

# Antioxidants help treat skin-picking disorder in mice, researcher says

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Two antioxidant supplements are effective in treating skin-picking disorder in mice, according to a study led by a Stanford University School of Medicine researcher.

The finding suggests that people with the potentially serious disorder might benefit from this therapy.

An estimated 4 percent of the population—or about 1 in 25—suffer from skin-picking disorder, in which repeated, compulsive picking or scratching of the skin can lead to severe disfigurement and life-threatening infection. Skin picking is also common among laboratory mice, which may develop potentially fatal ulcerative dermatitis, or [skin lesions](#), caused by excessive grooming.

The condition is the single leading avoidable cause of death among [laboratory mice](#), said Joseph Garner, PhD, associate professor of comparative medicine and senior author of the study, which was published online today in *PLOS ONE*. The lead author is Nneka George, DVM, of the University of North Carolina at Chapel Hill.

In the study, the researchers experimented with two [antioxidant supplements](#)—N-acetylcysteine and [glutathione](#)—to treat mice with skin-picking disorder. NAC is used by cells to make glutathione, which is the brain's main, naturally occurring antioxidant. NAC has been used experimentally in people with a variety of conditions, including Parkinson's disease, autism and cystic fibrosis, and reports of individual

cases suggest it could be useful in treating skin picking.

## **Potentially fewer side effects from glutathione**

"With NAC, almost every mouse got a little bit better," Garner said. "But there is a huge variability in response, anywhere from a slight improvement to complete cure, which is what you see in humans."

NAC also took a long time to show an effect: If an animal was cured, it took six to eight weeks. With glutathione, the pattern was very different. Fifty percent responded, but in these animals it was a rapid, all-or-nothing response: If they got better, they were completely cured in two to three weeks. The animals that didn't get better were worse off to start with, the researchers found.

Garner said the results suggest that glutathione might be an even more powerful therapeutic, with potentially fewer side effects.

"What's exciting is that we have a compound that works. It works as well as NAC. It's clearly working differently, or at least more directly. This different response profile gives us some hope that there may be some nonresponders, or people who can't tolerate NAC, who may be helped by glutathione," he said.

Skin-picking disorder is a surprisingly common condition, yet many patients avoid seeking help because of the shame and embarrassment, Garner said.

"This can lead to really serious disfigurement in extreme cases," he said. "People suffer in complete silence. They think they are the only one who has it, despite the fact that it's very common, and it kills people."

By the time people do seek help, about 35 percent have required some

kind of antibiotic treatment, and 5 percent have required intravenous antibiotics to treat potentially life-threatening infections, he said. Some are referred for psychiatric help. Although cognitive behavioral therapy can be an effective form of treatment, there are few practitioners equipped to do this form of therapy, Garner said.

People with the condition also may be prone to compulsive hair pulling, another body-focused, repetitive-behavior disorder. A clinical trial among patients with the hair-pulling disorder, also known as trichotillomania, showed NAC to be an effective treatment in 56 percent of cases.

## **Study methods**

In the latest study, the researchers selected 16 mice with lesions on the face, neck and limbs—signs of skin picking. Because the condition is painful and potentially fatal, the researchers treated all the mice with a thin film of topical antibiotic and steroidal ointment to relieve their discomfort. A third of the mice received a high dose of NAC in their drinking water. Another third were given drops of glutathione on the nose. (Because mice are nose breathers, they easily inhaled the compound.) A control group was given neither of the compounds.

Almost all the animals treated with NAC showed some improvement, though the improvement was slow. By the end of the study, 40 percent were fully cured. Among the animals treated with glutathione, results were more rapid: Within two to four weeks, about half were cured; the other half did not respond. There was no change among the control animals.

Garner believes that NAC works by combating oxidative stress that causes certain cells in the brain to die or become inactive.

"Our thought is maybe NAC works because in the brain it is the precursor to glutathione, and the brain has to make glutathione to protect itself against oxidative stress," he said.

NAC, however, isn't easily tolerated by many people, causing gastrointestinal distress, he said. Intra-nasal glutathione, on the other hand, may avoid these potential side effects by bypassing the gut and liver, delivering the compound directly to the brain. He first presented the results in April to a patient advocacy group.

"The sense of excitement from patients, advocates and researchers was palpable," he said. "This is the first new potential drug for this disorder in years."

Garner said his next step is to plan a clinical trial in patients to test the value of intra-nasal glutathione.

Provided by Stanford University Medical Center

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