

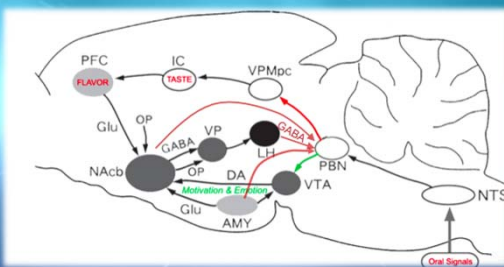
The Role of Central Amygdala Projections to the Parabrachial Nucleus on Ingestive Behavior in Rats

Isaiah Addison, Rebekah Bowie, Taylor Hall, and Bailey King

GABA / Benzodiazepines

- GABA modification alters taste-guided behaviors of the parabrachial nucleus (PBN)
- Benzodiazepine agonists can lead to GABA_A receptor hyperpolarization
 - Chlordiazepoxide (CDP)
- Hyperphagia

Taste Pathway



Previous Study

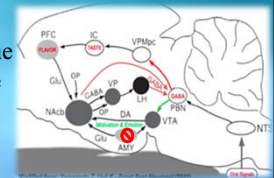
- Evaluated the effects of the lateral hypothalamus
- No attenuation of benzodiazepine's effect
 - No change in motivation
- Analysis of different brain areas

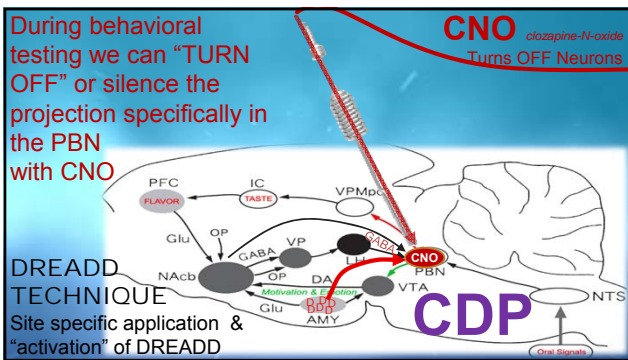
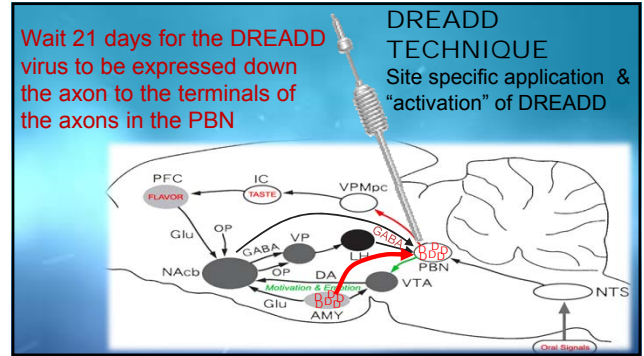
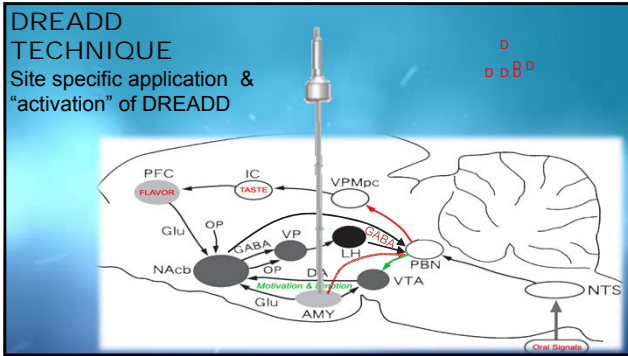
Designer Receptor Exclusively Activated by Designer Drugs (DREADDs)

- Viral technique
- Selectively activates or inhibits neurons when a specific ligand binds
- Receptors activated by clozapine N-oxide (CNO)
- Allows for the identification of pathways and their functions

What Do We Expect To Find?

- Selectively inactivating the CeA using DREADD technique will attenuate the effects of the benzodiazepine agonist
- No significant differences between conditions:
 - Saline + aCSF (control)
 - CDP + CNO (experimental)



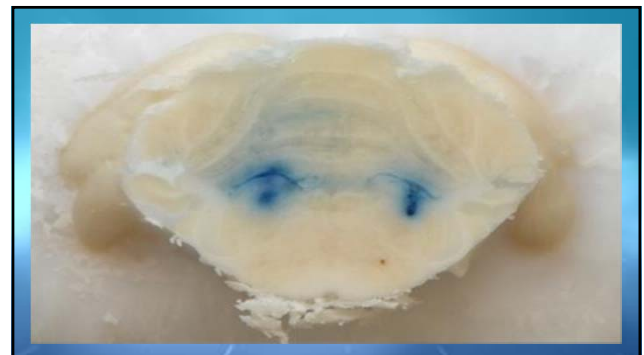


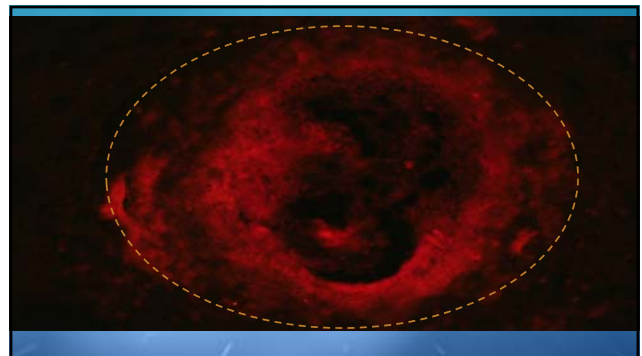
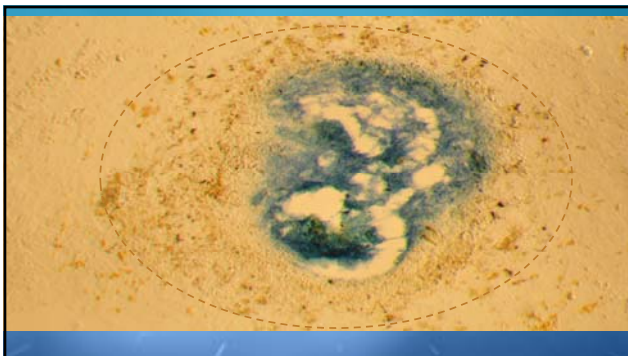
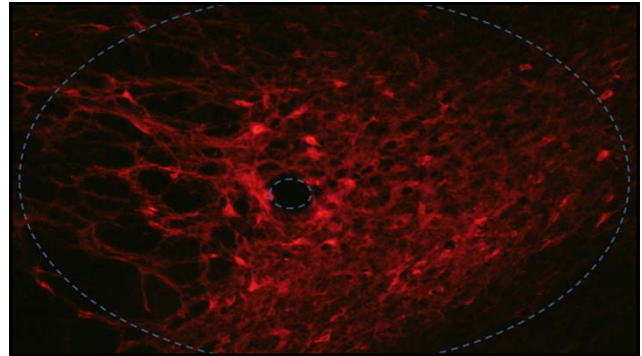
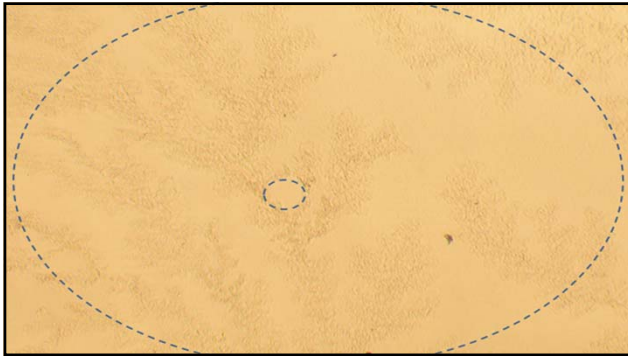
Long Term Testing

- CDP or saline IP injections on alternating days
- Microinjections of either CNO or aCSF
- Unrestricted access to sucrose or NaCl solutions
- AC-108 Lickometer

Histological Verifications

- Sectioning
- Staining
 - Crystal violet
 - Immunocytochemistry/fluorescence
- Verification





Long Term Testing (1h) AC-108 Lick Pattern Analysis

- Meals: group of licks defined by 10 minute break
- Burst: group of licks defined by 2 second pauses
- ILI less than 250 ms: pause that is less than 250 ms
- First minute licks: the number of licks in the first minute of the session
- Percent ILI above 250 ms: pauses that fall between 250 and 1000 ms

Timeline diagram showing lick patterns over a 60-minute session. It includes labels for 'Licking to Meal', 'Lick Burst', 'Pause', 'Meal Terminated Break <math>< 10\text{ min}</math>', and 'Meal Terminated Break $> 10\text{ min}$'. The session starts at 0 min and ends at 60 min.

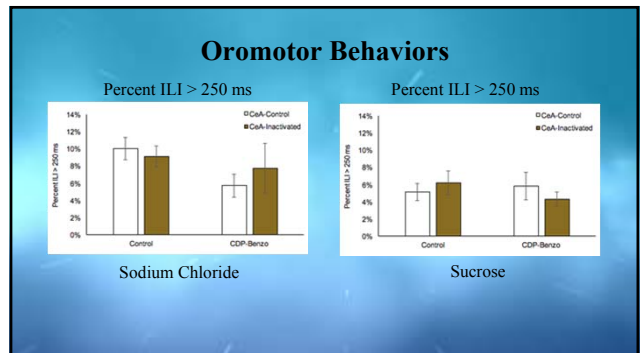
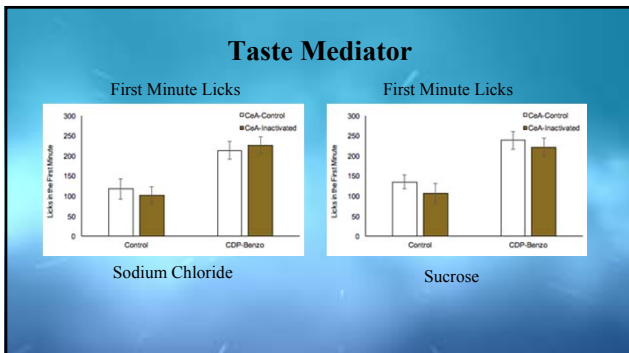
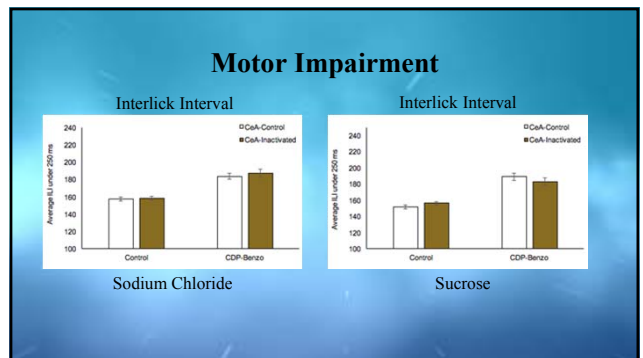
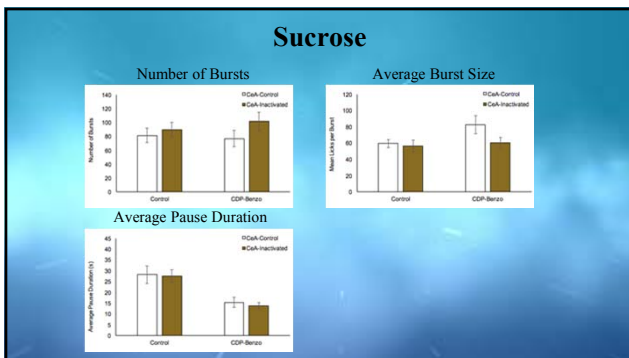
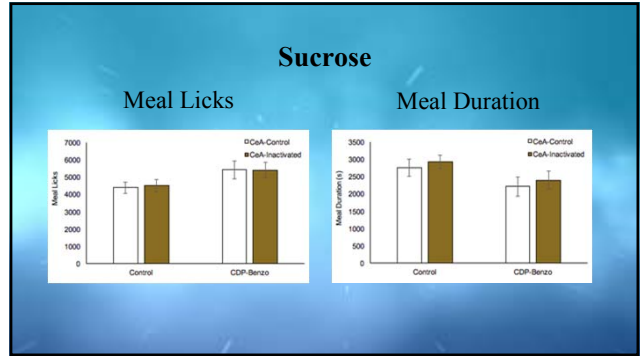
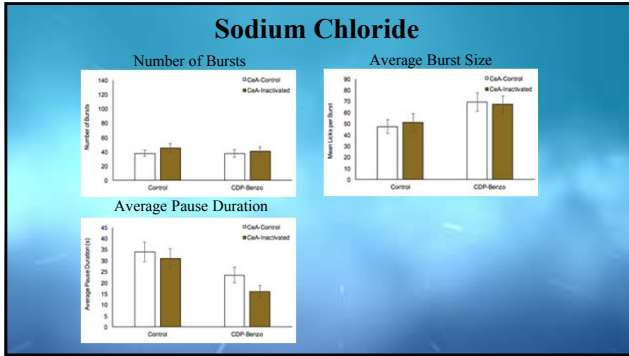
Sodium Chloride

Meal Licks

Group	Meal Licks
Control	~1500
CDP-Benzo	~2000

Meal Duration

Group	Meal Duration (ms)
Control	~1500
CDP-Benzo	~1000



Discussion

Goal of current study:

- Examine the role of the CeA through the selective inactivation of the CeA, in regards to taste and motivation

Summary

Summary of current study:

- Saline compared with CDP when not activating CeA replicate previous findings
- Inactivation of the CeA had no major effects on the lick variables, but other areas may compensate when it is inactivated to continue allowing the rats to lick

Conclusions

- CeA not the only GABAergic projection to the PBN and inactivation did not produce significant change on licking behavior, but showed some signs that it is involved in palatability
- Currently verifying histology of PBN/CeA

Future Studies

1. Inactivate multiple/all GABAergic projections to PBN
2. Selectively re-activate certain pathways
3. Use the DREADD that excites neurons to activate them in the absence of CDP

Special thanks to...



Dr. Pittman

Alex Brantly

Kassie Franck

NIDCD (R15DC012195)

Funding