Resorbable Laminated Repair Membrane for Accelerated and Sustained Wound Repair

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Technology description

Tracheal epithelial cells were cultured in vitro to yield a model that near-perfectly replicates naturally epithelialized tracheal lumen vide technology no. 5413. Technologies no. 5546 and 5558 studied how bio-degradable polymers and degradation processes could be used in replanting tracheal epithelial tissue. Technology no. 5764 showed choreographed releases of two or more proteins from degradable biopolymers integrating epithelial cells post-implantation. This invention combines all of the above to describe an implantable (resorbable) membrane device (with control over attendant protein release kinetics) that re-epithelializes tracheal lumen, an unachievable feat till date. A unique biodegradable polymer was embedded with required proteins and tested for epithelialization on the in vitro tracheal lumen model above. The features of and values obtained from the invention are: a)a multi-layered polymer structure, one for each participant protein, allowed for comprehensive epithelialization. b)a barrier layer beneath all the other layers kept out "in-growing" surrounding tissues and prevented enzymes and other substances from impeding the process. c)The experiments will now lead to re-epithelialization of the tracheal lumen in vivo. d)The device can be used with any kind of protein (as also other biological entities), can release active proteins, and is synthesized using a single and cost effective process. The invention applies to the market of tracheal injuries (due to intubation, chemicals, chemotherapy, etc), to the study and research of re-epithelialization in other areas of the body (skin, cornea, intestine, etc.), in wound healing and tissue scaffoldings, drug delivery systems, etc.

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