Enzyme could be the key to aiding wound healing in diabetic and elderly people

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Blocking a crucial enzyme which produces the stress hormone cortisol could lead to improved wound healing. This would be beneficial for patients with diabetes-associated ulcers', elderly patients who have undergone surgery, or those treated for burns, which would help to prevent infection and in some cases amputation, according to new research from the University of Birmingham.

Researchers found that wound healing significantly improved when an enzyme called 11β-hydroxysteroid dehydrogenase type 1 gene (11β-HSD1) was deleted or blocked –inhibitors of this enzyme were used to speed up wound healing. Poor healing of ulcers is a major complication of diabetes, and can lead to infection or even amputation of the affected area. Our research demonstrating improved wound healing suggests that this burden could be greatly reduced.

The findings, published in the *Journal of Clinical Investigation*, demonstrate that aged human skin, as well as that exposed to sunlight is associated with higher levels of 11β-HSD1 activity compared to younger skin.

Skin 11β-HSD1 generates the steroid hormone cortisol, which is known to affect skin integrity. Cortisol has a negative effect on collagen, which is important for skin elasticity and the ability to heal wounds. 11□-HSD1 mediated cortisol excess results in a loose collagen network and an "aged skin" appearance.

But by deleting the 11βHSD1 gene from a group of mice, the researchers found that age-induced thinning of the skin with a loose collagen network was prevented; aged mice had skin quality similar to young counterparts. Wound-healing in these mice was significantly accelerated (by up to 50%) compared to mice which still had the gene. Importantly, and of considerable translational potential, a similar result was noted for mice treated with an 11β-HSD1 inhibitor.

This leads to the possibility of using a topical 11βHSD1 inhibitor to combat age-related skin impairments, or even assist the wound healing process in patients with diabetes associated ulcers.

Professor Paul Stewart (European Research Council Advanced Senior Fellow) and Dr Gareth Lavery (BBSRC David Phillips Fellow) at the University of Birmingham said: "Poor wound healing is a huge burden for patients with diabetes, with some people having ulcers that heal poorly. Our findings linking poor skin quality – similar to that of aged skin - to 11?-HSD1, raises the exciting possibility that these patients may benefit from 11?-HSD1 inhibitors. "

More information: 11β-hydroxysteroid dehydrogenase type 1 blockade prevents age-induced skin structure and function defects, *Journal of Clinical Investigation*, 2013.

Provided by University of Birmingham