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# Naturalistic social behavior of mice with a Nav1.7 loss of function in C-Low threshold mechanoreceptors

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## Abstract

The voltage-gated sodium channel Nav1.7 encoded by the SCN9A gene has recently been shown to be required for the normal function of C-low threshold mechanoreceptors (C-LTMRs). Mice presenting a conditional C-LTMR-specific Nav1.7 loss of function are slightly hyposensitive to mechanical stimuli and exhibit reduced sensitivity to cooling. In light of the involvement of C-LTMRs in affective touch, we investigated the effect of this mutation in groups of mice hosted under naturalistic conditions. Following tamoxifen injection (50mg/kg), Nav1.7-WT and Nav1.7-KO mice were placed in groups of 5 individuals (4F+1M) in a seminatural environment and left undisturbed for 6 days. On Day 5, at dusk, mouse social behavior was observed continuously for 30 min. During this period, WT mice initiated longer anogenital sniffing episodes towards KO mice than towards other WT. In a co-occurrence analysis of the same time-period, KO mice were under-represented as emitters of social behaviors while receiving a large part of the social interactions initiated by WT mice. Throughout the diurnal phase of Day 5, KO mice spent more time huddling in groups but showed no difference in resting behavior when alone or in pairs. These results suggest an imbalance in social interactions, in which mice presenting an abnormal C-LTMR function due to loss of Nav1.7 are overall socially withdrawn despite active investigation from control mice.

**Keywords:** C, LTMR, social behavior, seminatural environment, affective touch, Nav1.7

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