Lecture 23: Readings Study Questions

Rosenzweig p80 – 81, 346 – 349, 434 – 465

1. Which type of feedback (positive or negative) is used to regulate body functions? Why?
    a. (Refer to figure 3.18, page 81) Why does the negative feedback from cell C cause a rhythmic output from cell B?

2. Describe the possible roles of the caudate nucleus and the putamen in motor function.
    a. What kinds of experimental techniques do researchers use to discover these functions?

3. The cerebellum may be involved in which specific aspect of motor behavior? What property of cerebellar neurons, as discovered by Masao Ito, might underlie this process?

4. What is the primary difference between Sherrington's stimulus–response model of complex behavior, and the central pattern generator model?
    a. Describe one experiment that supports the theory of central pattern generators.

5. a. A _____ rhythm has a frequency of greater than once per day.
    b. A _____ rhythm has a frequency of approximately one day.
    c. A _____ rhythm has a frequency of less than once per day.

    For each of the above, give an example of an animal behavior that follows that rhythm.

6. What brain region is thought to control circadian rhythms?
    a. This region is part of the _____ (name of a brain structure).
    b. Describe one experiment that demonstrates that this region is involved in circadian rhythms.

7. Lesions in the primary visual cortex does not alter the light-dark cycle of a rodent, even though the animal is blind. Why not?

8. Circle the correct answer:
    a. Flies that do not express the *per* gene do / do not display circadian rhythms.
    b. Mice that do not express the *Clock* gene do / do not display circadian rhythms in reponse to light-dark cycles.

c. Flies that do not express the *tim* gene do / do not display circadian rhythms.

9. After Per and Tim form a dimer, they inhibit the production of which protein?
    a. This protein (answer from previous question) promotes the expression of which genes?

10. Name four characteristics of:
    a. REM sleep
    b. SWS

11. What are "sleep spindles"?

12. What is the primary difference between "night terrors" and "nightmares"?

13. Compare dreams that occur during REM sleep with those that occur during stage 2 sleep.

14. What is a "monotreme"?

15. Describe how our sleep patterns change as we age.

16. What are the two ways in which we "pay" our REM sleep "debts"?

17. A transection between the _____ and the _____ is called an "encephale isole" brain preparation.
    A transection in the _____ results in the "cerveau isole" brain preparation.

18. For each of the above preparations, describe how the lesion affected SWS and REM sleep.

19. Where is the "reticular formation"? Why does stimulating the reticular formation "wake up" the rest of the brain?

20. What role might the raphe nucleus play in sleep production?

21. What are PGO waves? In which sleep stage do they occur?

22. Describe four possible reasons why we sleep.

23. Describe an experiment that demonstrates how severe sleep deprivation can be fatal.

24. What are some of the symptoms of narcolepsy?

25. What are some of the problems with the “sleeping pills” available today?
    a. Name one neurotransmitter and one hormone targeted by sleeping pills.

26. Go to bed early! ☺