

The Effects of Phytocannabinoids and HIV-1 Tat on Animal Behavior and Microglia-Mediated Neurotoxicity



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Background

- HIV leads to cognitive decline², anxiety¹⁹, pain¹⁸, motor problems even when treated.
- Symptoms are likely driven by Tat (neurotoxic HIV protein)-induced, microglia-mediated neuroinflammation^{23,25}.
- Cannabinoids (e.g., CBD, THC) are anti-inflammatory and may help^{92,93}.
- Effects of CBD and THC on HIV-related symptoms require investigation.
- Further need for characterization of *in vitro* impact of CBD on microglia-mediated neurotoxicity.



More Information and References:

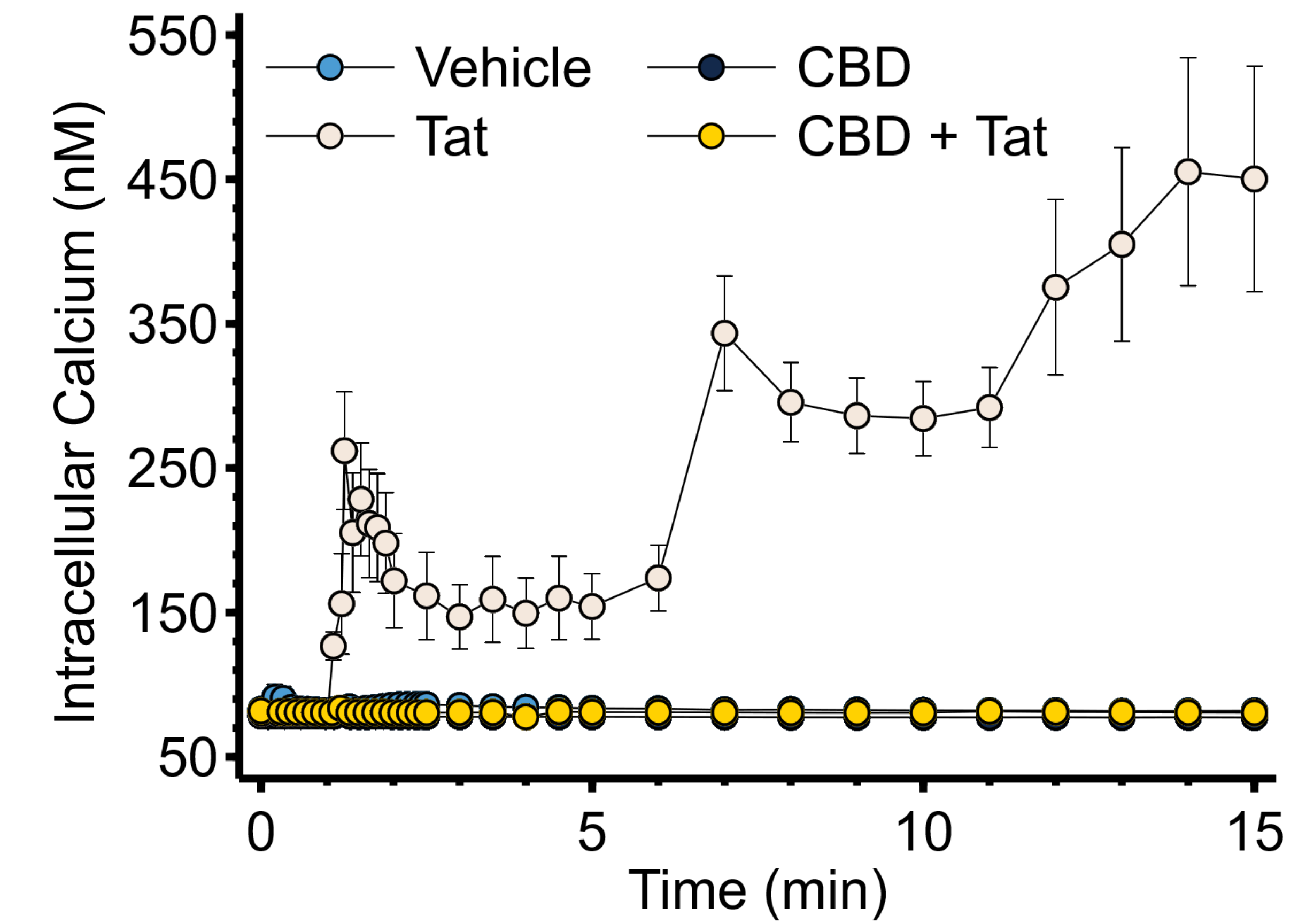
Methods

- Behavioral studies: Assessments of HIV Tat (via inducible transgenic mouse model) and CBD and THC (via acute injections) on:
 - Cognition (novel object recognition)
 - Anxiety (elevated plus maze)
 - Pain (tail flick and hot plate)
 - Motor function (rotarod and locomotor activity)
- Cell culture studies:
 - Primary culture microglia (DIV-14) were treated with vehicle, CBD, and/or Tat for 24 hours.
 - Extracted media was applied to primary culture neurons (DIV-21).
 - Neurotoxicity was measured by intracellular calcium influx.

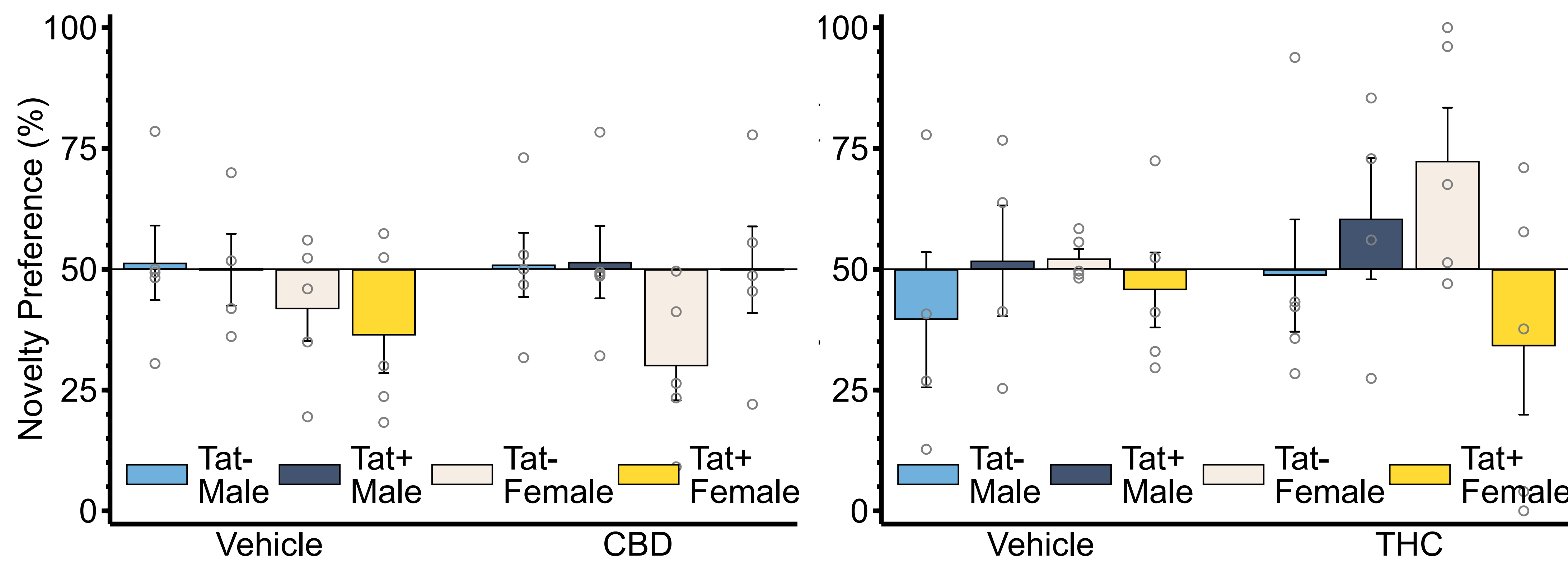
Discussion

- Possible lack of success of novel object recognition protocol.
- Cannabinoid findings complicated by effects on locomotion.
- Complex sex effects observed in anxiety.
- Surprising Tat antinociception; mirrored by literature suggesting Tat-induced neuronal dysfunction in the short term.
- Unlike opioid effects, THC is independent of Tat-related reductions in analgesic efficacy.
- Highly intriguing *in vitro* results; CBD completely eliminated Tat-induced, microglia-mediated neurotoxicity in a very small sample size. More investigation is needed.

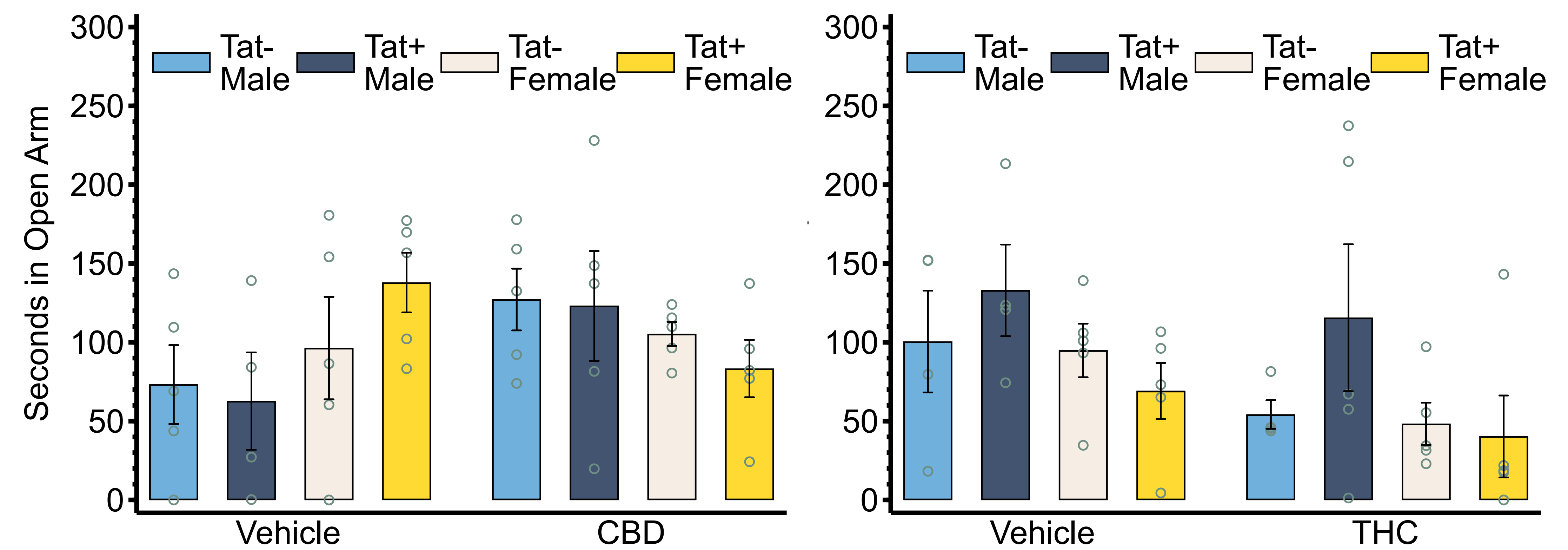
CBD Eliminated Tat Toxicity



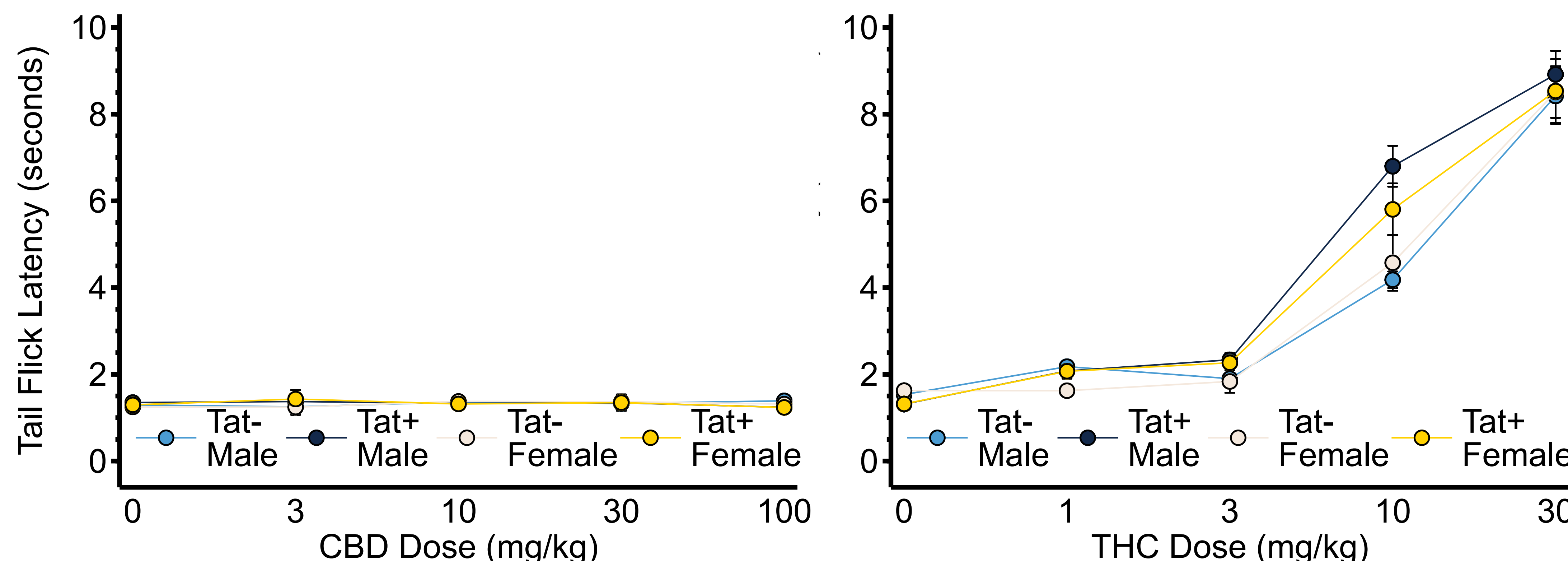
Possible Sex Differences in Cognitive Function



CBD May Be Anxiolytic; THC May Be Anxiogenic



THC, Male Sex*, Tat Diminished Pain



THC, Male Sex, Tat Diminished Motor Function

