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Biodegradable Wound Dressing for Skin Regeneration

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BIODEGRADABLE WOUND DRESSING FOR SKIN REGENERATION

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Using the delayed healing model of diabetic (db/db) mice, we evaluated the ability of a novel silk based dressing to facilitate healing of full-thickness excisional wounds. Silk protein from Bombyx mori was used to create wound dressings via a proprietary electrospinning technique. The resulting dressing is vapor and air transmissible. Eight millimeter diameter full-thickness wounds were created on the backs of diabetic mice and covered with either a standard (n=12) telfa-gauze or the silk (n=12) dressing. At 2 day intervals, the telfa dressings were removed, the wounds photographed, measured and fresh dressings placed. For mice receiving the silk dressing, it was allowed to remain in place unless it became dislodged. In that case, a fresh dressing was placed into the wound bed. Wound healing was followed for 21 days at which time the mice were sacrificed, the wound areas excised and subjected to H & E and Trichrome staining. Wounds covered with the silk dressings developed an eschar encompassing the silk whereas wounds dressed with gauze remained moist and without eschar throughout the study period. Upon histologic examination, 1 of the gauze dressed wounds developed a complete epithelial layer across the wound. The remaining 11 wounds had large areas remaining without an epithelial cover. In contrast, 5 of 12 mice receiving the silk dressing developed complete epithelial layers, 2 additional mice had very small areas remaining without a complete epithelium. The remaining 5 had modest areas without an epithelial covering. The ability of silk dressings to permit the formation of an eschar versus gauze in which the wounds remained wet may contribute significantly to the healing response observed. These results suggest that the breathable, vapor transmissible nature of the silk dressing may be an effective dressing for difficult to heal wounds such as diabetic foot ulcers.