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GMO vs. Non-GMO: Comparing the Addictiveness of Corn in Rats

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GMO vs. Non-GMO: Comparing the Addictiveness of Corn in Rats

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STATEMENT OF THE PROBLEM

Background

- Genetically modified (GMO) corn accounted for approximately 88% of all corn consumed in the United States in 2012. The health and safety implications of GMO corn use remain a controversial topic.¹
- Addictive behavior has been demonstrated in as many as 47% of adults in the United States. The addictive substance could be anything from tobacco and alcohol to gambling, shopping, or sex. Studies have also demonstrated that eating can be an addictive behavior.²

Significance of the Problem

- Studies comparing the addictiveness of GMO corn to non-GMO corn have not been conducted.
- If GMO corn is found to be more addictive than non-GMO corn, the findings will be strongly implicated in the incidence of obesity and its associated pathologies in the United States.

OBJECTIVES

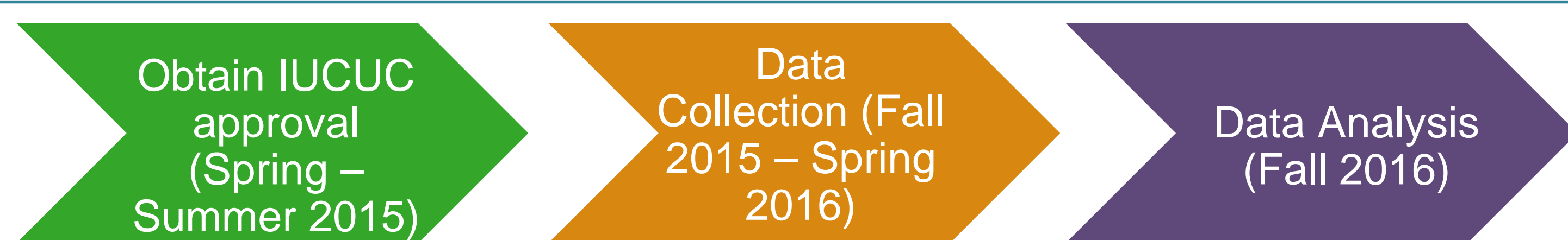
To compare the addictiveness between GMO corn and non-GMO corn in rats.

HYPOTHESES

Null Hypothesis: There is no statistically significant difference between the level of addictiveness between GMO corn and non-GMO corn in rats.

Alternative Hypothesis: GMO corn products are more addictive than non-GMO corn products in rats.

PROJECT TIMELINE



LIMITATIONS

- We are not identifying the specific chemical components of the corn molecule that lead to any differences in addictiveness.
- We are only assessing GMO corn and not other GMO products to see how addictiveness is affected by genetic modification in those other items.

FUTURE DIRECTIONS

- The purpose of this study is to provide exploratory framework for future dependency studies with GMO products.

ACKNOWLEDGEMENTS

We would like to thank Dr. Aleda Chen for her contributions to the design and future implementation of this research project.

PROPOSED METHODS

Study Design

- Controlled experimental physical dependency animal study

Sample

- Sprague-Dawley rats obtained from Harlan Laboratories and randomly assigned to 3 experimental groups
- Six weeks old at time of purchase
- The expected weight of the males will range from 225-275 grams and the weight of the females will range from 150-200 grams.

Data Collection

- Collection of cage food consumption and body weight data will begin during a 28 day treatment period during which each experimental group will be fed a pre-specified percentage of GMO corn (0%, 50%, and 100%).
- Behavioral changes, cage food consumption, and body weight changes for each of the 3 groups will be observed over the course of a 10 day withdrawal period immediately following the initial 28 day period. During this 10 day period, the rats will be fed a non-corn control feed.

Measurement

- Data will be collected during the treatment period to assess body weight and cage food consumption.
- Behavioral changes will be observed in an open field test. Signs of withdrawal are listed in the "Proposed Analysis" section.
- Each rat will be scored based on the withdrawal signs they exhibit.

PROPOSED ANALYSES

The table below lists the withdrawal symptoms to be measured.³ The presence of a symptom will be scored as a 1. The absence of a sign will be scored a 0. The scores will be totaled for each animal. The total scores will be compared using a repeated measures ANOVA test in SPSS.

Observations/Symptoms					
Wet dog shakes	Writhing	Teeth chattering	Convulsions	Increased muscle tone	Tail erection
Jumps	Twitches	Tremors	Struggling/vocalizing	Ptosis	Weight loss
Ataxia/posture change	Vocalization	Diarrhea	Piloerection	Increased startle response	Exophthalmos

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