Time-dependent effects of systemic muscimol on extinction (EXT) of a conditioned taste aversion (CTA)

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Abstract
Systemic muscimol (1.0 mg/kg, i.p.) administered during extinction (EXT) of a conditioned taste aversion (CTA) does not significantly change spontaneous recovery of the aversion.

Introduction

Extinction: Clinical Implications for Exposure Therapy

Conditioned aversion to saccharin resulting from taste pairing with a mildly noxious drug (LiCl) is a model system for studying extinction (EXT), since extinction is a successful component of exposure therapy (cf. Hackett, 1989). Research on EXT has been reviewed (e.g., Davis & Myers, 2002) and extensively studied (e.g., Leslie, 2004).

Block the taste memory itself

GABA receptor blockade may:
- Block the taste memory itself
- Have direct effects on EXT memory formation. Continuing studies are needed to assess the importance of this mechanism in the case of CTA.

Various procedures have been used to examine the process of EXT.
- Extinction trials, the effect was not immediately seen.
- CTA extinction trials began after CS re-exposures (see also Akirav, 2004).

During CTA extinction

Research demonstrating the effects of systemic muscimol (1.0 mg/kg, i.p.) administered during extinction of a CTA reveals a significant treatment effect [F (2,28) = 4.698, p < 0.001].

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Methods

Subjects:
- Subjects were male Sprague-Dawley rats weighing 300–400 g at the beginning of the experiment. They were housed in standard conditions (12 h light-dark cycle, food and water ad libitum) and were naive to the taste stimuli.

Group Designations and Procedures:
- Explicitly Unpaired group
- Muscimol as US group
- CTA Groups:
  - CTA + EXT (SAC then musc)
  - CTA + EXT + SR
  - CTA + EXT + SR

Extinction times for rats in the muscimol-treated groups.

Results

Saccharin drinking decreased significantly in the muscimol-treated groups.

Muscat (1.0 mg/kg, i.p.) does not act as an Unconditioned Stimulus and produces a CTA.

Saccharin drinking was significantly lower in the rats that had SAC before muscimol administration.

Saccharin consumption during EXT and SR revealed a significant interaction between Treatment and Trial [F (4,44) = 10.530, p < 0.001].

Summary and Conclusions

The GABA agonist muscimol can impair extinction of a CTA.

This phenomenon depends on the timing of the drug administration relative to CS re-exposures (see also Akirav, 2004).

The data are not consistent with the explanation that muscimol is indeed acting as a US (see Figure 2, above).

Muscimol given during extinction does not currently alter B of the CTA.

The exact mechanism by which muscimol fails EXT is currently unknown.

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References


