



Research Week 2020

Sex differences in behavioral responses to standard laboratory stressors in arctic ground squirrels (*Urocitellus parryii*)

Carolyn Jones, Ph.D., Andrew T. Tinsley, Pierfrancesco Chiavetta, Kelly Drew, Miranda M. Lim, Domenico Tupone

OHSU

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Abstract

Arctic ground squirrels are obligate seasonal hibernators found in the arctic tundra of North America and Siberia. In the wild as well as in the laboratory, AGS hibernation lasts approximately 7 months, during which time their body temperature reaches values as low as -2.9°C without appreciable physiological impairment of their organ function at return to normothermia.

In biomedical research, AGS is an ideal rodent model to understand thermoregulation and the natural entrance and arousal from torpor. However, unlike other laboratory rodents, we know very little about their behavioral responses to typical laboratory stressors, making standardization of research difficult across laboratories.

In this study, male and female wild caught, laboratory housed, AGS were video recorded in their home cages for two hours after either cage checks or gentle handling over 6 weeks. Behavioral ethograms were created by continuously recording behaviors from videos collected during both morning and afternoon time periods starting approximately one month after the completion of their natural breeding season.

We found that male AGS were more socially aggressive towards same sex conspecifics than females. Furthermore, males, but not females, showed increased social aggression as dates got closer to the annual timing for re-entrance into torpor.

In response to handling, males responded with more agonistic behaviors than females. However, both male and female AGS returned to their normal baseline behaviors within 30 minutes, consistent with habituation times expected in laboratory rats, a species that does not naturally hibernate. To our knowledge, these results are the first to report home cage agonistic and social behaviors in response to typical laboratory activities over time in the wild caught AGS and suggest that standard handling procedures produce minimal disruptions to their behavior.