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Poster Sessions

Behavioral Characterization of Dopamine D₅ Receptor Knockout(D₅KO) Mice

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Higher impulsivity is a risk factor for criminal involvement, substance abuse, and suicide. We have found that milnacipran and duloxetine suppress impulsive action by stimulating dopamine D₁-like receptors in the medial prefrontal cortex. D₁-like receptors comprise of D₁R and D₅R. The D₅R has a 10-fold higher affinity for dopamine compared with the D₁R. Therefore, we investigated the role of D₅R in impulse control using D₅KO mice in this study. Because normal locomotor activity and working memory are required to learn the impulsivity measurement task, we also checked those.

We used adult D₅KO mice or wild-type littermates. An open field test and a home cage locomotor test were used as measures of locomotor activity. A Y-maze test was used as a measure of working memory. We assessed impulsive action by using a 3-choice serial reaction time task (3-CSRTT). Each mouse was required to nose poke to a lit holes of the three holes to obtain a reward pellet. Nose poking during the waiting time was recorded as a premature response, an index of impulsive action. We also measured attentional function and motivation in the 3-CSRTT.

The genotype did not affect results at all. Therefore, it is unlikely that D₅R play an important role in the suppression of impulsivity. However, we cannot rule out that a compensatory effect may have occurred due to the gene deletion. Although the results differ from those of previous studies reporting reduced locomotor activity and working memory, a possible reason for the inconsistent results is that the D₅KO mice are created differently.