



Neuroimmune Signaling Associated with Weight Gain in OVX Rats: Effect of Voluntary Exercise

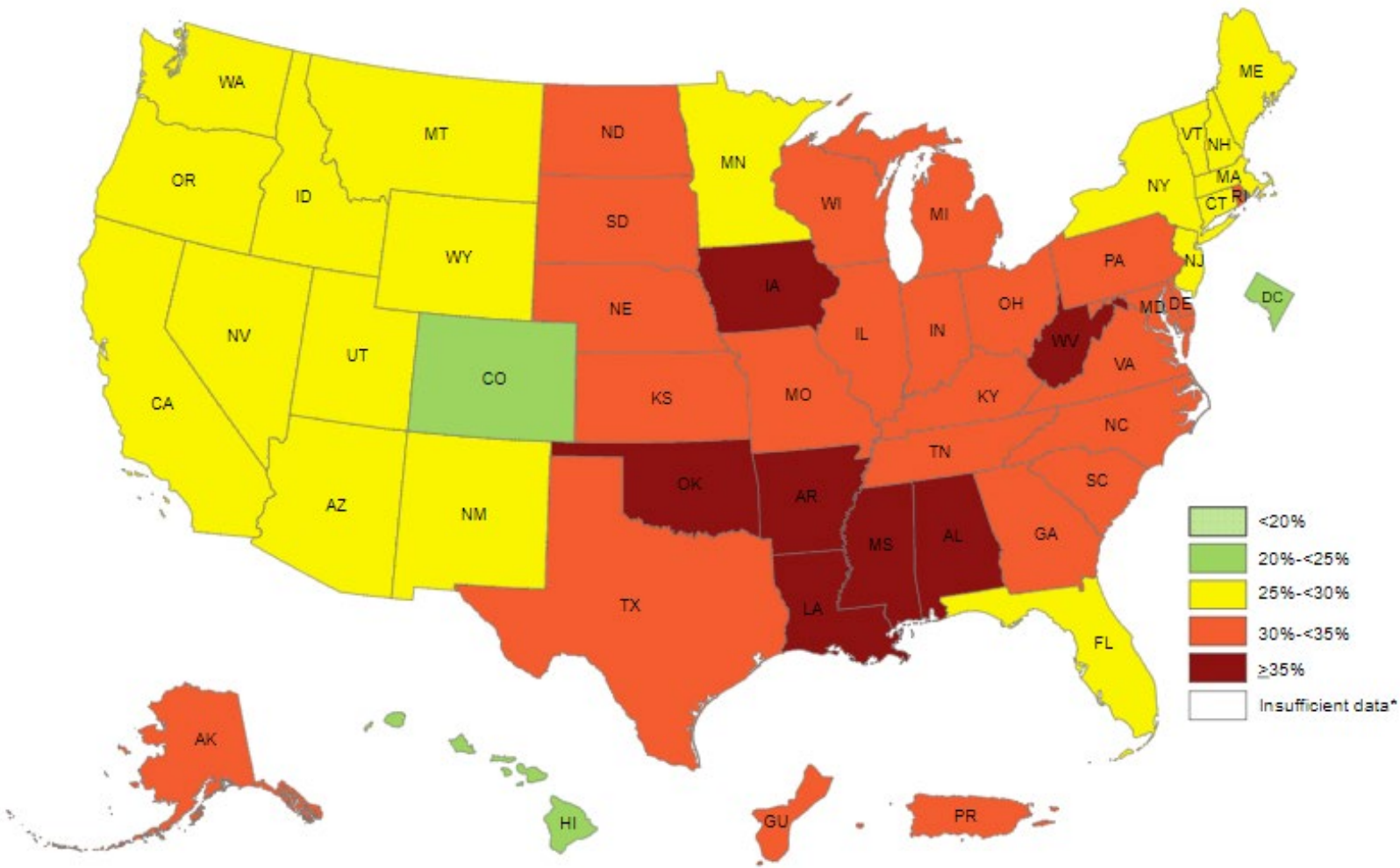


S. Rivera, D. Wu, D. Buck, R. Davis, K. Curtis

Department of Pharmacology & Physiology, Oklahoma State University Center for Health Sciences, Tulsa, OK 74107 USA

INTRODUCTION

Obesity in the U.S.; adapted from cdc.gov



- ❖ Obesity is prevalent in the U.S.
- ❖ >35% of adult Oklahomans are obese

Our previous study showed:

- ❖ Female rats reliably gain weight after ovariectomy (OVX)
 - Weight gain asymptotes after ~3 weeks
- ❖ Neuroimmune signals change during post-OVX weight gain

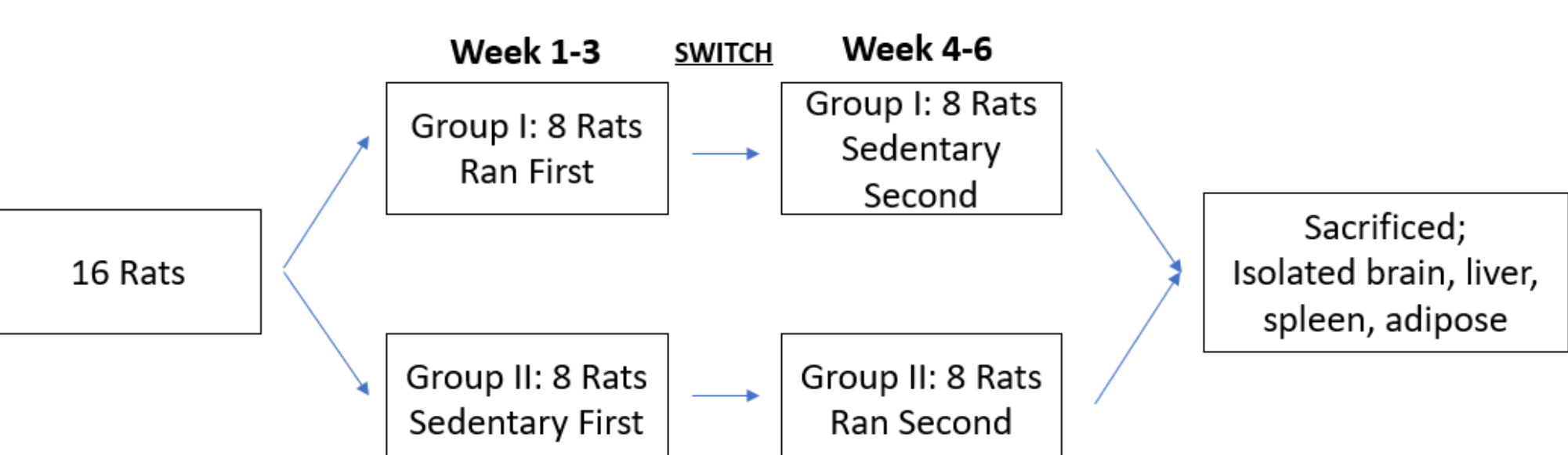
- ❖ A sedentary lifestyle contributes to obesity
- ❖ Exercise may play a part in decreasing obesity

HYPOTHESES

- ❖ Weight gain and rate of weight gain in OVX rats can be altered by exercise
- ❖ Metabolic hormone levels (e.g., leptin and insulin) in OVX rats can be altered by exercise

METHODS

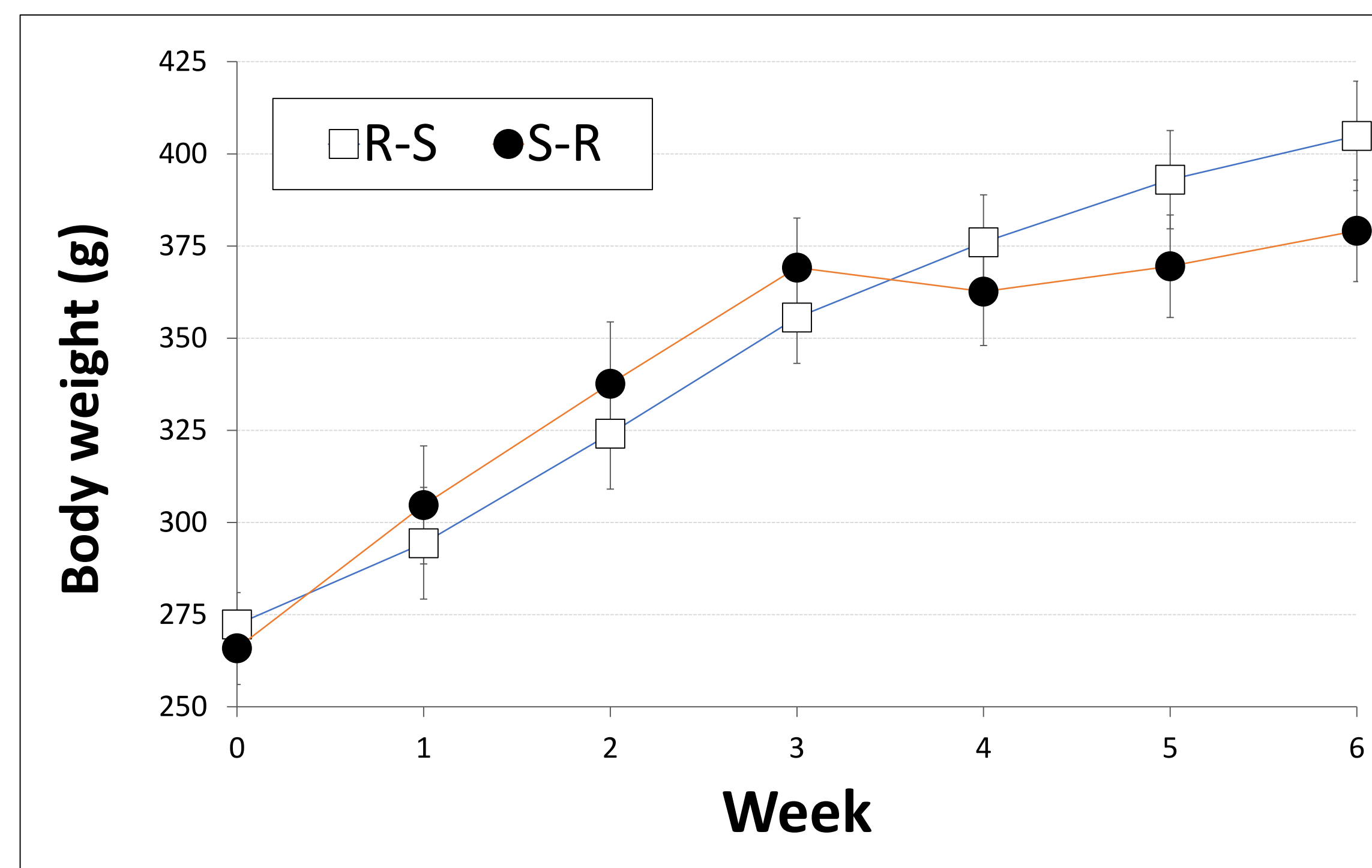
- ❖ 16-Female Adult Sprague-Dawley Rats
 - Ovariectomized



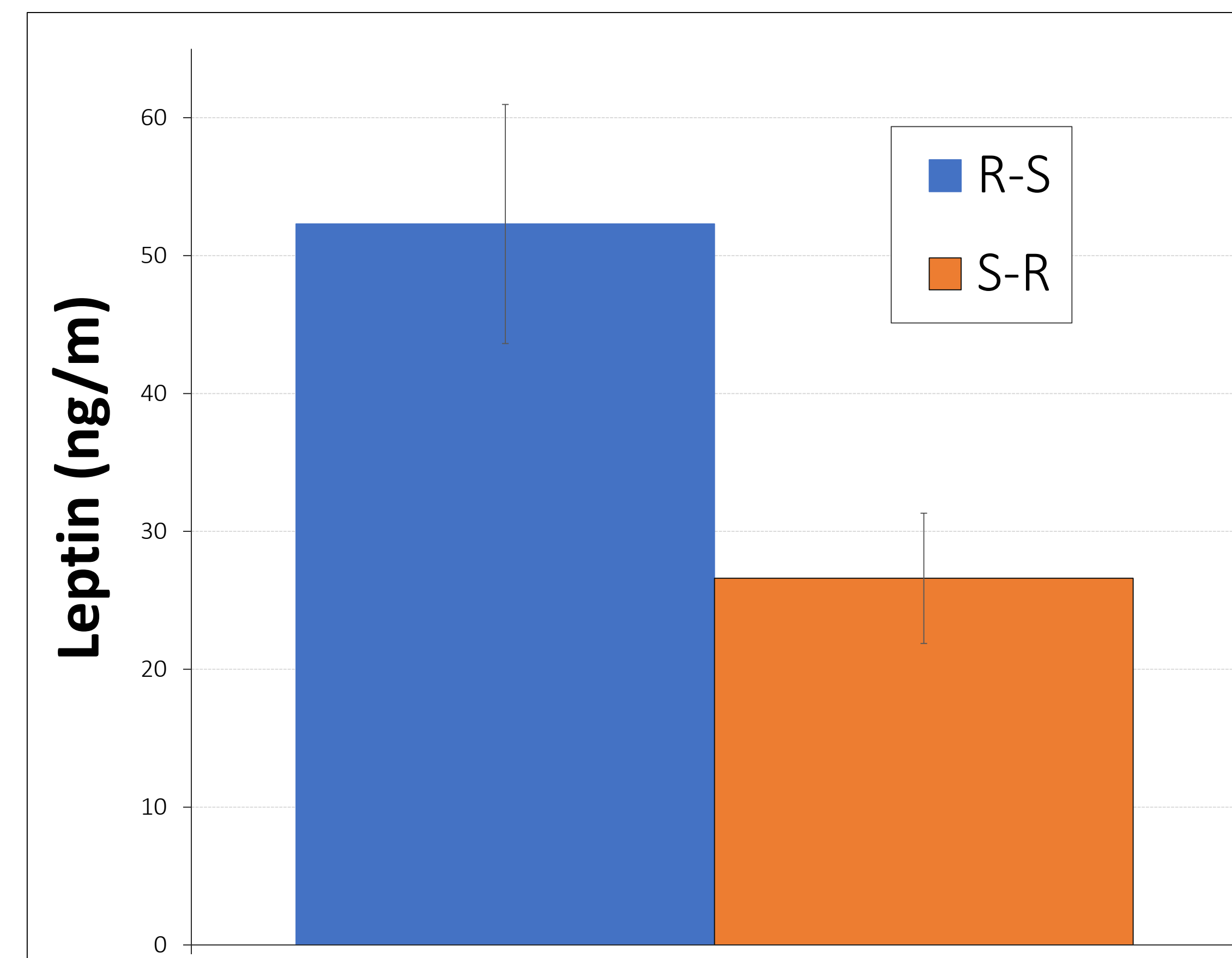
- ❖ Weight measured weekly
- ❖ Sacrificed to collect trunk blood, spleen
- ❖ ELISAs for circulating levels of Leptin and Insulin, normalized to total protein measured via BCA
 - n=8 from each group
- ❖ BCA assays to normalize ELISA levels to total protein
- ❖ Plasma protein concentration determined
- ❖ Spleen weight

RESULTS

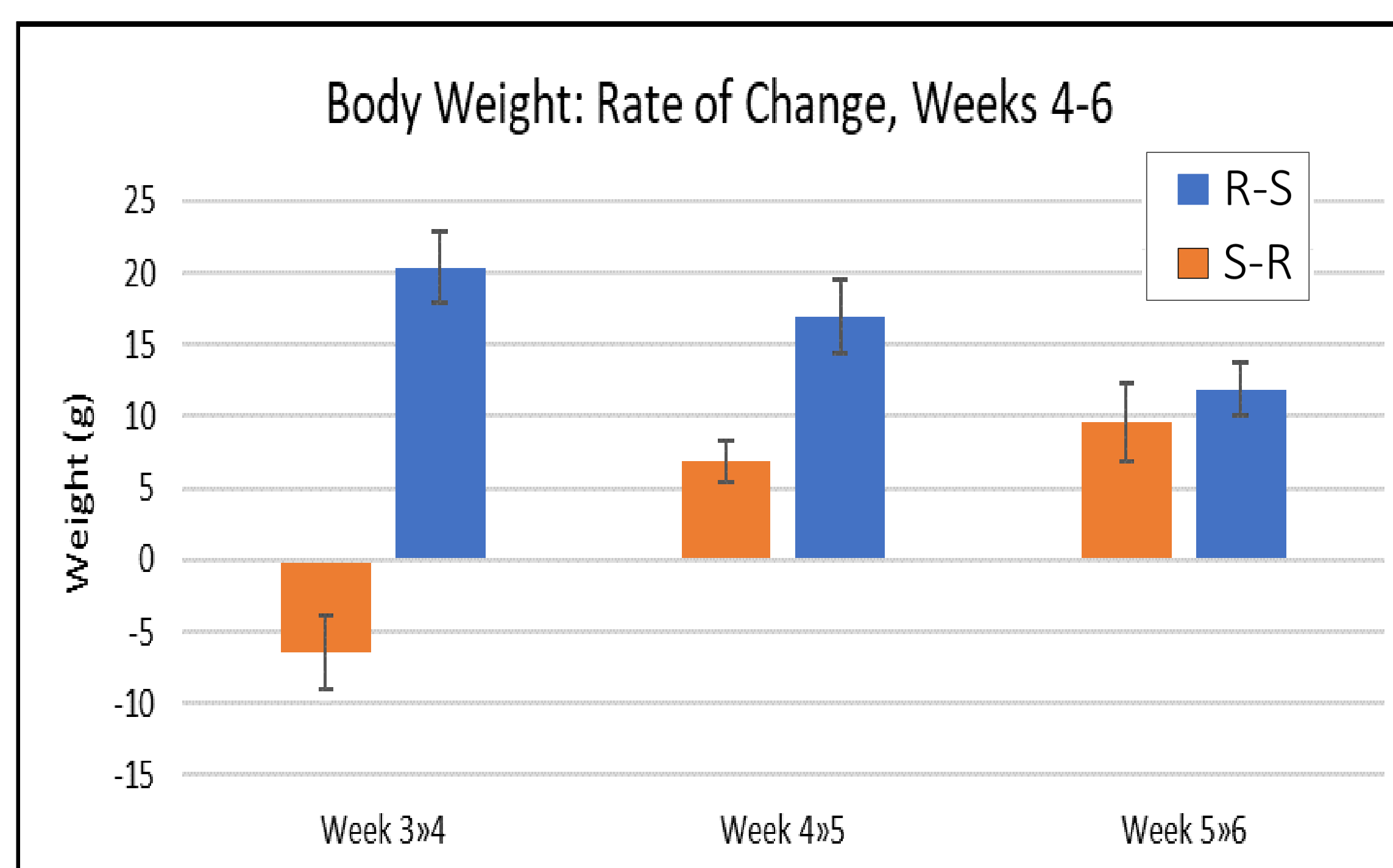
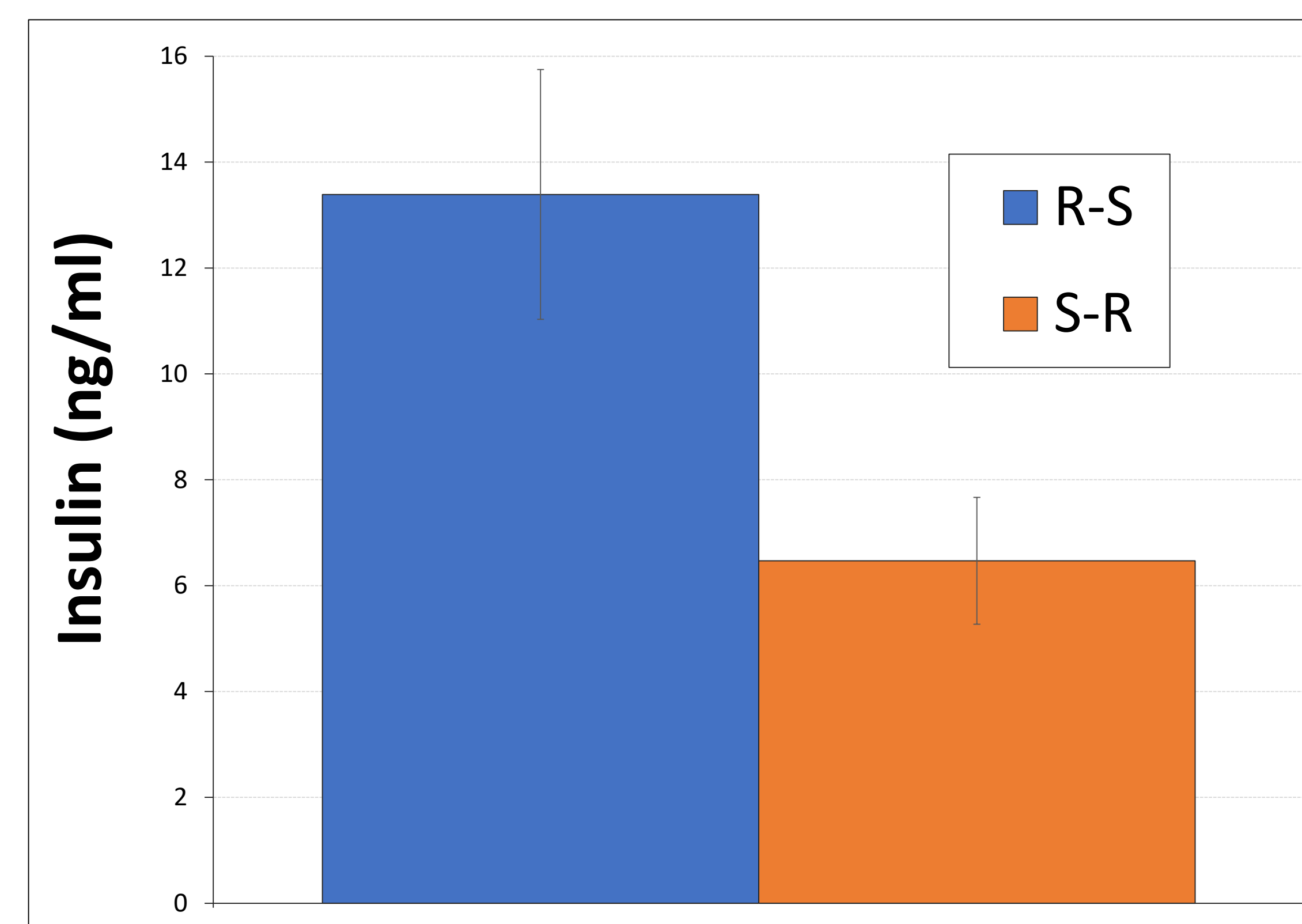
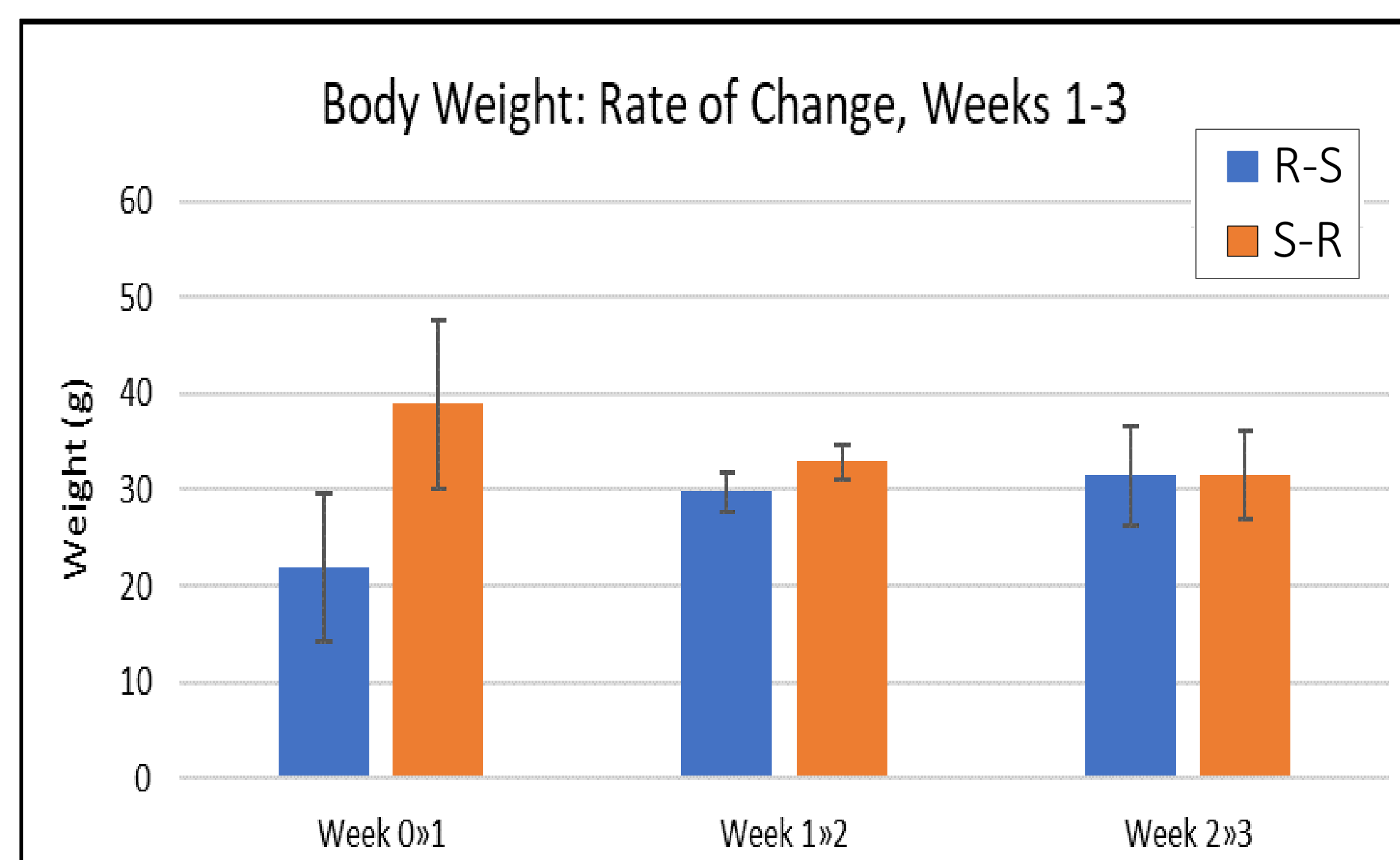
Body Weight



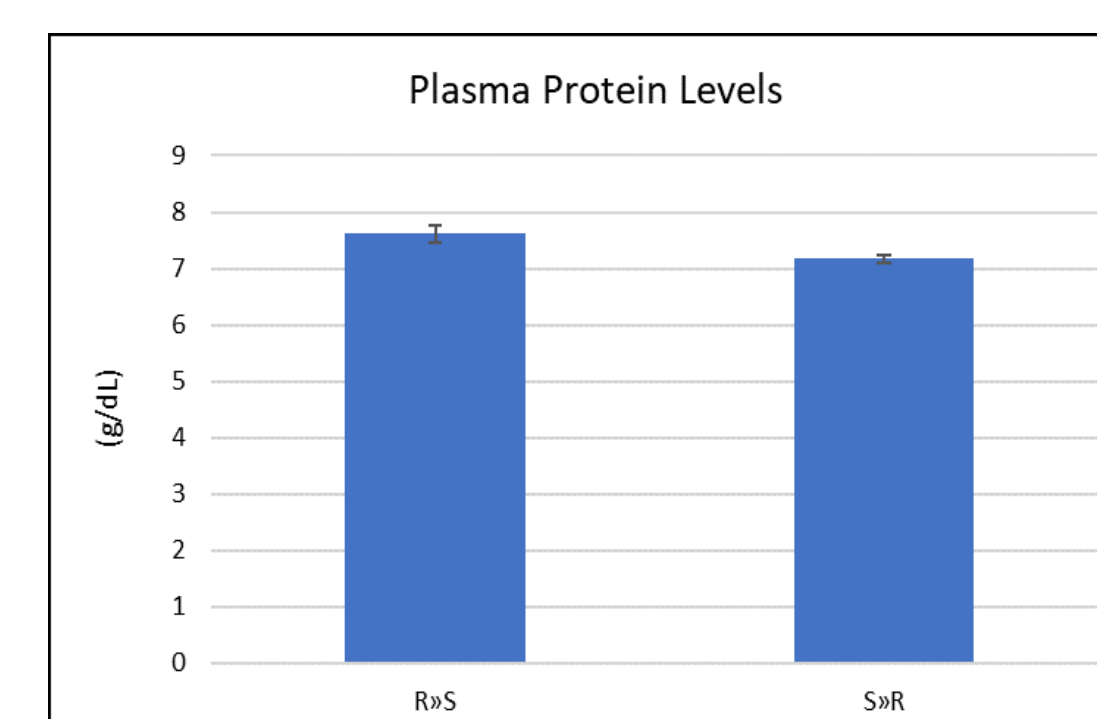
Metabolic Hormones



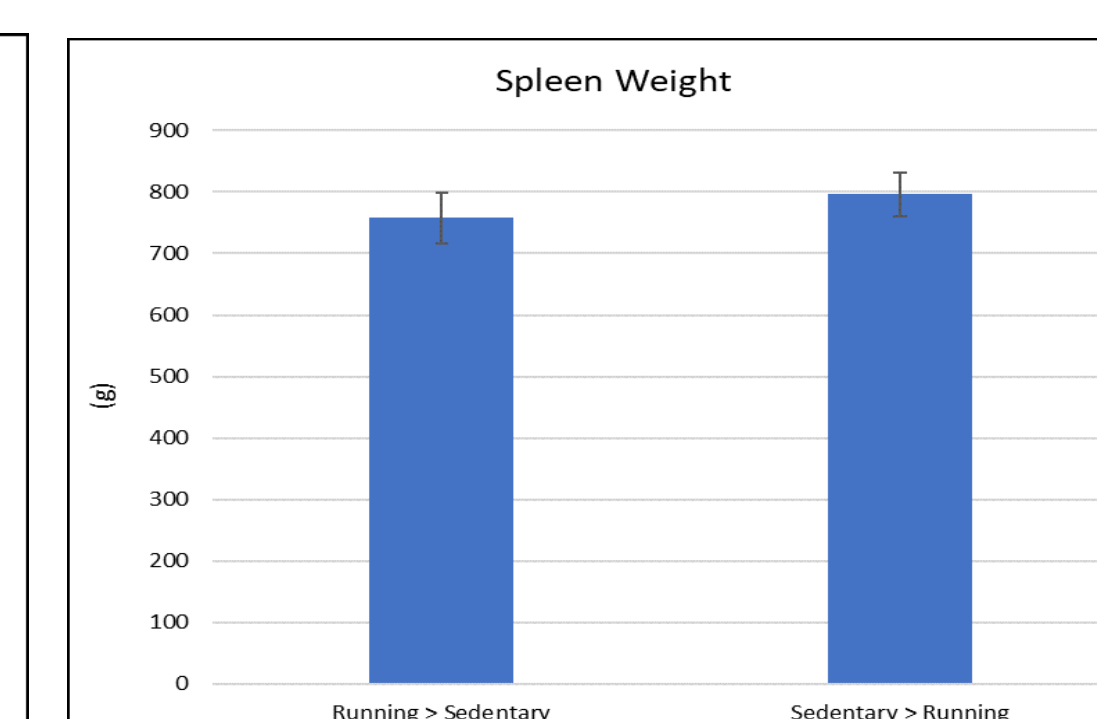
Change in Body Weight



Plasma Protein



Spleen Weight



SUMMARY

Body weight

- ❖ Body weight decreased in the delayed exercise group
- ❖ Rate of weight gain decreased in the delayed exercise group
- ❖ Final body weight was decreased in the delayed exercise group

Plasma protein concentration and spleen weight

- ❖ Plasma proteins were slightly decreased in the delayed exercise group
- ❖ Spleen weight was not affected by exercise timing

Metabolic Hormones

- ❖ Circulating levels of leptin and insulin were decreased in the S-R group

CONCLUSIONS

- ❖ Exercise has transient effects to slow post-OVX weight gain, regardless of whether exercise was initiated immediately or after a three week delay.
- ❖ These transient effects on weight gain were associated with decreased levels of circulating leptin and insulin
- ❖ An adaptation may have occurred that minimized weight loss, even as running increased.

FUTURE DIRECTIONS

- ❖ Examine long term/continuous exercise
- ❖ Examine metabolic hormones and neuroimmune signaling after 3 weeks

Funding:

CHS Presidential Research Fellowship Mentor-Mentee Grant (SR, DW)

OCAST HR18-089 (KSC)