

Gene associated with autism linked to itch response

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A pilot study from North Carolina State University has found that a gene associated with autism spectrum disorder (ASD) and pain hypersensitivity may actually decrease itch response. Atopic dermatitis and pain hypersensitivity are both conditions associated with some types

of ASD.

The gene in question, contactin associated protein 2 (CNTNAP2), is thought to be linked to a mutation associated with some forms of [autism](#). This gene is found throughout the dorsal root ganglia (DRG), which are clusters of sensory cells located at the root of the spinal nerves. The DRG is the superhighway that transmits sensations of both pain and itch from the skin through the spinal cord to the brain.

"Since atopic dermatitis is often associated with ASD and CNTNAP2 is both linked to pain hypersensitivity in ASD and expressed in almost all DRG sensory neurons, we wondered whether CNTNAP2 might also contribute to itch behavior," says Santosh Mishra, assistant professor of neuroscience at NC State and author of the study.

Mishra compared itch response in mice with the CNTNAP2 gene to those without it. In the presence of both histamine and non-histamine based stimuli, the CNTNAP2 knock-out mice, or mice without the gene, had a reduced itch response compared to mice with the gene.

"If there is a link between ASD and atopic dermatitis, then mice without a normal CNTNAP2 gene would be expected to have an increased itch response just as they have increased sensitivity to pain," Mishra says.

"There are several possible explanations for this finding, ranging from standard physiological differences between humans and animals to CNTNAP2's potential role in releasing neuropeptides that could affect this response.

"But we also know that pain can suppress itch sensation and vice versa. Just as some humans with ASD have higher pain sensitivity, so do mice without CNTNAP2. That pain sensitivity may be inhibiting the itch sensation."

Mishra hopes that this pilot study may pave the way to further exploration of the role of CNTNAP2 in itch.

"The functional role of CNTNAP2 in the neural transmission of itch is unknown," Mishra says. "While this study sheds light on the possible linkage between ASD and itch, it's limited because it is primarily based on behavioral, not cellular or molecular, results. Future studies may be required to dissect the molecular underpinnings of CNTNAP2 and itch sensation."

More information: Santosh K. Mishra, The Role of CNTNAP2 in Itch Sensation, *Journal of Investigative Dermatology* (2021). [DOI: 10.1016/j.jid.2021.07.152](https://doi.org/10.1016/j.jid.2021.07.152)

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