Thermosensory atypia in newborns mutant for the autism-related gene Magel2

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Abstract

Atypical responses to sensory stimuli are considered a core aspect and early life marker of Autism Spectrum Disorders (ASD). Although recent findings performed in mouse ASD genetic models report sensory deficits, these were explored exclusively during the juvenile or adult period. Our research concentrates on neonate mice lacking the autism-associated gene Magel2. MAGEL2 is an imprinted gene highly expressed in the hypothalamus that is paternally expressed and for which paternal deletion and point mutation cause Prader-Willi and Schaaf-Yang respectively; two syndromes with a high prevalence of ASD. We recently found that under a cool environment, neonatal mice lacking Magel2 present pup calls hypo-reactivity and are retrieved with delay by their wild-type dam. Intranasal administration of oxytocin to Magel2 neonates was able to rescue both the atypical thermosensory response and the maternal pup retrieval. Our previous results suggest a dysfunction in the neural coding of thermoception that we need now to investigate. By recording thermal cortical evoked potentials through both in vivo mesoscopic calcium imaging and in vivo electrophysiological multi-channel recording we aim to: (1) identify the existence of early activity in the somatosensory cortex induced by cool thermal stimulation; 2) Compare cortical activity between control and Magel2 deficient mice; 3) Investigate how oxytocin can influence the coding of thermosensory information during the first weeks of life. The project will establish for the first-time deficits in thermosensory integration in early life and focus on oxytocin as a potentially beneficial treatment for atypical sensory reactivity.

Keywords: autism, somatosensory cortex, thermsensation, oxytocin

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