

From managing sugar to managing healing

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Insulin is a hormone known primarily for regulating sugar levels in the blood, yet researchers at the University of California, Riverside, recently found that applying insulin directly to skin wounds significantly enhanced the healing process.

Skin wounds in rats treated topically with insulin healed faster"surface cells in the epidermis covered the wound more quickly and cells in the dermis, the deeper part of the skin, were faster in rebuilding blood vessels.

In follow-up studies of human skin cells in culture, Manuela Martins-Green and colleagues explored the molecular impact of topical insulin on keratinocytes, the cells that regenerate the epidermis after wounding, and on microvascular endothelial cells, the cells that restore blood flow.

Using various cell and molecular techniques, the researchers discovered that insulin stimulates human keratinocytes in culture to proliferate and migrate. In cultured human microvascular endothelial cells, the insulin stimulates only migration into the wound tissue. The insulin works by switching on cellular signaling proteins called kinases (specifically Src, PI3K, and Akt) and a protein (SREBP) that binds elements in DNA that regulate the production of cholesterol and its relatives.

Chronic or nonhealing wounds take an immense toll on American health and on health care systems. It particularly affects millions of patients with impaired mobility, as well as those with diabetes. Because diabetes is a disease caused by impaired production or utilization of insulin, this

work may help explain the connection between diabetes and poor healing.

Says Martins-Green, "This work is important because when we know which cells respond to insulin and which molecules are involved, we may be able to develop ways in which we can make insulin work even better or find ways in which more affordable molecules that mimic these functions of insulin can be developed to treat people who suffer from poor healing."

Source: American Society for Cell Biology

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