

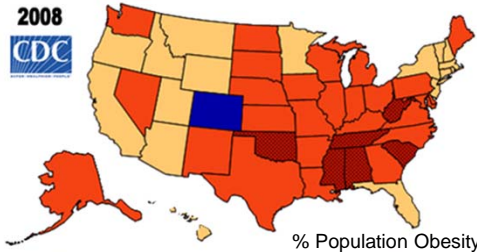
D-AP5, a chemical which suppresses receptor activity, injected into the lateral hypothalamic area of the brain reduces feeding behavior in foraging rats.



Lauren Jamison, Jonathan Hufford, and Richard O'Neal
Representing Bio 250 Introduction to Research
Instructed by Dr. Stacey Hettes

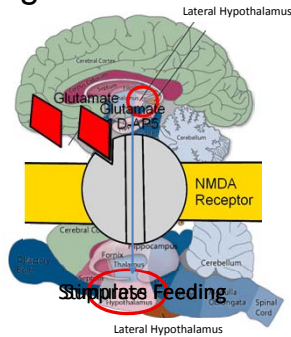
Why should YOU care?

- \$344 billion (2018)
 - 103 million (2018)
- ~Thorpe, 2009



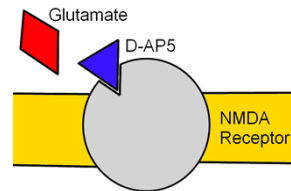
What's happening in the brain?

- Lateral Hypothalamus
 - Glutamate
 - main excitatory NT
 - Glutamate and its agonists in LH → feeding
 - NMDA receptor
 - D-AP5 = antagonist
 - in LH suppresses feeding (75%)
- Stanley et al. 1996



What is our hypothesis?

D-AP5, by acting as an antagonist on LH NMDA receptors, will suppress feeding behavior in food-deprived rats in a controlled foraging environment.



Why a foraging environment?

- Will D-AP5 effectively reduce feeding in a foraging environment?
 - Optimal Foraging Theory
 - Costs vs. Benefits
 - Predation vs. Energy
- ~Arcis and Desor, 2003



Methods

What was our model?

- Subjects
 - 17 Adult, Male Sprague-Dawley rats
- 350-400g initial weight
- Rat condominium
- 12 hour light/dark cycle
- Rat chow and water



How did we collect the data?

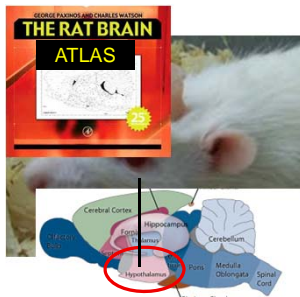
Time (min)	Eat	Drink	Groom	Loc	Rear	Alert	Rest
-10						✓	✓
-9					✓	✓	
-8			✓	✓		✓	
-7					✓	✓	
-6						✓	✓

- Percentages of behavior averaged over 5 minute intervals
- Recorded
 - Latency to feed
 - Food Mass at 30 minutes and 60 minutes
- ANOVA & Student-Newman-Kuels Post-Hoc Testing

- ✓ Eating
- ✓ Drinking
- ✓ Grooming
- ✓ Locomotion
- ✓ Rearing
- ✓ Alert
- ✓ Resting

Latency to Feed: _____ [time (min)]

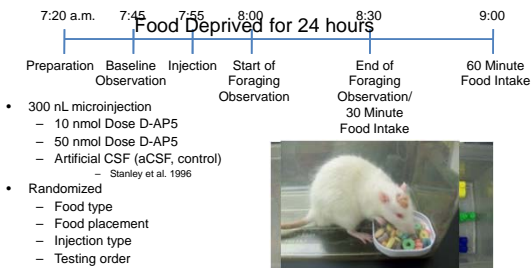
How did we target the LH?



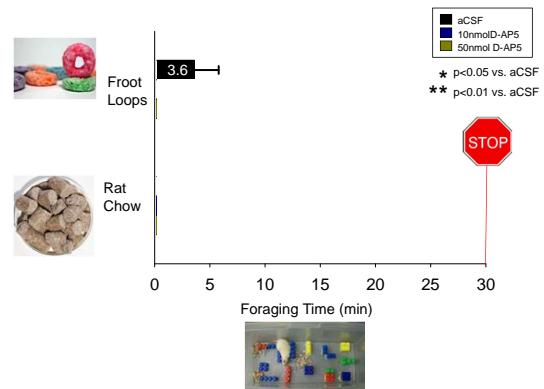
- Stereotaxic surgery
- Cannulas into LH
- Protective cap
- At least 1 week recovery

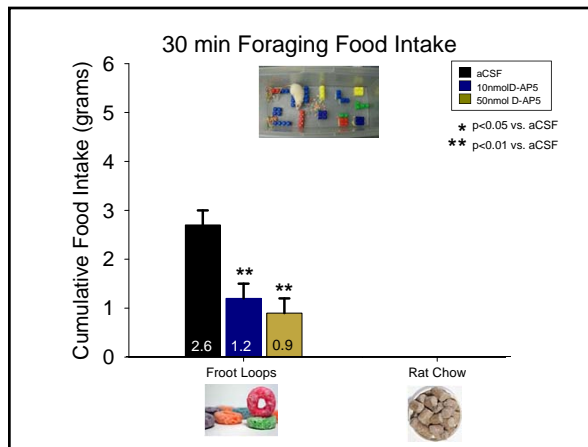
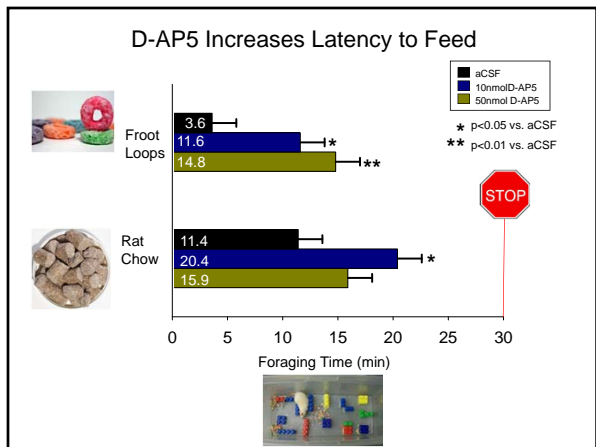
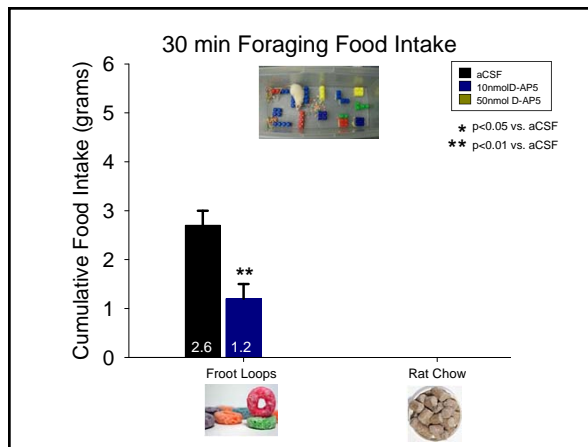
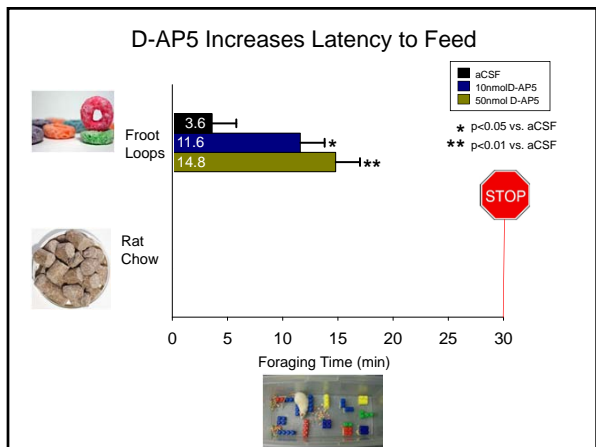
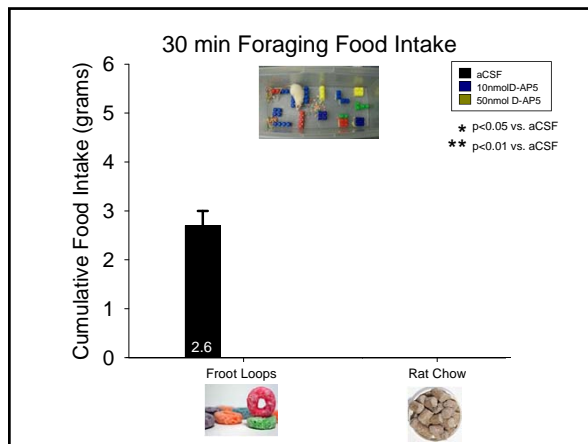
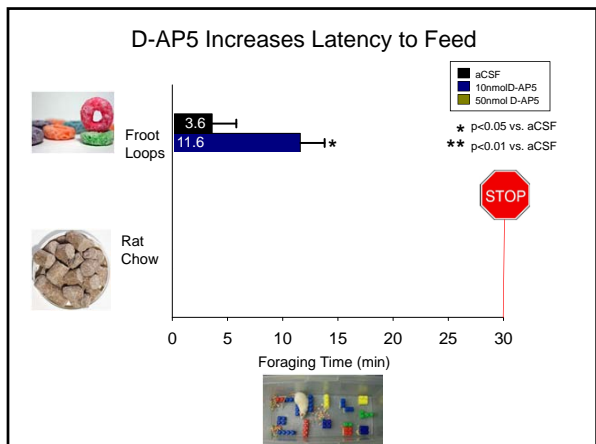
Results

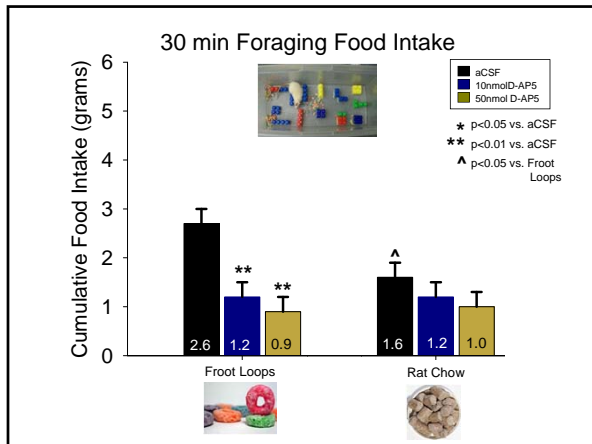
What was the experimental paradigm?



D-AP5 Increases Latency to Feed

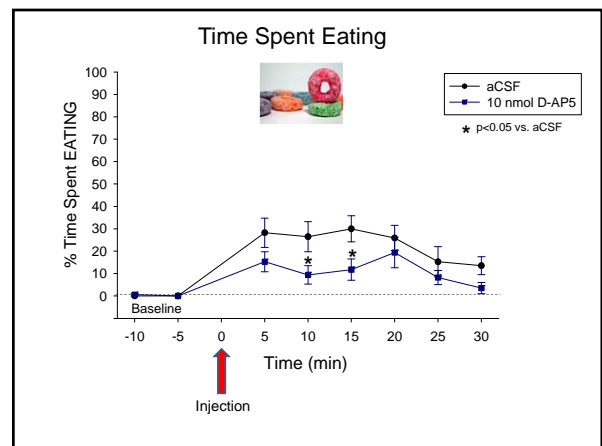
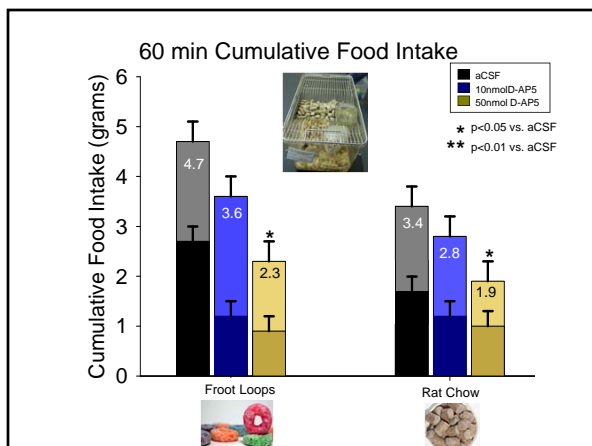
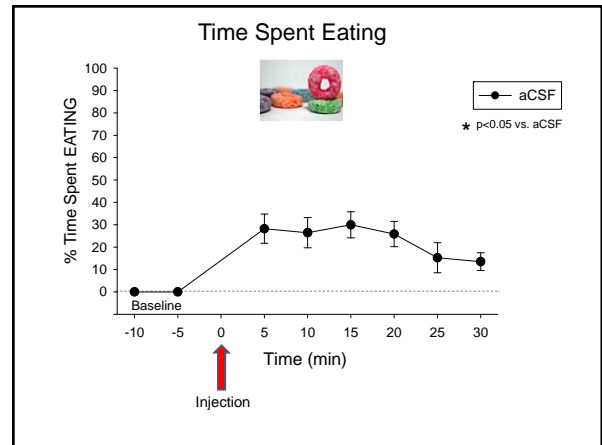
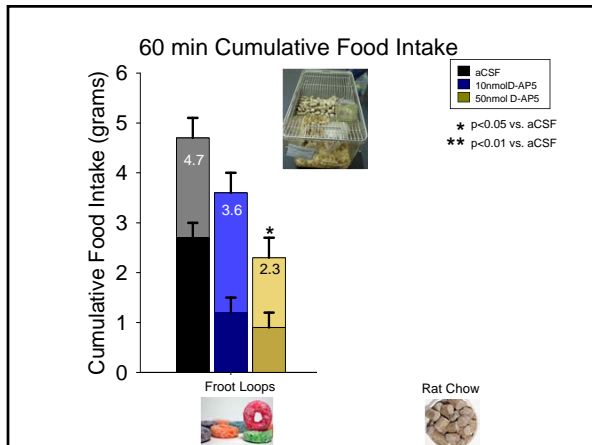


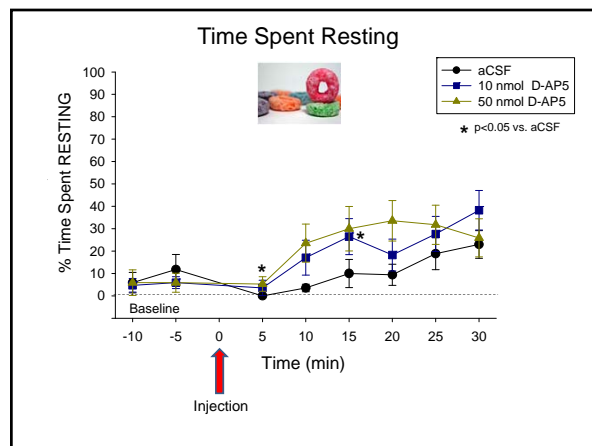
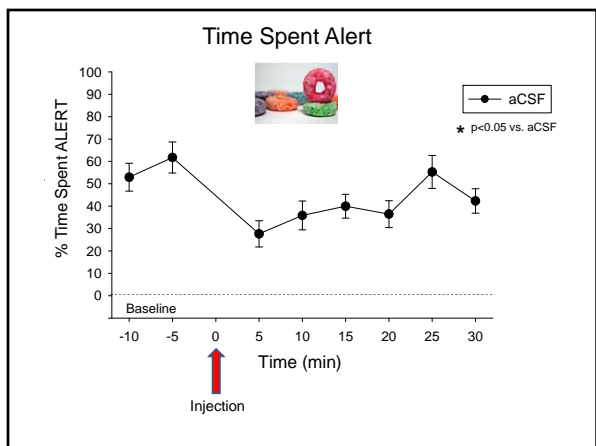
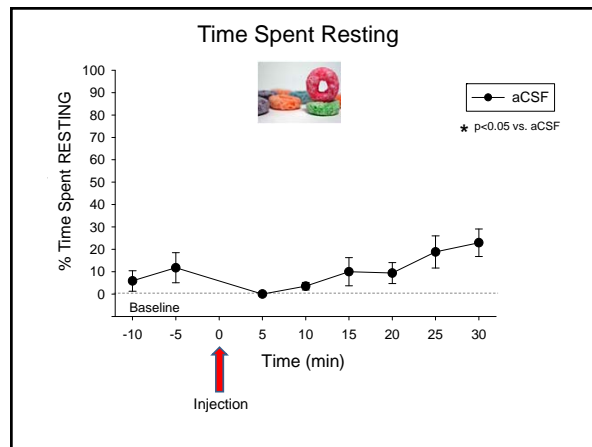
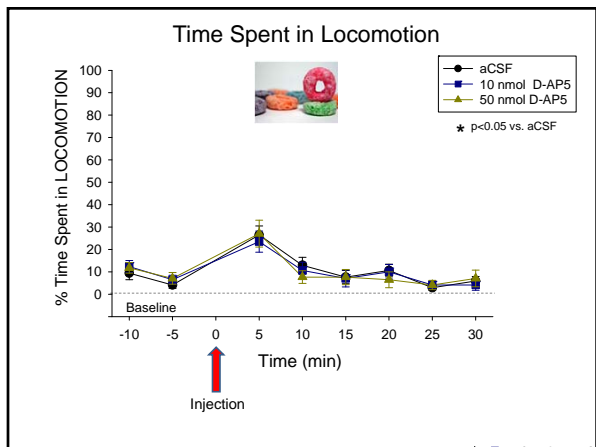
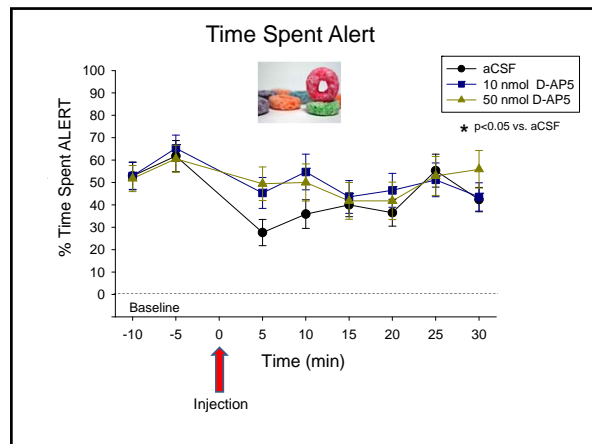
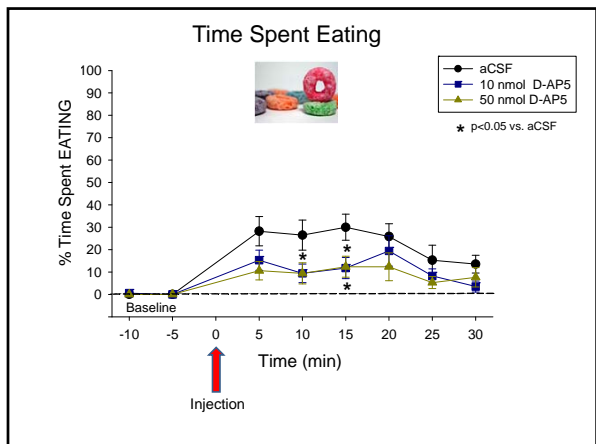


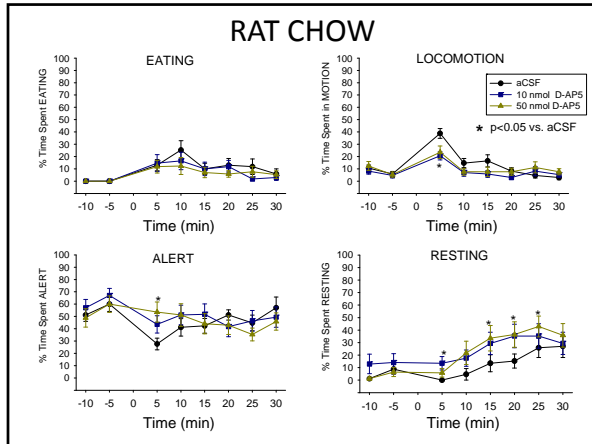


Summary of Food Intake

- D-AP5 injected rats had an increased latency to feed
- D-AP5 injected rats showed decreased Froot Loops intake
- aCSF injected rats ate more Froot Loops than Rat Chow







Conclusion

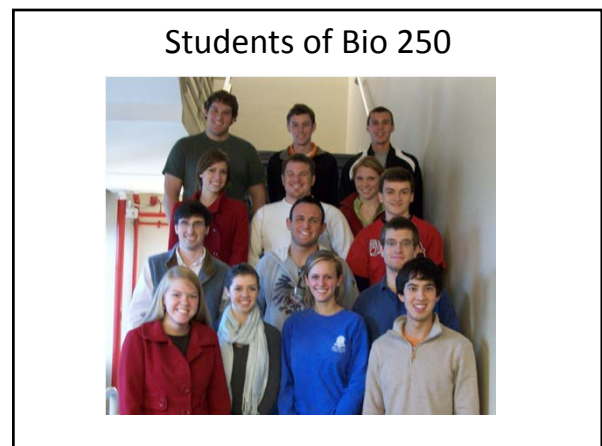
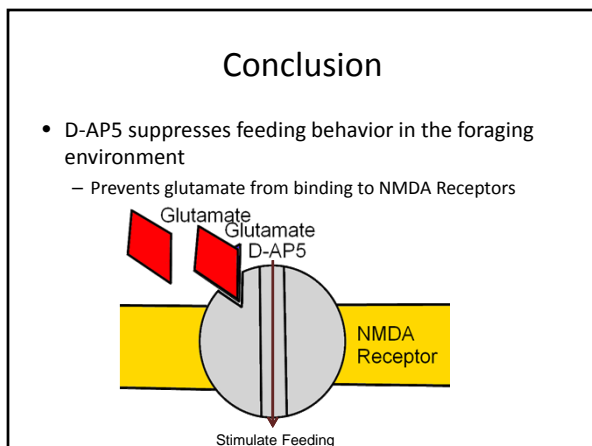
- Food Type:
 - Froot Loops and Rat Chow have different palatabilities
 - Hettes et al, 2005*
 - Resulted in differences in behavior
- Behaviors:
 - Because D-AP5 injections resulted in less time feeding, more time was spent alert or resting.

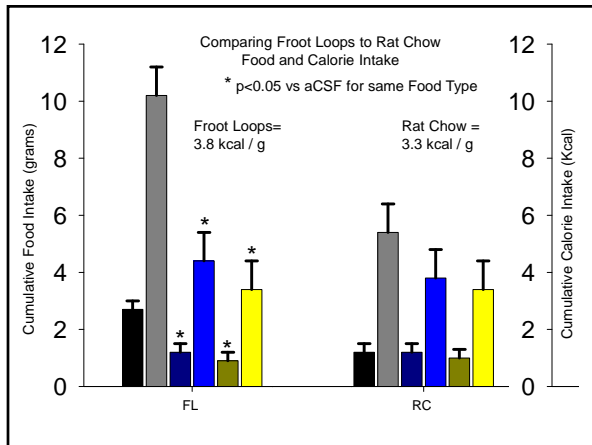
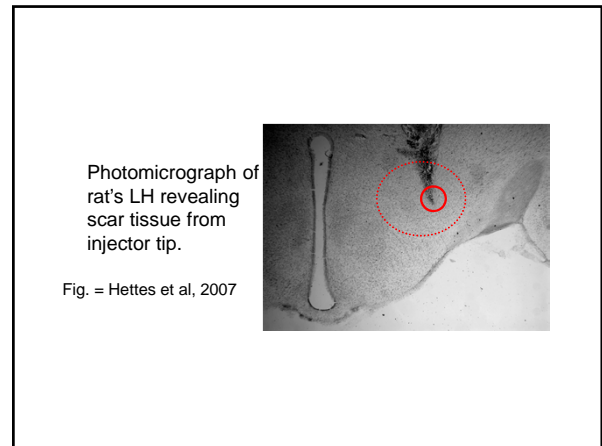
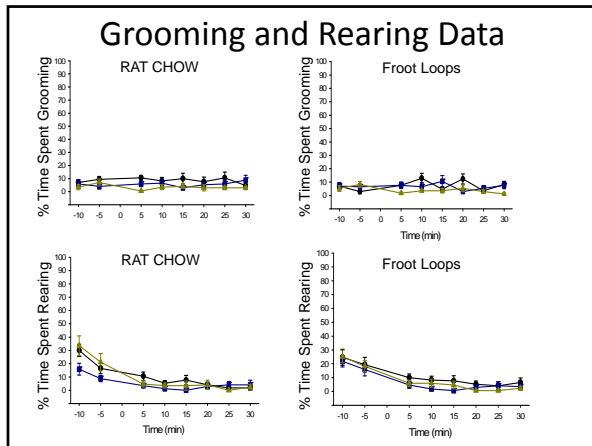
Summary of Behavior

- D-AP5 injected rats:
 - Less time eating
 - More time alert and resting
 - Less time in motion when offered rat chow
- Results are consistent with the Optimal Foraging Theory (Arcis and Desor, 2003)

Conclusion

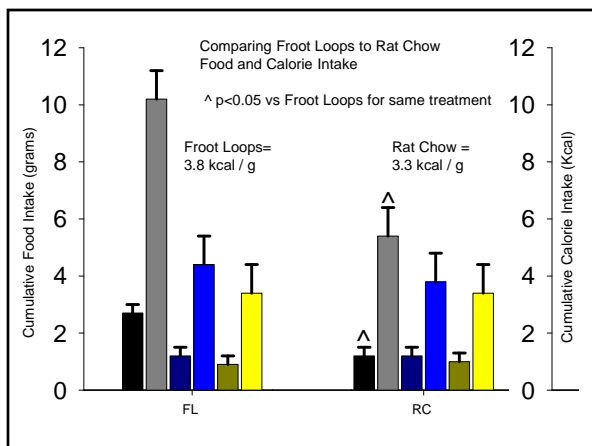
- Foraging Environment:
 - Served as a closer approximation to an actual rat environment
 - Paradigm will be used in future research at Wofford College





Stereotaxic Surgery Questions

- Maintain clean antiseptic parameters
- Prepare rat for surgery
 - Anesthetize
 - Shave
 - Place in stereotax
- Disinfect with Betadine
- Make Midsagittal Incision
- Take medial/lateral coordinate measurements



Stereotaxic Surgery Continued

- Take dorsal/ventral coordinate measurements
- Drill skull
- Clean skull
- Insert and anchor anchor screws
- Place cannulas
- Secure cannulas dental acrylic.
- Clean cannulas

Stereotaxic Surgery Continued

- Place protective cap and anchor
- Insert obdurators
- Recovery

