Shank3-KO mice display itch hypersensitivity and peripheral mechanosensory dysfunctions

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Abstract

Autism Spectrum Disorder (ASD) is a complex neurodevelopmental disorder characterized by persistent difficulties in social interaction, increased repetitive behaviors and altered sensory perception. Responses to touch are often perceived differently in ASD patients. Studies on ASD mouse models demonstrated that peripheral nervous system dysfunction is responsible for some deleterious phenotypes. However, we still ignore which component of touch is altered in ASD. Additionally, a recent study showed that a mouse model of autism was sensitive to inflammation which could be related to social deficits. Our study focuses on Shank3-KO mice to investigate primary somatosensory neuron functions and modalities (such as itch). We studied the tactile experience by performing behavioral phenotyping combined with in-depth analyses of the somatosensory system. We showed that Shank3-dC/dC mice elicited an hypersensitivity to develop mechanical and pharmacological itch. We performed ex-vivo skin nerve recordings and identified some alterations in the electrophysiological responses of the C-LTMRs somatosensory fibers. Finally, we suggest that it might become important to consider alterations in sociability in ASD mouse models by including analyses of the peripheral integration of tactile stimuli. Moreover, ASD mice could have a particular susceptibility to inflammation (and/or environmental stress), which could relate to both tactile integration and social experiences.

Keywords: autism, c, ltmr, skin, somatosensory system, itch, mice, Shank3

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