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Stress Robs Skin of Antimicrobial Defenses

Researchers discover how it leads to 'nervous breakdown' in the epidermis

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HealthDay

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FRIDAY, Nov. 2 (Health Day News) -- A team of researchers has identified the biological mechanism by which stress increases susceptibility to skin infections.

"We have shown what stress does, the basis of the stress," said study author Dr. Peter Elias, a professor of dermatology at the University of California, San Francisco, and the VA Medical Center, San Francisco. Interestingly, it has nothing to do with the classic explanation of the immune system breaking down, he added.

Rather, it's a breakdown in the skin's antimicrobial defense, according to the study in the November issue of *The Journal of Clinical Investigation*.

Elias and his team subjected mice to psychological stress and found them more susceptible to group A *Streptococcus pyogenes* skin infections than mice kept under less stressful conditions.

The stressed-out mice showed a decrease in the expression of antimicrobial peptides by the skin's epidermis.

Streptococcal bacteria can cause many problems, such as skin infections, severe sore throats and even flesh-eating disease. The role of the peptides that Elias and his team studied have come to light in recent years, and it has been found that they are the "front line" of the immune system. They act like antibiotics, attacking bacteria and killing them.

In the study, Elias' team also found that the stress led to the increased production of glucocorticoids. This, in turn, inhibited the synthesis of fat in the skin's epidermis and reduced the secretion of vesicles containing antimicrobial peptides, setting up the mice for skin problems.

"What happens is, stress down-regulates the expression of two key families of antimicrobial peptides," Elias said. As that happened, skin infections became more severe in the animals.

When Elias' team blocked the production of the glucocorticoids, the skin's antimicrobial defenses returned to normal.

While many people think of the immune system's T-cells, which attack invaders, as the first line of defense, recent research suggests otherwise, Elias said. "The antimicrobial defense mechanisms are so effective, they deal with

99.5 percent of all challenges by microbial pathogens, such as bad viruses, bad bacteria," he said.

In an accompanying commentary, Dr. Andrzej Slominski, of the University of Tennessee, wrote that "this study provides what I believe to be the first mechanistic link between psychological stress and increased susceptibility to microbial infection."

The research may eventually lead to new treatment options, such as topical medications that block excess glucocorticoid production.

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