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# EDITORIAL

# Wound Management with Chitosan Based Biomaterials

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*Dear clinicians, researchers, colleagues and friends!*

Treatment of wounds poses acute medical and social challenges for research and practice. It acquires even more importance with an increase in natural disasters, industrial and domestic accidents and military conflicts.

In modern medicine there are a great number of wound dressings. Their application is based on the principle of moist recovery of the wound formulated by G. Winter (1962) and C.D. Hinman, H. Maibach (1963). The authors established that moist antibacterial environment was optimal for maintenance of normal mitotic process in the wound: migration of epidermal cells and epithelialization of wounds occur more actively in the moist environment and not in the open air which dries out the surface. The moist environment ensures a higher protease activity that enables prompt cleaning of wound surface without use of fermentation drugs associated with allergic response. Besides, it prevents dryness of nerve endings and relieves pain. As the dressing does not stick to the wound, there is no pain on removal and no damage to granulation tissue and growing epithelia.

A dominant tendency in the development of modern wound dressings is the use of polymer matrix composites based on biocompatible natural and synthetic polymers. Effective healing of wounds and wound infections requires dressings to have a high sorption activity, effectively removing excessive wound exudate and its toxic components. Such dressings are semi- permeable to vapor and at the same time prevent dryness of the wound surface and protect from secondary infection of the wound; they are elastic and capable of restoring surfaces with complicated relief, and they are mechanically robust. Dressings should provide an optimal microenvironment for wound recovery and cause neither pyrogen and toxic effects nor irritant and allergic reactions.

One of the advantages of dressings based on composite matrices is their ability to deliver antibacterial, antiseptic, anti-inflammatory drugs that facilitate reparative processes. Transparent films allow visualization of the wound bed.

Absorbable membranes made from polymer matrices mostly conform to all clinical specifications and could be applied at all stages of wound and burn treatment. Optimal mechanical and physicochemical properties of hydrogel compositions used in drug delivery enable a prolonged effect of drug substances, targeted drug delivery and possibly a marked synergistic effect of drugs.

Chitosan and its derivatives are viewed as most promising biopolymers. Chitosan is not toxic, it is biocompatible and biodegradable. It has antimicrobial and immunostimulating activities. Chitosan is a hemostatic agent, it accelerates coagulation process, and blocks nerve endings alleviating the pain. Chitosan has been actively investigated as the basis of wound and burn dressings and a major component of multiple products: hydrogels, membranes, films, nanofibers, granules, nanoparticles and scaffolds. Scaffolds are of particular interest as new universal forms which can be utilized in tissue engineering and regenerative medicine.

In the section *Surgery* you will be offered the data on effectiveness of novel developments in chitosan-based dressings used for treatment of biliary and heavy exudate wounds. Results of researches broaden our knowledge on application of chitosan-based wound dressings and their anti-inflammation and regenerative properties.