

Commentary

Behavioral Evolution and Health: Comparative Studies on Stress and Mental Health Across Species

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Description

Stress responses have evolved as adaptive mechanisms to help organisms cope with environmental challenges. In the wild, stress responses are crucial for survival, aiding animals in escaping predators, finding food, and navigating social hierarchies. However, the same stress mechanisms that evolved to handle acute challenges can become maladaptive in modern, chronic stress environments. Across species, the physiological stress response involves the activation of the hypothalamic-pituitary-adrenal (HPA) axis, which regulates the release of stress hormones like cortisol in humans and corticosterone in many other animals. These hormones prepare the body to respond to immediate threats but can lead to negative health outcomes when stress becomes chronic. Comparative studies of stress responses across species reveal both similarities and differences in how animals handle stress. For example, research on rodents has provided valuable insights into the mechanisms of stress and mental health. Rodents exhibit behaviors and physiological responses similar to those observed in humans, such as changes in activity levels, anxiety-like behaviors, and alterations in brain function during stress. In contrast, primates, including humans, exhibit more complex social behaviors and stress responses due to their highly developed cognitive and emotional capacities. Studies on primates reveal that social hierarchies and relationships play a significant role in stress levels. Dominant individuals often experience less stress than subordinate ones, highlighting the importance of social

status and support systems in managing stress. The study of stress and mental health in non-human animals extends beyond traditional models. For instance, research on birds and fish has provided insights into the evolution of stress responses and mental health disorders. Some species exhibit behaviors akin to depression and anxiety under chronic stress conditions, such as altered feeding patterns or reduced social interactions. Birds, particularly those that engage in complex social behaviors and migrations, have been shown to experience stress in response to environmental changes. For example, migratory birds face significant stress during long-distance flights, which can impact their health and survival. Understanding how these species cope with stress can offer insights into the broader principles of stress management and mental health. From an evolutionary perspective, stress responses can be classified as adaptive or maladaptive. Adaptive responses are those that help an organism survive and thrive in its environment, such as the acute stress response that mobilizes energy and enhances focus during a threat. Maladaptive responses occur when stress mechanisms become dysregulated, leading to chronic stress and associated health problems.

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Conflict of Interest

None.