

Common protein in skin can 'turn on' allergic itch

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Credit: Alice MacGregor Harvey

A commonly expressed protein in skin—periostin—can directly activate itch-associated neurons in the skin, according to new research from North Carolina State University. The researchers found that blocking periostin receptors on these neurons reduced the itch response in a mouse model of atopic dermatitis, or eczema. The findings could have implications for treatment of this condition.



Itch sensations are transmitted from neuronal projections in the skin through the dorsal root ganglia (DRG) - which are clusters of sensory cells located at the root of the spinal nerves—then to the spinal cord.

"We have found that periostin, a protein that is produced abundantly in skin as part of an allergic response, can interact directly with <u>sensory</u> <u>neurons</u> in the skin, effectively turning on the <u>itch</u> response," says Santosh Mishra, assistant professor of neuroscience at NC State and lead author of a paper on the work. "Additionally, we identified the neuronal receptor that is the initial connection between periostin and itch response."

Mishra and a team including colleagues from NC State, Wake Forest University and Duke University identified a receptor protein called $\alpha\nu\beta3$, which is expressed on sensory neurons in skin, as the periostin receptor.

In a chemically-induced mouse model of atopic dermatitis, the team found that exposure to common allergens such as dust mites increased periostin production in skin, exacerbating the itch response. However, when the researchers "turned off" the receptor <u>protein</u>, itch was significantly reduced.

"Periostin and its receptor connect the <u>skin</u> directly to the central nervous system," Mishra says. "We have identified the first junction in the itch pathway associated with eczema. If we can break that connection, we can relieve the itch."

The research appears in *Cell Reports*, and was funded by NC State's startup fund. Mishra is both first and corresponding author of the work.

More information: Santosh K. Mishra et al, Periostin Activation of Integrin Receptors on Sensory Neurons Induces Allergic Itch, *Cell*



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