CDP Increases and Alters Taste Palatability across Specific Tastants in Rats

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Introduction

"What it comes down to is you have to find out what reaction they're looking for, and you give them that reaction."

- Anti-anxiety drug CDP, Benzodiazepines, and GABA
- CDP and other benzodiazepines heighten the hedonic value of food.
- Benzodiazepines alter taste palatability and lead to hyperphagia and weight gain
- Benzodiazepine receptor agonists and antagonists
- CDP may alter taste palatability

Our Study…

- Previous Studies: Berridge and Treit (1986), Parker (1991), and Miller, McGinnis, and Richardson (2008) explore primarily sweet tastants, as well as some salty and bitter.
- Miller, McGinnis, and Richardson (2008) presented food over long periods of time; our study hoped to demonstrate the direct effects of CDP on taste palatability in short 15 second trials.
- Measure the effects of CDP on eating habits, consumption, and palatability of tastants saccharin, monosodium glutamate (MSG), ethanol, and capsaicin in Sprague-Dawley Rats.

Our Study…

"IF WE DIDN'T DO SO WELL IN THE EASY BOX, THEY WOULDN'T HAVE GIVEN US THIS COMPLICATED BOX."

- Saccharin and MSG: The Sweet and Salty as observed in Miller et al. (2008) and Parker (1991)
- Capsaicin: a Trigeminal Nerve Irritant, non-taste-mediated
- Ethanol: Soderpalm and Hansen (1998)
- Hypotheses: Saccharin, MSG, and Ethanol: Taste-mediated increases in palatability
- Capsaicin: No significant changes.

Methods

❑Animal Subjects

- Sprague-Dawley Rats
- 3 Phases
- Light/Dark Cycle
- Water Restriction

❑Chemical Stimuli

- Saccharin (2.5, 5, 10, 50 mM)
- MSG (0.1, 0.3, 0.5, 1.0 M)
- Capsaicin (5, 10, 15, 30 uM)
- Ethanol (2%, 4%, 8%, 12%)
- Water

Methods: Behavioral Procedure

❑ Phase I

- Davis Rig Measures Licking 15-s Trials
- Counterbalanced Schedule for Injections and Stimulus Presentations

Rat1	Water	MSG	MSG	Cap.	Cap.	Water
Rat2	Water	MSG	MSG	Cap.	Cap.	Water
Rat3	Water	Cap.	Cap.	Sac.	Sac.	Water
Rat4	Water	Cap.	Cap.	Sac.	Sac.	Water
Rat5	Water	Sac.	Sac.	EtOH	EtOH	Water
Rat6	Water	Sac.	Sac.	EtOH	EtOH	Water
Rat7	Water	EtOH	EtOH	MSG	MSG	Water
Rat8	Water	EtOH	EtOH	MSG	MSG	Water

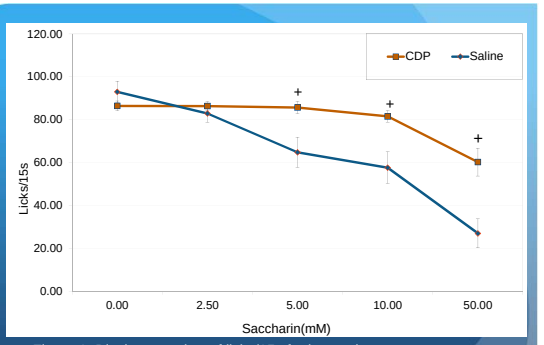


Figure 1. Displays number of licks/15s for increasing concentrations of saccharin in Phase 1 water-deplete trials. Significant drug effects for specific concentrations are indicated by cross (p<0.05) or star (p<0.01).

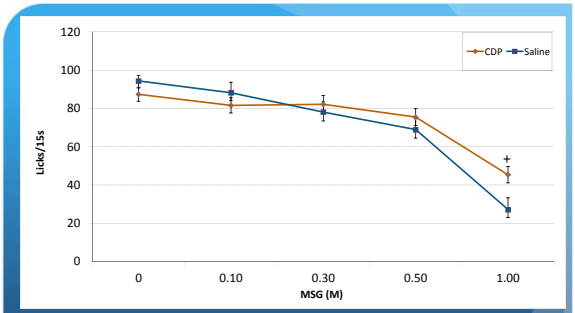


Figure 2. Displays number of licks/15s for increasing concentrations of MSG in Phase 1 water-deplete trials. Significant drug effects for specific concentrations are indicated by cross (p<0.05) or star (p<0.01).

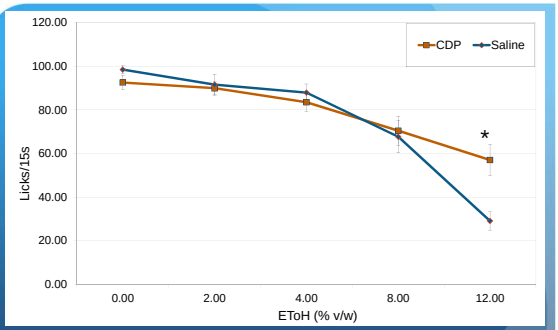


Figure 3. Displays number of licks/15s for increasing concentrations of ethanol in Phase 1 water-deplete trials. Significant drug effects for specific concentrations are indicated by a star (p<0.01).

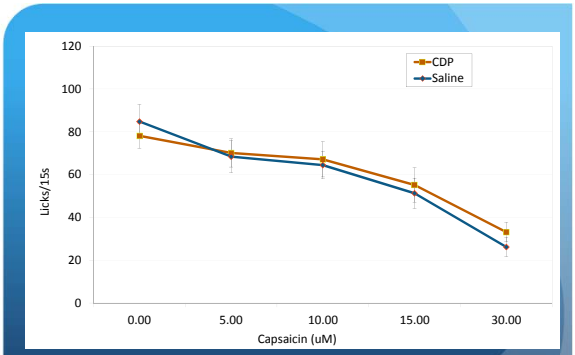


Figure 4. Displays number of licks/15s for increasing concentrations of capsaicin in Phase 1 water-deplete trials.

Methods

- ❑Phase 2
  - Water Replete Testing:
  - Tested at start of active dark phase 2 A.M to 2 P.M. Light/Dark Cycle
  - Removed water 4hrs before testing Saccharin and MSG at all concentrations
  - After 4 days of testing: Ceiling effect
- ❑Phase 3: Replicate with water removal 30 minutes prior to testing

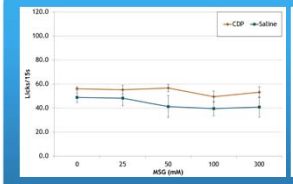


Figure 5. Displays number of licks/15s for increasing concentrations of MSG in Phase 2 water-replete trials.

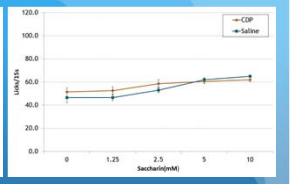


Figure 6. Displays number of licks/15s for increasing concentrations of saccharin in Phase 2 water-replete trials.

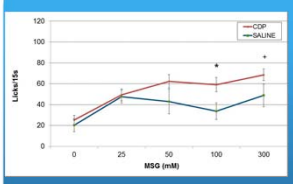


Figure 7. Displays number of licks/15s for increasing concentrations of MSG in Phase 3 water-replete trials. Significant drug effects for specific concentrations are indicated by a cross ($p<0.05$) or a star ($p<0.01$).

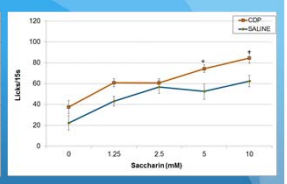


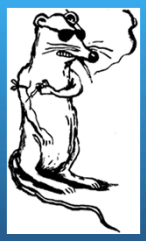
Figure 8. Displays number of licks/15s for increasing concentrations of saccharin in Phase 3 water-replete trials. Significant drug effects for specific concentrations are indicated by a cross ($p<0.05$).

Discussion

- CDP reduces licks to saccharin, MSG
  - Highest concentrations only
- No effect of CDP on aversiveness of capsaicin solution at any concentration
  - Contrary to criticism that CDP would reduce aversion to negative stimuli in general
- CDP causes increase in average number of licks to highest concentration of ethanol
  - Consistent with prediction that CDP would have a more pronounced effect on ethanol than capsaicin

- CDP caused increased ingestion of typically aversive tastants
  - Improves overall palatability of tastants
  - Did not have this effect on ingestion rates of capsaicin or water – Why?

Water replete testing



- Determined if thirst due to water deprivation caused increased number of licks to aversive stimuli
- Results indicated that rats with free access to water show similar increase in licks to aversive stimuli
- Pattern of increased licks to higher concentrations

Future Research

- Different doses of CDP
- Directly inject CDP into PBN
- Effects of GABA antagonists in conjunction with CDP
- Practical implications?