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NEUROSCIENCE AND PHYSIOLOGY SEMINAR SERIES

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"Circuit Dysregulation in Secondary Motor Cortex-Orbital Area During Behavior in Fragile X Mouse Model"

Fragile X syndrome (FX), the most common inherited form of autism, is associated with behavioral hyperactivity combined with learning and memory deficits in perceptual decision-making tasks. Considering that these complicated tasks involve processing sensory input, evaluating sensory information, and producing motor actions, the neural circuit mechanism underlying these deficits remains unclear. We used a visual Go/No-Go discrimination task, and Neuropixels recordings in a Secondary Motor Cortex (MOs)-Orbital Area (ORB) circuit in Fmr1 knockout and WT control mice. We observed FX exhibit enhanced cue-related responses and altered reward-related activity in both MOs and ORB. Cluster-based analyses revealed disrupted neuronal response patterns, characterized by altered amplitude, latency, duration, and reduced stimulus discrimination. Together, these findings implicate overexcited ORB activity and dysregulated MOs processing consistent with FX behavioral impairments.

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