

*Questions based on Schneider chapter and lectures:*

1. What in addition to hormonal factors may explain male-female differences in brain structure and function?
2. Is Papez' circuit sexually dimorphic?
3. What are two major factors correlated with brain size in humans?

*Questions on readings: Swaab and Hofman, also Schneider*

1. Briefly compare evidence for genetic factors, hormonal influences and social environment in the determination of sexual orientation.
2. What are three or four very clear examples of neurological or psychiatric disease where there are dramatic sex differences?
3. When are sex differences in gonadal hormone levels at the highest levels in human development, and when do morphological differences in the hypothalamus appear?
4. Describe one of the technical factors in studying morphological differences in the hypothalamus of postmortem human brains. What is the Swaab and Hofman solution?
5. What is a cell group of the human hypothalamus which differs between the sexes? Is it also different in hetero- and homosexuals?
6. Which nucleus of the hypothalamus may be involved in sexual orientation according to a study a few years ago in rats? How is this cell group different in human males of different sexual orientation?

*Questions on readings: Nottebohm and abstracts; Schneider*

1. Describe the evidence from Nottebohm *et al.* that the male canary brain changes from season to season. What did he think the change was caused by? How has the work of Sarah Bottjer modified this view?
2. Although only male canaries sing, both male and female canary brains are constantly acquiring new neurons. Why might the females need new neurons (and loss of old ones)?
3. Describe the findings of Toran-Allerand which indicate that sex differences in the brain are probably much more widespread than has been indicated in the studies of cell-stained human post-mortem material.

*Questions on readings: Baum*

4. What structures in the CNS besides the hypothalamus have sexual dimorphism?

5. Why were some of these findings so controversial after the first reports?
6. Why do some human beings develop a female body and brain despite being genetically male and having testes rather than ovaries?

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## 9.14 Brain Structure and Its Origins

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