**Discussion Questions**

to accompany

***Animal Behavior,* Eleventh Edition**

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**Chapter 5**

**The Physiological Basis of Behavior**

5.1 Inhibitory neural messages often play a key role in organizing the behavior of an animal, as the mantis demonstrates. Mature female crickets (*Gryllus bimaculatus*) approach chirping males. About one hour after mating, during which the male transfers a spermatophore to his partner, the female stops tracking the calls of males of her species (Loher et al. 1993). If you found that emptying the sperm storage organ caused the female to resume responding to calling males, you could speculate on how the female cricket’s nervous system controlled this aspect of her behavior. How might inhibitory messages be involved? What is the adaptive significance of this proximate mechanism?

5.2 You may recall that the transition to foraging in honey bees (*Apis meliffera*) depends on the makeup of the colony, such that if there is a shortage of nurse workers within the hive, older bees will delay their shift to the foraging role. What prediction follows about *per* gene expression in the brains of these socially delayed older nurses relative to foragers of the same age from other colonies with numerous young nurse bees? Provide proximate and ultimate hypotheses for the fact that social interactions can alter circadian rhythms in honey bees—and even fruit flies (Levine 2004), which do not live in highly organized societies.

5.3 In humans, the menstrual cycle involves hormonally mediated physiological changes that lead to the production of a mature egg. Historically, physiologists have not looked for an associated pattern of sexual activity in women (Gangestad et al. 2004). However, evolutionary biologists have recently proposed that there should be a relationship between the menstrual cycle and sexual desire. Why would they predict a difference in this relationship for married women versus those without a steady partner? Why might ovulating women find males with masculinized facial features especially attractive?

5.4 To study the hormonal control of behavior, researchers often remove an animal’s ovaries or testes and then inject the creature with assorted hormones to see what behavioral effects they have. What advantage does this technique have over another approach, which is simply to measure the concentrations of specific hormones in the blood of animal subjects from time to time? The far less invasive direct measurement approach would show, for example, whether testosterone or estrogen concentrations were elevated when mating was occurring.

5.5 The endangered Amargosa River pupfish (*Cyprinodon nevadensis amargosae*) lives in Death Valley, where different populations of the species live in total isolation from one another in tiny permanent pools and short stream segments (Lema and Nevitt 2004). Although these populations have been separated from one another for only 400 to 4000 years, males in some places aggressively defend territories and court females drawn to them, while males in other populations are not aggressive toward one another and do not defend territories. How could these changes occur so rapidly? How might you establish experimentally that the hormone arginine vasotocin (AVT) decreases aggressive behavior in pupfish? If the hormone does lower aggression in this species, what predictions could you make about AVT or about AVT receptor protein differences between territorial and nonterritorial males of the same species?

References

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