

- **BIOMEDICAL SCIENCES 136 – BIOLOGY OF HUMAN SEXUALITY**
- **REVIEW SHEET FOR 2nd LECTURE EXAM**

THIS REVIEW SHEET IS MEANT TO BE AN AID TO YOU IN YOUR STUDIES FOR THE EXAM. IT DOES NOT NECESSARILY INCLUDE ALL OF THE INFORMATION WHICH WAS PRESENTED IN LECTURE AND LAB FOR THE EXAM. THIS REVIEW SHEET IS NOT A SUBSTITUTE FOR REGULAR, DILIGENT STUDY OF THE COURSE MATERIAL.

SOME REVIEW QUESTIONS:

You should review the homework assignment on genetics and heredity.

1. How does a haploid cell differ from a diploid cell?
2. What is a zygote?
3. What is an homologous pair of chromosomes?
4. What are the sex chromosomes in humans and the genotypes of males and females?
5. Briefly describe how a karyotype can be performed on an adult or on a developing fetus (e.g. amniocentesis).
6. What causes Down's syndrome? What is nondisjunction? What causes Turner's syndrome?
7. Who was Gregor Mendel?
8. What is a gene? What is an allele?
9. Define the following: cross-fertilization, P generation, F1 generation, F2 generation, monohybrid cross, dominant allele, recessive allele, Punnett square, codominance, polygenic inheritance
10. What are linked genes? What is a sex-linked gene? List one dominant, one recessive, and one sex-linked disorder that occurs in humans.
11. What is a carrier?
12. What do the terms homozygous recessive, heterozygous, and homozygous dominant mean?
13. If a trait is dominant is it always more abundant in a population? What does dominance mean?
14. What is a pedigree? How are these useful for tracking genetically inherited diseases?
15. What is a carrier for a genetic trait?
16. If a disease is sex-linked, why does it occur more often in males than females? Think about the sex chromosomes.
17. Can males be carriers of sex-linked diseases?
18. Use a Punnett square to show that the probability of a man and a woman having a son is always 50% (assume everyone is normal).
19. What is hemophilia? Is this disease sex-linked? Show a Punnett square with the probabilities of the genotypes and phenotypes of the offspring of a man with hemophilia who mates with a woman who is a carrier for the disease.
20. Red-Green Color Blindness is a sex-linked recessive trait. If a normal sighted male had a child with a woman who was a carrier for red-green color blindness, what is the probability that they will have a daughter who is red-green color blind? What is the probability they will have a son who is red-green color blind?
21. What is codominance? Describe what causes there to be different blood types. What are the genotypes and phenotypes for each blood group (A, B, AB, O)?
22. What is polygenic inheritance?
23. List at least three physical, chemical or biological factors/agents that can lead to mutations (mutagens).
24. What is cancer? How do mutations in oncogenes or mutations in tumor suppressor genes each cause a cell to become cancerous?
25. What is metastasis? How does a benign tumor differ from a malignant tumor?
26. How can cancer be treated?
27. What is negative feedback? What is positive feedback?
28. What are the two basic functions of the testes?
29. What are the two basic functions of the ovary?
30. Briefly describe or draw a flow chart type diagram to show the process of spermatogenesis as it occurs from fetal development to adulthood (after puberty); what are the names of the various sperm cell types? Is each sperm cell type diploid or haploid? When does mitosis occur? When does meiosis I and meiosis II occur in the sequence?
31. What is spermiogenesis?
32. What are the two compartments (types of tissue) in the testes? What is the function of each?
33. What anatomical structures are found in each compartment?
34. Briefly describe/draw a diagram of a cross-section through a seminiferous tubule? Be able to

- identify on a simple diagram where each of the following would be found: lumen, boundary tissue, Sertoli cells, tight junctions, spermatogonia, spermatocytes, spermatids, spermatozoa.
35. Why are there tight junctions between the Sertoli cells in the seminiferous tubules?
 36. Where are the blood vessels, nerves, lymphatics and Leydig cells in the testes?
 37. What cell types produces most of the androgens in males? What cell type can make estrogen in the testes?
 38. What is the function of the tunica vaginalis around the testes?
 39. What is cryptorchidism? Would a man who has cryptorchidism have a normal, abnormally high or abnormally low FSH level in his blood?
 40. What are some functions of the Sertoli cells?
 41. Where are testosterone and FSH each required for specific steps of spermatogenesis.
 42. Is the incidence of testicular cancer increasing or decreasing? What age group has the highest rate of testicular cancer? How can testicular cancer be treated?
 43. Why would a man who has had testicular cancer need the androderm patch (testosterone patch)?
 44. List 3 different types of androgens. List 3 different types of estrogen.
 45. What is the sequence of steroid production (steroidogenesis); cholesterol is the starting point and estradiol is the ending point (what basic conversions occur in between)?
 46. What are anabolic steroids? What are some of the side effects of anabolic steroids? Why would anabolic steroids cause the testes to become smaller with chronic use?
 47. Describe three physiological mechanisms that help keep the testes cooler than the abdomen.
 48. What is Benign Prostatic Hyperplasia (BPH)? How can it be treated?
 49. Be able to identify on a diagram and know the basic functions of: testis, rete testis, vasa efferentia, epididymis, vas deferens, prostate gland, seminal vesicles, bulbourethral (Cowper's) gland, urethra, penis, scrotum, seminiferous tubules, interstitial tissue of testes, ovary, fimbriae, Fallopian tube (oviduct), uterine myometrium, uterine endometrium, cervix, cervical os, vagina, clitoris, labia majora, labia minora, mons.
 50. What is the function of the secretion from the bulbourethral gland?
 51. How does a vasectomy prevent fertilization? Are these reversible? What factors determine how readily a vasectomy can be reversed?
 52. List the lineage of cells seen during oogenesis from oogonia to "ootid" including how many chromosomes would be found in each cell type. Which of these cells is ovulated? Which of these cells is fertilized by an egg?
 53. When does meiosis begin, start and stop during the female germ cell lineage?
 54. Describe the basic effects of FSH and LH in both the male and female reproductive system.
 55. What is inhibin? Relate changes in the level of spermatogenesis to changes in inhibin and FSH levels.
 56. Why did the World Health Organization (in the 1970's) believe that inhibin would have been a good male contraceptive? Why can't inhibin be used as a male contraceptive?
 57. List 4 ways to sterilize a male rat.
 58. If a man had a low sperm count, would his FSH level always be elevated? Why or why not?
 59. What cells produce estrogen in the ovary?
 60. What cells produce progesterone in the ovary?
 61. List the major effects of: testosterone in the male, estrogen in the female, and progesterone in the female.
 62. How do the feedback effects of estrogen at low doses differ from those of estrogen at high doses?
 63. Describe the hormonal mechanism that causes ovulation?
 64. What causes menstruation if a woman does not become pregnant?
 65. Where is the stratum functionalis? Stratum basalis? Spiral arteries? in the female reproductive system.
 66. Is a woman born with all of the eggs she will ever have? Do these eggs degenerate as she ages?
 67. Progesterone is thermogenic, what does this mean?
 68. Relate the timing of the following events together as they occur during the menstrual cycle:
 - FSH has dominant effects on the ovary
 - LH has dominant effects on the ovary
 - increased estrogen production
 - increased progesterone production
 - follicular phase, proliferative phase, secretory phase, luteal phase, menses
 - granulosa and thecal cells in the ovary, paraluteal and luteal cells in the ovary
 - increased versus normal basal body temperature
 - copious, watery cervical mucous versus thick, viscous cervical mucous

- increased versus decreased myometrial contractions

69. Why are progesterone and estrogen each required during a pregnancy?
70. Describe and or draw a diagram to show the changes that occur in the ovary during a menstrual cycle as a follicle develops, ovulates and becomes a corpus luteum. What is a corpus albicans?
71. What role do prostaglandins play during the menstrual cycle? How does aspirin or ibuprofen help ease the pain of menstrual cramps?
72. Be able to identify diagrams that show how the relative levels of gonadotropins and steroids change during the menstrual cycle.
73. When does estrogen negatively feedback on FSH during the menstrual cycle? When does estrogen positively feedback on FSH/LH during the menstrual cycle?
74. What is an estrous cycle?
75. Describe and be able to identify on a diagram the basic structure of the penis and the clitoris.
76. What is premenstrual syndrome (PMS)? How many women experience it?
77. What are the basic symptoms of PMS and when during the menstrual cycle do they usually appear? How does PMS potentially affect behavior?
78. What are the potential causes and possible treatments of PMS?
79. Why do women in Western, non-natural societies experience more menstrual cycles (think of length of reproductive life, menarche, menopause, number of children, amount of lactational amenorrhea? What are some potential problems associated with having large numbers of menstrual cycles during a woman's reproductive life?
80. What are the four stages of sexual arousal in order? Are the stages the same in both sexes?
81. As per figure 15-2 (Jones), how does the sexual arousal sequence of events differ between males and females?
82. What is an erogenous zone? What is proceptive behavior?
83. As per chapter 15 and the website notes, describe the basic physiological changes and changes in the secondary sexual organs that occur in each sex during each of the 4 stages of the sexual response cycle (pgs. 365 – 375, Jones).
84. Draw a diagram of the hypothalamo-pituitary axis showing all of the following: hypothalamus, anterior pituitary (adenohypophysis), posterior pituitary (neurohypophysis), portal system, neurosecretory cells, endocrine cells (which release anterior pituitary hormones).
85. What is a gonadotroph? What hormones are released from this cell type?
86. How do conventional neurons differ from neurosecretory cells?
87. How does a neurotransmitter differ from a hormone?
88. Briefly describe how hormones released from the hypothalamus cause the release of hormones from the anterior pituitary.
89. What are 4 hormones released from the anterior pituitary?
90. What are 2 hormones released from the posterior pituitary?
91. What is the function of gonadotropin-releasing hormone (GnRH)?
92. Define the following: pubes, puberty, pubescence, menarche, spontaneous erection, nocturnal emission.
93. Describe a simplified typical sequence of pubertal events in the male and the female including changes in: sweat and sebaceous gland secretion, secondary sexual structures, ovary size, testes size, metabolic rate, breast size, size and shape of larynx, pattern of hair distribution, pubic hair development, development of acne, timing of the growth spurt.
94. What is an anovulatory cycle? Hormonally, why do these occur during puberty? What hasn't fully developed yet?
95. When do nocturnal emissions and spontaneous erections tend to occur in males during puberty? Are sexual stimuli necessary for spontaneous erections?
96. Which gender experiences the growth spurt first, why?
97. Why are men, on average, taller than women?
98. Describe the basic changes that occur in the ovaries and testes during puberty (pgs. 141-142, Jones)
99. Describe the basic pattern of FSH, LH, GnRH, estrogen, and testosterone levels as puberty progresses?
100. When does the pulsatile (episodic) pattern of gonadotropin release first occur (awake/asleep)? Does it matter if the person sleeps during the day?
101. How do growth hormone levels change during puberty?
102. What causes the acne associated with puberty?
103. What is the gonadostat hypothesis? What is the evidence for it? Against it?
104. What is the GnRH pulse theory? What is the evidence for this theory?

105. Describe the basic structure of a sperm. Draw a diagram. What is the function of the midpiece of the sperm? What is the function of the acrosome of the sperm?
106. What factors help the sperm travel from the cervix to the oviducts? Is it just swimming?
107. How do vaginal sperm, cervical sperm and uterine sperm differ? What are cervical crypts?
108. What is capacitation (with regards to sperm)? Where does this process occur?
109. What is the function of the cilia in the oviducts (Fallopian tubes)?
110. What causes the sperm to initially clot together in the vagina?
111. During the menstrual cycle, when is the cervical mucous more hospitable to sperm?
112. What do oxytocin and prostaglandins cause with regard to the uterus?
113. Draw a diagram of an egg to show the following: egg cell membrane, vitelline membrane, zona pellucida, egg cell nucleus.
114. What is the acrosome reaction and why is it necessary for fertilization?
115. What is the cortical reaction and why is it necessary for fertilization?
116. Draw a diagram to show the cortical reaction as it occurs during fertilization.
117. What is polyspermy? What is the slow, permanent block to polyspermy?
118. How do medical doctors, research scientists, and the general public each stage pregnancy and how long is pregnancy for each group (table 8-1, Jones)?
119. Review the information regarding cancers of each of the following organs: breast, ovary, uterus, cervix, vagina, testes, prostate, penis. Which is the most and least common in each sex? Your instructor may give you specific information in an addendum regarding reproductive cancers to know for the exam.