**Pharmacological and Deep Brain Stimulation Treatments in a Rodent Model of Post-Traumatic Stress Disorder**

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**1. Introduction**

- Post-Traumatic Stress Disorder (PTSD) has a lifetime prevalence of about 7.8% (Kessler et. al., 1995).
- SSRI's are the most commonly prescribed drug treatments for PTSD with a full remission rate of 20-30% (Berger et. al., 2000).
- Deregluation of the amygdala (Liberzon and Sripada, 2007) and decreases in baseline dopamine (Corral-Frias et. al., 2013) have been identified as neuropsychological changes in animal models of PTSD.
- Oxytocin (OXT) has been shown to reduce baseline anxiety in fear-potentiated startle paradigms (Missig et al., 2010).
- Nicotine (NIC) and OXT are known to interact with the dopaminergic system (Yin and French, 2000; Baskerville et. al., 2015).
- Deep Brain Stimulation (DBS) has emerged as a viable treatment for diseases such as depression in humans and has been shown effective in a rodent model of PTSD (Langevin, et. al., 2010).

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**2. Methods**

**Pharmacological experiments**

- Sham-DBS
- DBS experiments

**A. Effect of Nicotine**

**Chronic Nicotine Increases Long Term Anxiety**

**Time Spent in Shock Side during Situational Reminders**

- Nicotine (n = 9) vs. Saline (n = 7)
- * = p < 0.05

**B. Effect of Oxytocin**

**7-Day Chronic Oxytocin Administration Increases Anxiety in BWBox Test**

- Time Spent in Shock Side

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**3. Results**

**A. Effect of Nicotine**

- Chronic Nicotine Increases Touch Sensitivity, But Not Pain Sensitivity

**C. Effect of DBS of the Amygdala**

**Time-lapse of Ball-Burying Behavior**

**Placement of DBS Electrodes**

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**4. Conclusions**

- Avoidance of the shock compartment is increased by chronic nicotine suggesting its possible role in memory consolidation.
- Chronic nicotine increases long term anxiety in the BWBox test but not in the open field test.
- Acute administration of OXT immediately after reactivation of the traumatic context may block memory consolidation, and decrease long term anxiety. Chronic OXT post trauma but not during trauma reduces anxiety.
- Chronic Oxytocin affects touch but not pain sensitivity.
- DBS immediately after trauma causes a lasting reduction in anxiety, even after DBS has ceased.
- The DBS effect can be delayed and still cause reduction in anxiety.
- DBS affects cue-related anxiety, while paroxetine affects general anxiety.

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**5. References**

[References are not included in this text, but are typically found at the end of the document.]

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