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Keratin-associated protein micromaterials as a new type of wound dressing in diabetic mouse model

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Introduction: Wound repair is a mechanism whereby the body tries to restore the integrity of the tissues. However in some diseases such as diabetes mellitus the healing process is impaired. The main goal of tissue engineering and regenerative medicine is to assemble functional scaffolds that restore, maintain, or improve damaged tissues or whole organs. To enhance healing processes we developed keratin associated proteins (KAPs) powder prepared from mice fur, which added to damaged site, could be easily colonized by migrated epithelial cells.

Aim of the study: was to investigate the effect of KAP on wound healing rate using surgical wound model in diabetic mice.

Materials & methods: Chemical & biological studies Procedure of KAP preparation was carried out according method proposed by Lipkowski et al.¹ Obtained m-KAP were impregnated by silver nanoparticles as established earlier by Sileikaite et al.² Simultaneously to the KAPs preparation, pharmacologically induced diabetes was developed in mice as described by Wu et al.³ When diabetes was stable two wounds were made by skin incision and covered by KAPs. Wound tissue samples were collected on day 4, 7 and 14 and processed for histopathological studies.

Conclusions & Results: Developed KAPs were characterized by very low immunogenicity. Keratin covering has been absorbed by regenerating skin during healing process. Additionally keratin powder well absorbed exoduses, while maintaining moist environment within wound area. Our preliminary results confirmed that keratin powder could be used as a wound dressing well adsorbed in regenerating skin during healing process.

References:

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3. K.Wu, Y. Huan, Curr Protoc Pharmacol. 2008 Mar;Chapter 5:Unit 5.47

Biography

Marek Konop is a PhD student at Mossakowski Medical Research Centre PAS. My supervisor is prof. Lidia Rudnicka MD, PhD. His PhD thesis concerns of the influences of natural derived structural proteins in healing process (especially in diabetic wound model). During my PhD studies Marek Konop obtained KAP dressing (according method proposed by Lipkowski) and diabetic wound model.

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