By: Steven Nim
Dr. Gorman
PSYC 132
Our paper is about:
1) pubertal affects of hormones affecting the organization of the brain at adolescent
2) sensitivity to hormones during this time
3) ovarian hormones also play a role in female brains

Specific claim for hypothesis #3:
“Depending on the behavior, ovarian hormones during adolescence feminize (enhance female-typical attributes), masculinize (enhance male-typical attributes) or defeminize (suppress female-typical attributes) adult behavior. For example, food guarding is a sexually dimorphic behavior in rats, with males and females displaying different postural strategies for defending their food source (Field et al., 2004). Neonatal or pubertal ovariectomy significantly alters the defense strategy to be more “male-like”, whereas adult ovariectomy has no effect. Thus, these data suggest that ovarian hormones during the neonatal and / or adolescent periods actively feminize postural strategies for food defense. Another recent report...

- 32 female and 8 male Long-Evans rats (recorded robber’s movements to see if it has any effect – does not have any effect)

- Most conditions kept the same until adulthood:
  - Wired mesh cages
  - 12 hour light-dark cycle
  - 20 g/day feeding
  - During testing, made sure 80-85% body weight free of food, and 6 to 8 months old

<table>
<thead>
<tr>
<th>Female (8 rats each)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonatal ovariectomized (NOVX)</td>
</tr>
<tr>
<td>Prepubertal ovariectomized (POVX)</td>
</tr>
<tr>
<td>Sham surgery at prepuberty (Control)</td>
</tr>
<tr>
<td>Adult ovariectomized (AOVX)</td>
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1) **Difference of distance traveled by Pelvis to distance traveled by Snout** / Distance traveled by snout * 100 = percent difference. Males have a lower percent (more pelvis movement) than females.

2) Females orient snout towards robber’s midline. Males orient towards head.

3) Analyze hindpaw stepping pattern. Males take more steps.

Take average.

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- Male-like, female-like?

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2) Orientation of back to snout (male) or midline (female)

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3) Hindpaw analysis
Male-like, female-like?

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<td>Number of steps</td>
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<td></td>
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<tr>
<td>Direction of Steps</td>
<td>Male-like</td>
<td>50%</td>
<td>Female-like</td>
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- Same experiment, but with pregnant females to see if body weight changes movement (males and NOVX are significantly heavier than AOVX and normal females)
- Conclusion: body weight do not change dodging behavior \( \rightarrow \) OVARIAN HORMONES at prepubertal and especially, neonatal times changes a rat’s dimorphic dodging

- The use of the word “significant difference” – sample size of 32 too small to determine a significance difference between POVX and normal females

- Estrogen Receptors are not considered in this experiment (there are two types, ER alpha and beta, each affecting different rat behavior). Not knowing the exact mechanism can lead to false or partially false conclusion (activational or organizational?)
Genetically engineered animals

Lacking H or R
Overexpressing H or R

Ideal: ability to turn H or R on or off

Estrogen Increases Locomotor Activity in Mice through Estrogen Receptor α: Specificity for the Type of Activity

SONOKO OGAWA, JOHNNY CHAN, JAN-ÅKE GUSTAFSSON, KENNETH S. KORACH, AND DONALD W. PFAFF

Laboratory of Neurobiology and Behavior, Rockefeller University, New York, New York 10021; Department of Medical Nutrition, Karolinska Institute (U-A.G.), 141 86 Huddinge, Sweden; and Laboratory of Reproductive and Developmental Toxicology, National Institute of Environmental and Health Sciences (K.S.K.), Research Triangle Park, North Carolina 27709

Estrogens are known to increase running wheel activity of rodents primarily by acting on the medial preoptic area (mPOA). The mechanisms of this estrogenic regulation of running wheel activity are not completely understood. In particular, little is known about the separate roles of the two types of estrogen receptors, ERα and ERβ, both of which are expressed in mPOA. In female mice, estrogen treatment increases running wheel activity significantly more than in male mice. Both homozygous ERα−/− and wild-type female mice increase running wheel activity to the same extent, indicating that ERα is the estrogen receptor involved. In contrast, homozygous ERα−/− and heterozygous female mice exhibit significantly lower running activity compared with wild-type females. Before estrogen treatment, gonadectomized ERα−/− female were

Sonoko Ogawa, Johnny Chan, Jan-Ake Gustafsson, Kenneth S. Korach, and Donald W. PFAFF. "Estrogen Increases Locomotor Activity in Mice through Estrogen Receptor α: Specificity for the Type of Activity". Endocrinology 144(1):230-239.
Still prove that ovarian hormones had an effect during prepubertal and neonatal times even if complete knowledge of mechanism is still unknown

Peer review article has extremely in depth evidence to support a mechanistic claim (ovarian hormones affect puberty and prenatal periods)

However, evidence for immediate cause are easy to pile up for small mammals (the mechanism of how things happen). Hard to relate or apply to humans (humans are more complicated, and harder to create mechanistic experiments due to ethical reasons). What is the purpose, then, of animal studies? Quantity vs Quality.


3) Sonoko Ogawa, Johnny Chan, Jan-Ake Gustafsson, Kenneth S. Korach, and Donald W. PFAFF. “Estrogen Increases Locomotor Activity in Mice through Estrogen Receptor α: Specificity for the Type of Activity”. Endocrinology 144(1):230-239.