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Harmaline interaction with D2 signaling in tremor and attenuation of sensory-motor activity in mice

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Essential tremor is one of the most common neurological disorders characterized by uncontrollable shaking and tremors throughout the body. Well known to affect adults, it can also affect children. Harmaline induced tremor is an established animal model for human essential tremor, but its underlying mechanism and effects on mood behavior are still elusive. This study aims to use pharmacological and behavioral methods to investigate the pharmacology in harmaline-induced tremor and the auditory startle response. Mice tremors and auditory startle responses were recorded by the Kinder Startle Monitor System. Harmaline (12.5 mg/kg) reliably induced tremor, and that can be attenuated by ethanol (1.5 mg/kg) and sulpiride (20 mg/kg). In addition, it caused the startle response to decrease significantly. Prepulse inhibition and gap responses also decreased upon harmaline injection and increased the following day, but not significantly from the controls. Supplemental administration following recovery can significantly attenuate gap detection without affecting prepulse inhibition. Our data confirms the frequency of the tremor was from 10-15 Hz, and the ethanol effect, which indicates validity as novel tremor assay. We also found that harmaline attenuates the auditory startle reflex by causing the reflex and gap detection to be suppressed, but did not affect prepulse inhibition significantly. These findings suggest harmaline not only specifically modulates sensory-motor integration, but also the timing of gap detection. Our data provides additional information that D2 receptors are involved in harmaline-induced tremor.

Biography

Xiping Zhan has his expertise in Neuropharmacology. His lab uses multiple interdisciplinary approaches to study neural circuits and underlying functional implications. He applies behavior measures to evaluate the neuropharmacology of small molecular drugs on tinnitus, tremor or mood behavior, and uses patch clamping or single unit *in vivo* recording to address the molecular mechanisms. In addition, he uses human iPS cell derived dopamine neurons to model pharmacology in human. He has been focused on tinnitus and tremor for years in research and teaching.

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