

# Could chronic wounds not heal due to too low local copper levels?

Published 2021

medical hypotheses

This study explores possibility that low levels of copper contribute to the incapacity of the wounds to heal in individuals with diabetic ulcers, decubitus, peripheral vascular, or other wounds with compromised circulation to the wound site.

Chronic wounds are characterized by extensive loss of the integument, clear necrosis, or signs of circulation impairment either localized or more extensive, usually in the limbs, leading to extensive loss of substance.

Contrary to the high susceptibility of microorganisms to copper, human skin is not sensitive to copper and the risk of adverse reactions due to dermal exposure to copper is extremely low.

Several mechanisms for the potent biocidal activity of copper have been proposed, which include alteration of proteins and inhibition of their biological assembly and activity; plasma membrane permeabilization; and membrane lipid peroxidation.

Some observations about the role of copper include:

- Immunohistochemical studies show that wound edges of copper-treated wounds have more prominent VEGF expression
- Copper modulates integrins expressed by suprabasally differentiated keratinocytes during the final healing phase
- GHK, a tripeptide with high affinity for copper ions that was isolated from human plasma, potently reduces tissue oxidative damage after injury and activates tissue remodeling
- Expression of the metallothionein gene is upregulated in the skin following topical application of copper, and in wound margins, particularly in regions of high mitotic activity.

“...in ischemic patients, with poor local copper supply by the circulatory system, exterior supplement of the copper by elution from copper containing dressings, directly to the wounds, will result in healing where conventional treatments fail.”

Gadi Borkow, Jeffrey Gabbay, Richard C. Zatcoff, Could chronic wounds not heal due to too low local copper levels?, Medical Hypotheses, Volume 70, Issue 3, 2008, 70(3): 610-613.

Read the full text online:

<https://www.sciencedirect.com/science/article/abs/pii/S0306987707004124>