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Negatively charged microspheres: Wound conditions tailored therapy

New technology as a result of interdisciplinary approach. Biophysical research of polymers effect of phospholipid membranes fusion led to development of a new class of wound healing products. Negatively charged microspheres (NCM) are made from polystyrene are non-biodegradable 5 micron in diameter particles, do not carry any active ingredient and are used as a water suspension. Cells are actively attached and spread on the surface of microspheres, the microspheres are not engulfed by cells of any kind tested, and the cell-microspheres interaction is limited by extracellular membrane. Cells attachment to microspheres triggers in vitro modulation of the balance of cytokines by monocytes, lymphocytes and fibroblasts, stimulates free radicals production by inflammatory cells, collagen production by fibroblasts, proliferation and cell migration of fibroblasts, keratinocytes, endothelial cells, facilitation the Ca^{2+} influx to fibroblasts and lymphocytes. Cell response depends on amount and properties of microspheres and the metabolic conditions of cells. In animal models wound healing (excisional full thickness wounds, burns) microspheres causes accelerated wound closure accompanied with influx of

macrophages, elevation of collagen. In double blind controlled clinical study significant acceleration of wound healing in chronic stagnant wounds with exposed tissues and coverage of at least 75% of wound area with healthy granulation tissue within 4 weeks has been observed.

Conclusion: Non biodegradable polystyrene charged microspheres influence activity and proliferation of various types of cells presented normally in wounds that might explain the efficacy and diversity of etiologies and conditions of a successfully treated wounds by NCM based commercial products.

Speaker Biography

Vladimir Ritter has completed his PhD at the age of 31 years from Institute of Biophysics of the Academy of Sciences of USSR, Puschino-Oka. Dr. Ritter serves as CEO and CTO of company Polyheal, Israel, that he established in 1996. He is the inventor of microspheres based technology for wound healing and tissue regeneration and also author of number of patents and manuscripts.

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