

electrospun nanofiber bandages *speed* healing

Electrospun nanofibers might someday provide an effective way to deliver medication to wounds in order to accelerate healing. University of Akron chemistry professor Daniel Smith and polymer science professor Darrell Reneker are currently evaluating the effectiveness of nitric oxide, delivered by bandages made of urethane elastomer nanofibers.

The electrospinning process uses an electrically charged plate, which attracts ionized polymer resins through an orifice, creating fine, spiderweb-like fibers. The chemical precursors for production of nitric oxide are added to the polymer resin, and become encapsulated in the fibers as part of the manufacturing process. When activated with water, the bandage produces nitric oxide at a rate regulated by the polymer. Nanofibers have a high ratio of surface area to volume, which results in effective delivery of the medication.

The bandages are currently undergoing clinical trials in Columbia and Bolivia for treatment of sand fly bites, which carry a parasitic disease called leishmaniasis. This disease, which is also a threat for soldiers in Iraq, presently has to be treated with a cocktail of harsh drugs delivered intravenously, and takes months or years to heal even with treatment. Using the bandages would allow topical treatment instead. Nitric oxide reduces inflammation, kills the parasite, and helps heal the wound. Preliminary studies have demonstrated a high rate of success, with treatments requiring only a few weeks.

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