CDP Increases and Alters Taste Palatability across Specific Tastants in Rats

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Introduction

- 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.

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., E1OH, E1OH, Water
  - Rat6: Water, Sac., Sac., E1OH, E1OH, Water
  - Rat7: Water, E1OH, E1OH, MSG, MSG, Water
  - Rat8: Water, E1OH, E1OH, MSG, MSG, Water
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 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 concentration 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?

Future Research

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

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