Sex Differences in Basal and Restraint Stress Related Core Body Temperature in the Long Evans and Sprague Dawley Rat.

Rationale:
Studies on core body temperature to stress focus primarily on male subjects; even though females show markedly different core body temperatures, greater sensitivity to stress, and modulations of key neurotransmitter systems (e.g. serotonin (5-HT)). Acute or chronic stress act via the sympathetic nervous system (SNS) to cause hyperthermia. In contrast, repeated exposure to a mild predictable restraint via the hypothalamic-pituitary adrenal axis (HPA) leads to a decline in stress hormones in both males and females. However, our previous findings show that declines in stress hormones correlate to higher hypothermia in response to 8-OH DPAT (5-HT 1A agonist) in male, but not female rats.

Objectives:
We therefore hypothesized that male but not female rats would show lower hyperthermia following repeat restraint, indicative of declines in sympathetic nervous system activity and correlated to higher sensitivity to 8-OH DPAT hypothermia.

Results:
Male rats showed significant declines in hyperthermia and stress hormone levels during repeated restraint exposure in contrast to the first restraint exposure, which correlate to higher sensitivity to 8-OH DPAT hypothermia. Whereas female rats failed to show any thermal habituation. Core body temperature in female rats rose in anticipation of restraint, this anticipatory hyperthermia lasted up to 72hrs after the termination of restraint whereas no anticipatory hyperthermia was observed in male rats.

Conclusion:
These finding demonstrate that males show declines in SNS and HPA in response to a predictable mild stressor. Instead females fail to show SNS habituation, which may be indicative of greater susceptibility to stress.