of cosmetic industry.

Keywords: Fucoidan, Algae, Wound Healing, Tissue Engineering

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Superficial Modification of Exosomes for Cancer Cell Targeting

Behnam Rassuoli Fatemeh*, Farizani Fatemeh Sadat

PHD, Associate prof. of Cell Biology, Ferdowsi University, Mashhad, Iran

Cancer is a global health concern with growing prevalence, incidence and mortality rates, especially in developing countries. Main reasons for failure of current therapeutic modalities include metastasis of cancer cells and their innate/acquired resistance to chemoradiotherapy. To introduce novel strategies against metastatic and resistant cancer cells, recent attempts have focused on engineering of biogenic exosomes. These natural vehicles could be used to directly transfer drugs, therapeutic microRNAs and proteins to cancer cells. To enhance efficacy of exosome-mediated delivery, the superficial structures of exosomes could be modified to facilitate targeted uptake only by cancer cells.

In this regard, engineered exosomes that express GE11 peptide, which binds to epidermal growth factor receptor on tumor cells with epithelial origin, effectively deliver their drug cargo to tumor cells. Likewise, expression of exosomal membrane protein Lamp2B fused to Interleukin 3 receptor, which is overexpressed on leukemia cells, enhanced exosome specificity in vivo. Besides modifying exosomes by a ligand on their surface to target cancer cells, they could also be engineered to induce cell death, as reported for TRAIL+ exosomes that express tumour necrosis factor-related apoptosis-inducing ligand. Although various approaches were used to modify structure and function of exosomes, a thorough

understanding of their biology is still necessary before translating this exciting approach to clinical studies.

Keywords: Exosome, Surface Modification, Cancer Therapy

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The Impact of Tourniquet Release Time on Wound Healing in Patients Undergoing Tibia Fracture Plating Surgery

Khodabakhshi Maryam*, Mahmoudirad Gholamhossein, Bahador Reza

MSc of Medical - Surgical Nursing Education, Birjand University of Medical Sciences, mashhad, Iran

Background: The use of tourniquet is very common in orthopedic surgeries. By obstructing blood flow in the limb, tourniquet may result in muscle ischemia and skin flap hypoxia. This study aimed at determining and comparing the effects of tourniquet release time on wound healing in patients undergoing tibia fracture plating surgery.

Methods: This study was a randomized clinical trial, wherein 40 patients with acute extra-articular tibia fractures were randomly assigned to 2 groups of A (releasing the tourniquet after fracture fixation and before wound closure) and B (releasing the tourniquet after wound closure and application of compression dressing). Duration of surgery in each group was recorded and independent t test was utilized to compare the 2 groups. The wound healing rate was investigated in the patients 24 hours and 14 days after surgery using the Redness, Oedema, Ecchymosis, Discharge, Approximation (REEDA) scale. In this tool, 0 represents "lack of the variable" and 3 indicates "maximum variable score". The scores in this scale range from 0 to 15. The Mann-Whitney test was used in order to compare the wound healing rates between the 2 groups.

Results: There was no significant difference between the 2 groups concerning the average duration of surgery. Wound redness, edema, ecchymosis, discharge, approximation, and the general condition of wound healing showed no significant difference in the 2 groups 24 hours after surgery, while there was a significant difference 14 days after surgery with the aforementioned parameters being greater in group B than group A.

Conclusion: The results showed that releasing the tourniquet before wound closure in group A led to improv wound healing. Wounds need oxygen for restoration and prevention from infections. As the use of tourniquet occludes blood flow to the limb for a while, it can result in increased wound hypoxia after surgery and delayed healing process; hence, less tourniquet time is more desirable for oxygenation of tissues and wound dryness.

Keywords: Tourniquet, Tibia Fracture, Internal Fixation of Fractures, Wound Healing, Infection

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Effect of Structure and Composition of Functional Sutures on Wound Healing-a Review

Yaghoobi Maliheh

PHD, Assistant Professor of Biomedical Engineering, Engineering Department, Faculty of Chemical Engineering, University of Zanjan, Zanjan, Iran

Background: Polymer sutures are natural or synthetic textile materials in monofilament, multifilament, twisted, and braided form, which are widely used in wound closure. Sutures are classified based on origin, absorbability, and structures. The using of antibiotics or other therapeutic agents in the suture structure has become an attractive and interesting research in wound healing.

Objectives: This review attempt to describe key properties of sutures include physical, mechanical, handling, and biological properties. Also the types of functional sutures will present.

Methods: Suture properties and fabrication techniques have been studied in this work. Among the different fabrication methods, electrospinning