OR032

The general stress response syndrome in the honeybee

Naila Even, Jean-Marc Devaud, Andrew B. Barron

The biological concept of stress originated in mammals, where it describes a set of common integrated physiological responses to diverse noxious agents. Physiological mechanisms of stress in mammals have been extensively investigated through diverse behavioral and physiological studies. One of the main elements of the stress response pathway is the endocrine hypothalamo-pituitary-adrenal (HPA) axis, which underlies the 'fight-or-flight' response via a hormonal cascade of catecholamines and corticoid hormones. Physiological responses to stress have been studied more recently in insects. Here I present a hypothetical integrated stress response system in bees that has functional and organisational analogies to the mammalian HPA. The bee stress response system involves signaling elements such as biogenic amines (octopamine, dopamine, serotonin), neuropeptides (allatostatin, corazonin) and metabolic hormones (adipokinetic hormone, diuretic hormone) that coordinate responses between the brain (particularly the neurohaemal organ corpora cardiaca) and its peripheral targets, including energy storage organs (fat body and crop). Understanding these mechanisms is highly important as the accumulation of new stressors is suspected to be the cause of honeybee population decreases in various parts of the globe.