

TDF-094: KYTOSTAT-Converting inexpensive indigenous chitosan to high value commercial pro-angiogenic tissue engineered skin grafts for burn patients



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According to survey in Pakistan the mortality rate is more than 98% for burn patients with more than 50% total body surface area. Also 10% deaths occur due to blood loss out of 6% of all deaths caused by injuries. Where in middle income countries like Pakistan, the cure and medication to severe wounds and burns is expensive and out of reach of 70% of population. To meet the demand the advance synthetic skin and related items are being importing from international market on high cost which is a burden on Pakistan economy. To overcome the cost and availability of advance wound care products, we proposed the development of advance wound care products based on indigenous source chitosan, which is easy to extract from waste sea sources. Chitosan is biodegradable, biocompatible, and anti-infectious in nature. The presence of positive charges in its structure makes it attractive towards blood cells and involves it in angiogenesis and hemostasis. Chitosan was isolated from crustacean's source (Shrimps and crabs).

In current project, one product is synthetic pro-angiogenic skin graft. This graft was prepared from water soluble polymer obtained as a result of simple chemical transformation in chitosan. It supported new blood vessel formation and also showed ability to carry thyroxin as a proangiogenic agent. Second product under this project is chitosan based haemostatic gauzes. Instant blood clotting is the basic need of today's era, as death rate due to blood loss during accidents and war is increasing. Third prototype is an advance wound dressing used for partial thickness burn and chronic wounds. It has similar potential effectiveness in diabetic patients and venous foot ulcers. It has ability to form blood vessels at burn or wounded sites. It has power to absorb



the extra body fluids and provide moist environment and proper gaseous exchange at the effected site. Enhance blood vessels growth and provide hemostatic effect. It has ability to degrade at the effected site and reduces pain. The commercialization of all these products is being planned by partner Industry (Cotton Craft PVT LTD), they have submitted dossier to Drug Regulatory Authority (DRAP) of Pakistan for necessary approvals and registration. All the prototypes were completely and structurally characterized using FTIR, and SEM; for cytotoxicity cells were cultured and for wound healing full thickness rat model was used.



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(54) **MATERIAL AND PREPARATION OF
BIOCOMPATIBLE HEMOSTATIC WATER
SOLUBLE CHITOSAN**

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(57) **ABSTRACT**
A water soluble biocompatible hydrogel having an amino sugar linked to a hydrophilic polymer is disclosed. Linkage of the amino sugar and hydrophilic polymer may be provided by an imine-amine bond between an amine of the amino sugar and a primary amine of the hydrophilic polymer. The linkage between the amino sugar and the hydrophilic polymer may be provided by reacting an amine of the amino sugar and a primary amine of the hydrophilic polymer with a formate ester in an acidic solution. Water soluble biocompatible polymer having an amino sugar linked to a hydrophilic polymer may be cast into films, dried into gauze and/or combined with salt solutions to provide injectable ...