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Testing the Impact of Prebiotics on Anxiety-like Behaviors in Aged Male Rats

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Introduction

There has been evidence of an increase in anxiety of older human populations, which is potentially due to dysregulation of gut-brain axis. This could lead to lower quality of life for older populations and testing of these effects are relevant because the United States average age is increasing. Rats have been used as a model for anxiety-like behavior in many experiments, and are thus established as a good species to test for late-life changes.

Prebiotics have the potential to give nutrients to healthy gut bacteria and promote beneficial microbiome populations. This research should help to give insight into potential supplements to sustain quality of life for the older population easily, through a prebiotic supplemented treatment.

Approach: FOS treatment was anticipated to reduce anxiety-like behaviors in elderly rats, and this hypothesis was tested through a series of behavioral assays.

Methods

Animals: Sprague Dawley Rats

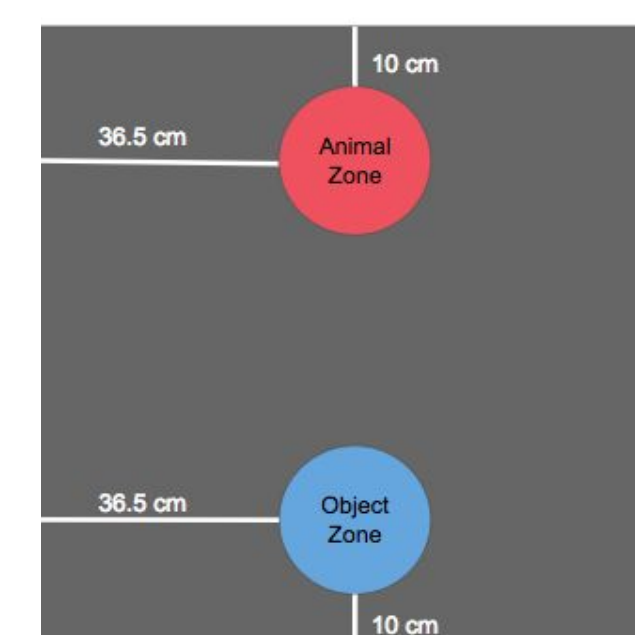
- 21 Subjects
- Male - 1 year old
- 12:12 light/dark cycle
- Water and food *ad libitum*

Treatment:

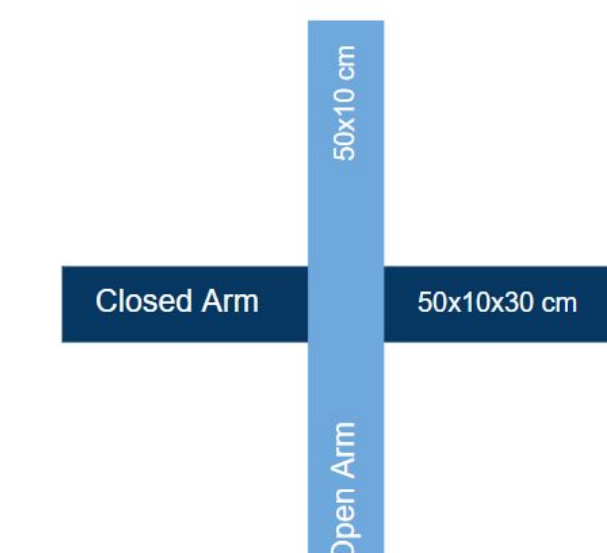
- 12 rats in FOS treatment group.
- Fructooligosaccharide (FOS) prepared at a concentration of 10.25g/L.
- Treatment induced three weeks prior to behavioral testing.



Open Field (10 min)



Social Anxiety (10 min)



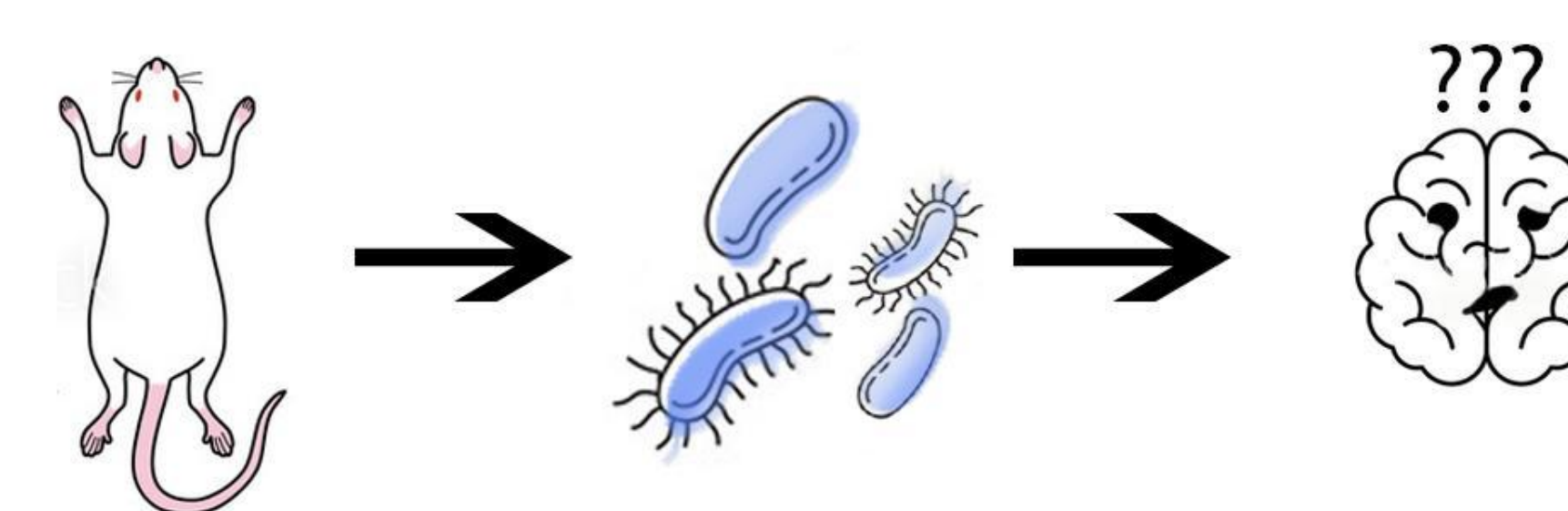
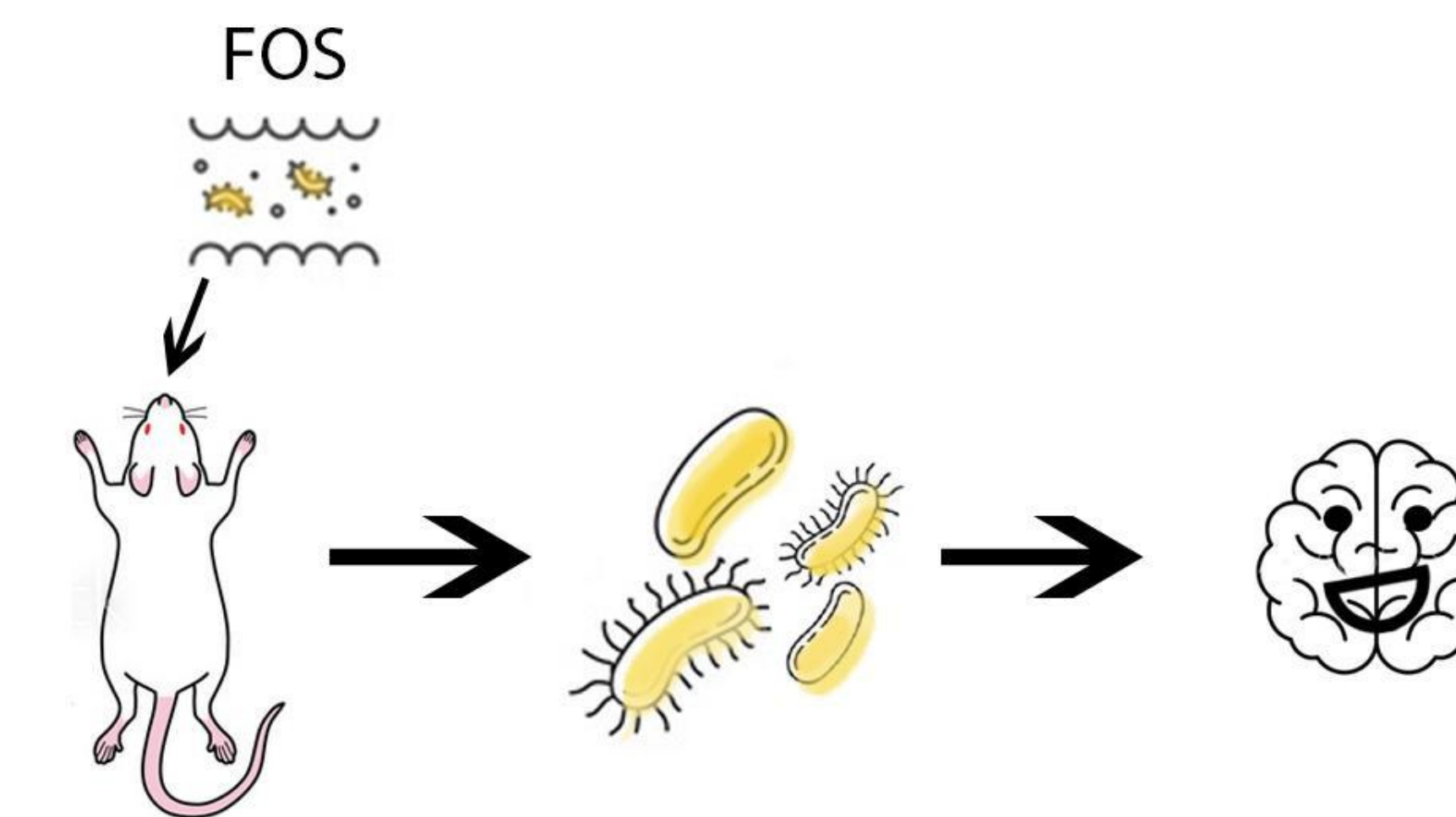
Elevated Plus Maze (5 min)



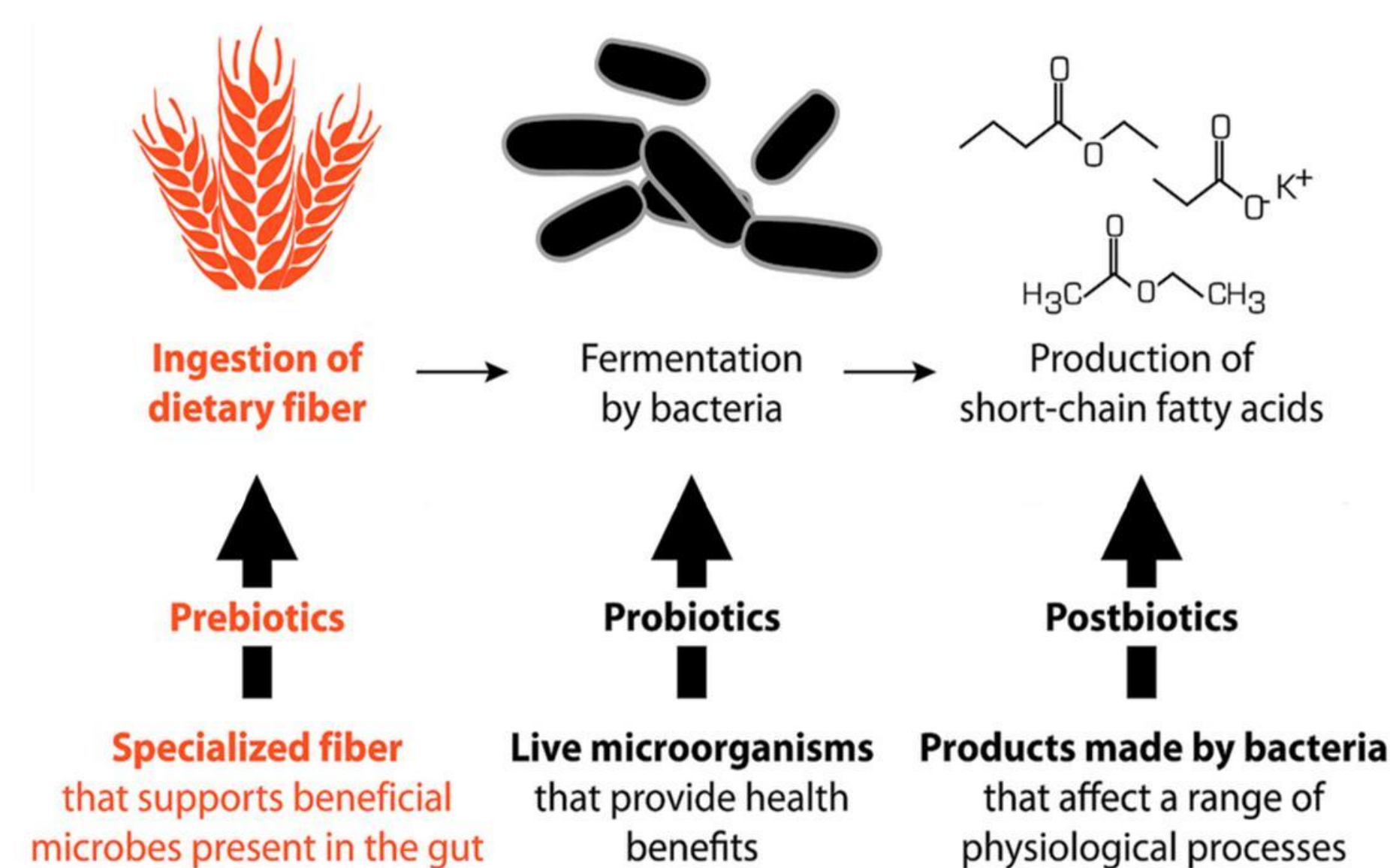
Nestlet Test (30 min)

Hypothesis Revisited

The results of these behavioral assays suggests that FOS impacts exploratory behavior.



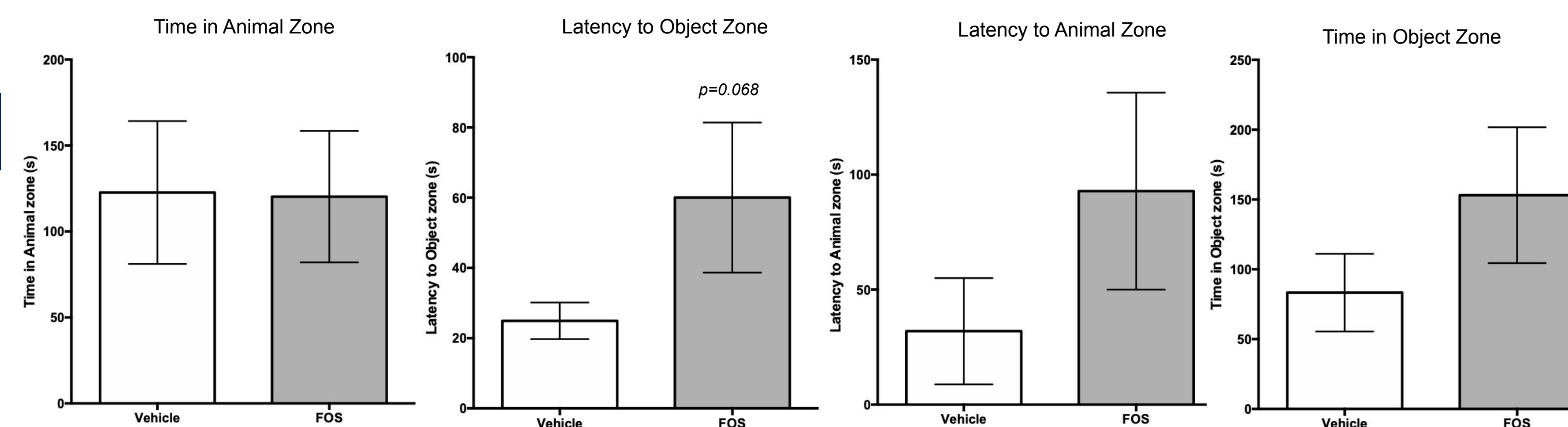
Pre- vs. Pro- vs. Post-biotic



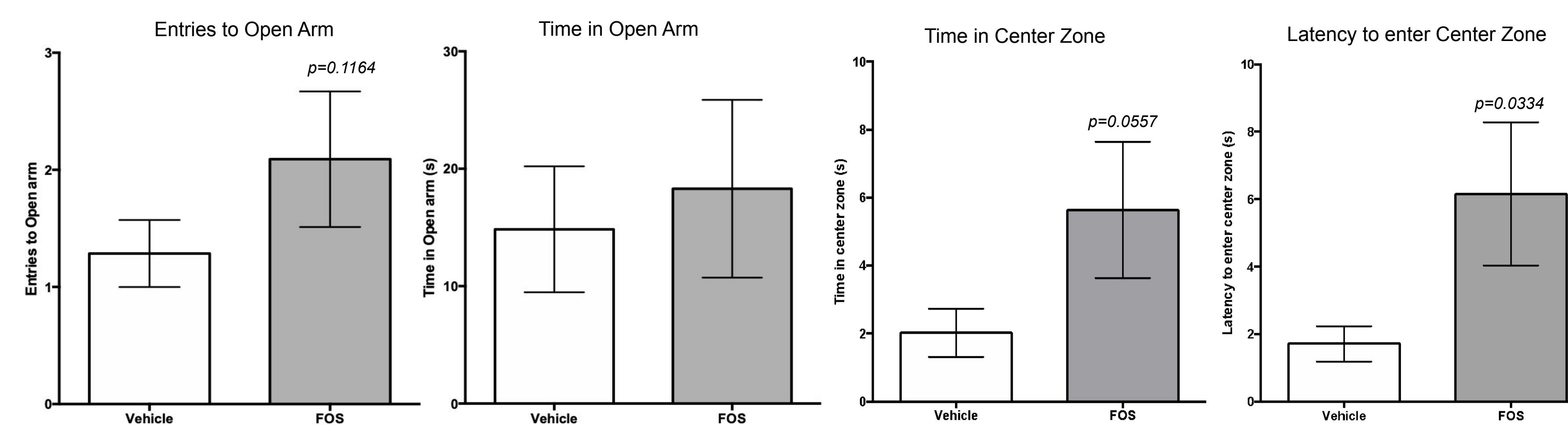
Prebiotic treatment affects exploratory behavior in aged rats.

Results

Social Anxiety



Elevated Plus Maze



Open Field

Summary

The present results indicate that the prebiotic FOS impacts the exploratory behavior of aged male rats. This work also revealed the needed to different types of behavioral tests to more optimally assess anxiety-like behavior in older, larger rodents.

Future Directions:

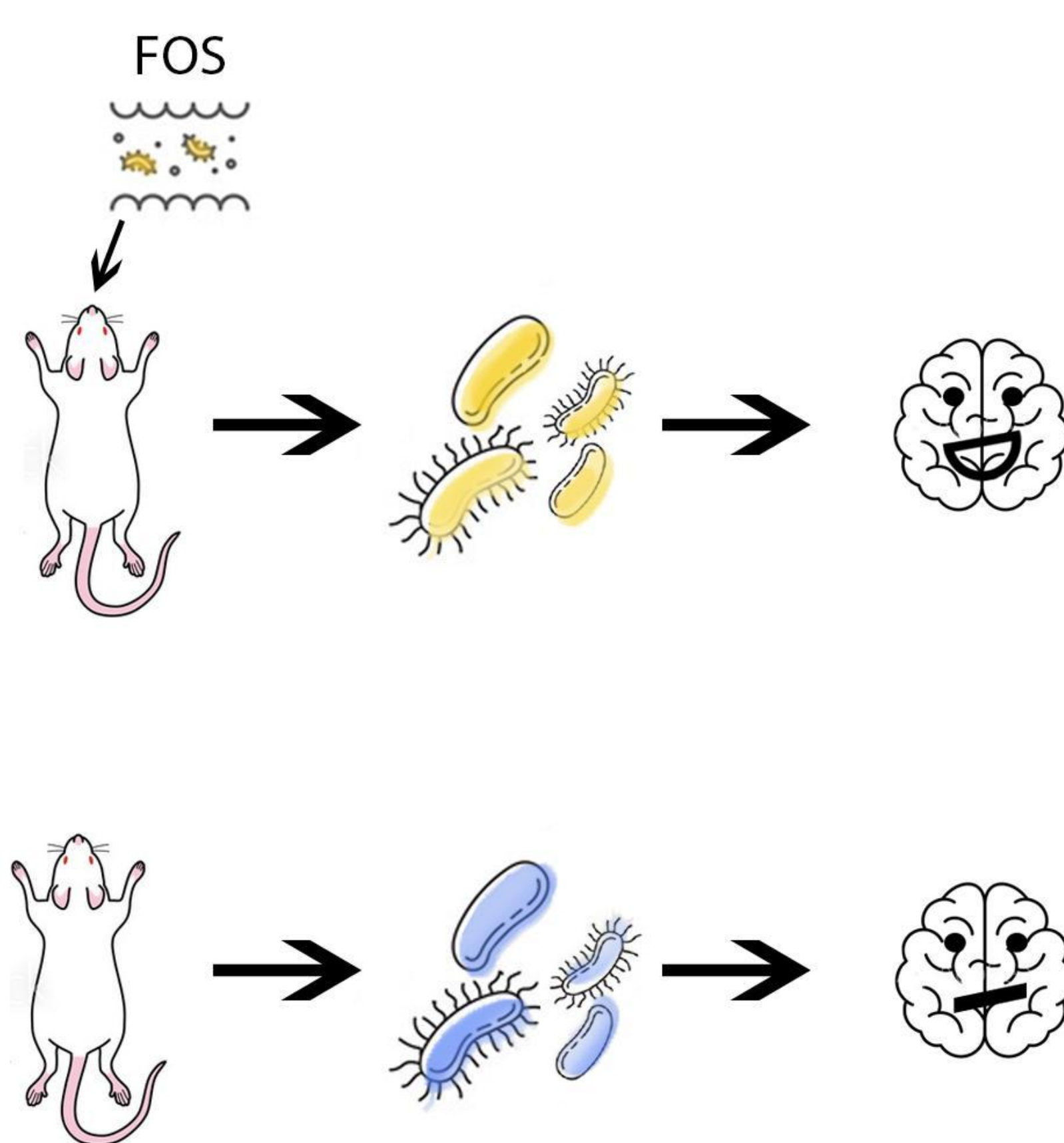
Construct more suitable behavioral apparatuses for large, aged rats.

Analyze the dose-responsiveness of FOS on rat exploratory behavior

Test the impact of FOS on neuroanatomical regions and neurochemicals implicated in risk aversion/ exploratory behavior.

Compare the impact FOS has on the microbiota flora in aged rats with younger rats.

Hypothesis



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