Aged Animals Appear Cognitively and Behaviorally Hyporesponsive to Chronic Restraint (Psychosocial Stress) Compared to Young Animals

Kendra Hargis[1] • Jelena Popovic[1] • Sara Qutubuddin[1] • Eric Blalock, PhD[1]

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[1]*Pharmacology and Nutritional Sciences, University of Kentucky*

It is established that aging has detrimental consequences including a change in sleep architecture, a blunted circadian rhythm, and a decrease in cognition. Psychosocial stress (PS) is a non-painful stimulus associated in humans with major life changes including job loss, death of a spouse, and social isolation. It strongly influences multiple systems (e.g., corticosterone level, body temperature regulation, sleep and cognition). In prior work, we showed that acute PS resulted in typical cognitive deficit and hyperthermia responses in young animals, but that aged animals were hyporesponsive to this acute PS challenge. However, PS in humans is normally chronic, not acute, and the likelihood of experiencing PS increases with age. Nevertheless, little work has investigated the response of chronic PS in aged subjects. We hypothesized that aged animals will continue to be hyporesponsive to chronic PS. To test this, young (3mos) and aged (19mos) male Fischer344 rats were assigned to control or PS groups and implanted with wireless telemetry from Data Sciences International to monitor sleep and body temperature. Chronic PS (restraint, 3 h/day, 4 days/week, 4 weeks) effects on distress response, Morris water maze (MWM), body temperature, and corticosterone levels were collected. Chronic PS did not affect spatial MWM training, deep sleep duration, body temperature, or corticosterone levels at any age. PS resulted in decreased active period wake in aged animals. Conversely, aged animals were hyporesponsive to PS effects on the distress response and MWM probe trial. Taken together, the aged animals appear cognitively and behaviorally hyporesponsive to chronic PS.