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# Male Reproductive System: Hormones, Anatomy & Spermatogenesis

Exam — Reproductive System

High school / pre-med / IB practice on the HPG axis, endocrine feedback, testicular anatomy, and spermatogenesis/meiosis (n, chromatids/DNA molecules, stages, and locations).

100 items — Printable Exam

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**1 Which pairing correctly matches the testis' exocrine and endocrine functions?**



- A** Exocrine: testosterone secretion; Endocrine: sperm delivery into ducts
- B** Exocrine: sperm production; Endocrine: testosterone and inhibin secretion
- C** Exocrine: LH secretion; Endocrine: GnRH secretion
- D** Exocrine: semen production; Endocrine: semen storage
- E** Exocrine: sperm motility; Endocrine: sperm capacitation

**2 Where does spermatogenesis primarily occur?**



- A** Epididymis
- B** Seminiferous tubules
- C** Prostate gland
- D** Seminal vesicles
- E** Vas deferens

**3 Leydig cells are located in the testes and are best described as cells that:**



- A** Line the seminiferous tubules and form the blood-testis barrier
- B** Produce testosterone mainly in response to LH
- C** Store sperm until ejaculation
- D** Secrete fructose-rich fluid into semen
- E** Carry action potentials to muscle fibers





4 Which pituitary hormone most directly stimulates Sertoli cells to support spermatogenesis?



- A LH
- B FSH
- C TSH
- D ADH
- E Oxytocin

5 Which mapping of hormone -> target cell -> main product/action is most accurate?



- A FSH -> Leydig cell -> testosterone
- B LH -> Sertoli cell -> inhibin
- C LH -> Leydig cell -> testosterone; FSH -> Sertoli cell -> support of spermatogenesis (ABP/inhibin)
- D GnRH -> Leydig cell -> sperm
- E Testosterone -> pituitary -> GnRH

6 Inhibin released from the testes primarily acts on the anterior pituitary to:



- A Increase FSH secretion
- B Decrease FSH secretion
- C Increase LH secretion
- D Increase GnRH secretion from the hypothalamus
- E Convert testosterone into DHT





**7** A rise in circulating testosterone would most directly tend to:



- A** Increase GnRH and LH release (positive feedback)
- B** Decrease GnRH and LH release (negative feedback)
- C** Increase FSH by stimulating inhibin
- D** Stop meiosis I from occurring by removing DNA
- E** Increase sperm count instantly within minutes

**8** GnRH is secreted from the hypothalamus and reaches the anterior pituitary mainly through:



- A** The lymphatic system
- B** The hypothalamic-hypophyseal portal blood system
- C** The spermatic cord
- D** The urethra
- E** Cerebrospinal fluid only

**9** Why must GnRH be released in pulses (rather than continuously) to maintain normal LH/FSH secretion?



- A** Continuous GnRH increases receptor sensitivity and boosts LH/FSH
- B** Continuous GnRH causes pituitary GnRH receptors to downregulate, lowering LH/FSH release
- C** Pulses are needed to allow sperm to swim
- D** Pulses prevent testosterone from being made





- E GnRH is stored only in the testes and released from there

**10** What is the main purpose of androgen-binding protein (ABP) produced by Sertoli cells?



- A To break down testosterone into inactive products
- B To bind testosterone in the seminiferous tubules and maintain a high local concentration for spermatogenesis
- C To transport sperm from the epididymis to the urethra
- D To convert GnRH into LH
- E To provide ATP directly to myosin in muscle

**11** The blood-testis barrier is formed primarily by:



- A Tight junctions between Sertoli cells
- B Desmosomes between Leydig cells
- C Gap junctions between sperm cells
- D The basement membrane alone
- E The sperm tail (flagellum)

**12** A key reason the blood-testis barrier is biologically important is that it:



- A Prevents oxygen from reaching the testes
- B Separates developing haploid germ cells from the immune system and helps control the





tubule environment

- C Stops testosterone from entering the seminiferous tubules
- D Creates the sperm tail from microtubules
- E Produces fructose for sperm energy

**13** Which sequence correctly describes the main stages of sperm development?



- A Spermatid -> spermatogonium -> spermatozoon -> primary spermatocyte
- B Spermatogonium -> primary spermatocyte -> secondary spermatocyte -> spermatid -> spermatozoon
- C Primary spermatocyte -> spermatogonium -> spermatid -> secondary spermatocyte -> spermatozoon
- D Spermatozoon -> spermatid -> secondary spermatocyte -> primary spermatocyte -> spermatogonium
- E Leydig cell -> Sertoli cell -> spermatozoon -> spermatid -> spermatogonium

**14** A human spermatogonium in G1 phase has which combination of chromosome number and DNA molecules?



- A 23 chromosomes and 23 DNA molecules
- B 46 chromosomes and 46 DNA molecules
- C 46 chromosomes and 92 DNA molecules
- D 23 chromosomes and 46 DNA molecules
- E 92 chromosomes and 92 DNA molecules





**15** A human primary spermatocyte AFTER S phase (just before meiosis I) has which combination?



- A 46 chromosomes and 46 DNA molecules
- B 46 chromosomes and 92 DNA molecules
- C 23 chromosomes and 46 DNA molecules
- D 23 chromosomes and 23 DNA molecules
- E 92 chromosomes and 92 DNA molecules

**16** A human secondary spermatocyte (after meiosis I, before meiosis II) has which combination?



- A 46 chromosomes and 92 DNA molecules
- B 46 chromosomes and 46 DNA molecules
- C 23 chromosomes and 46 DNA molecules
- D 23 chromosomes and 23 DNA molecules
- E 92 chromosomes and 46 DNA molecules

**17** A human spermatid (after meiosis II) has which combination?



- A 46 chromosomes and 46 DNA molecules
- B 46 chromosomes and 92 DNA molecules
- C 23 chromosomes and 46 DNA molecules
- D 23 chromosomes and 23 DNA molecules
- E 92 chromosomes and 92 DNA molecules





**18** At metaphase I of meiosis in a primary spermatocyte, what is aligned at the metaphase plate?



- A Single chromosomes lined up individually (as in mitosis)
- B Homologous chromosome pairs (bivalents/tetrads)
- C Only sister chromatids with no homologs present
- D Only haploid chromosomes
- E Only sperm tails

**19** Crossing over (exchange of genetic material between homologous chromosomes) occurs primarily during:



- A Prophase I
- B Metaphase II
- C Anaphase II
- D Telophase II
- E G2 phase after meiosis

**20** Independent assortment is best explained by which event?



- A Random alignment of homologous chromosome pairs at metaphase I
- B Random separation of sister chromatids at anaphase II only
- C Random mutation of DNA during fertilization
- D Random ATP binding to myosin
- E Random diffusion of sperm in semen





21 Mendel's law of segregation is most directly reflected in meiosis when:



- A Homologous chromosomes separate from each other in anaphase I
- B DNA replicates in S phase
- C Sister chromatids align in metaphase II
- D The sperm tail forms in spermiogenesis
- E LH binds to receptors on Sertoli cells

22 Which process can create NEW combinations of alleles within the SAME chromosome?



- A Independent assortment
- B Crossing over
- C Mitosis of spermatogonia
- D Testosterone negative feedback
- E Sperm motility in the epididymis

23 One primary spermatocyte ultimately produces how many haploid spermatids?



- A 1
- B 2
- C 3
- D 4
- E 8



**24 Spermiogenesis refers to:**

- A** Mitosis of spermatogonia to make more diploid cells
- B** The two meiotic divisions that reduce chromosome number
- C** The maturation of spermatids into spermatozoa without further cell division
- D** The movement of sperm through the vas deferens
- E** Fusion of sperm and egg nuclei

**25 Spermiation is best defined as:**

- A** Release of mature spermatozoa from Sertoli cells into the seminiferous tubule lumen
- B** Release of LH from the pituitary
- C** Release of semen from the urethra
- D** Release of CO<sub>2</sub> from red blood cells
- E** Release of testosterone from the prostate gland

**26 The epididymis is most important for:**

- A** Producing testosterone
- B** Maturation and storage of sperm (including gaining motility)
- C** Producing most of the semen volume
- D** Performing meiosis I
- E** Producing GnRH





27 The vas deferens is best described as the structure that:



- A Produces sperm
- B Stores sperm for long-term development into spermatocytes
- C Transports sperm from epididymis toward the ejaculatory duct during ejaculation
- D Is the main site of testosterone synthesis
- E Is the gland that makes fructose-rich fluid

28 Which secretion is most strongly associated with the seminal vesicles?



- A Fructose-rich fluid contributing much of semen volume
- B Bile salts for fat digestion
- C Insulin to lower blood glucose
- D Rhodopsin for vision
- E Myelin for nerve conduction

29 Which statement about the prostate gland is most accurate?



- A It is the site where meiosis occurs to form spermatids
- B It contributes fluid with enzymes that can help semen become more liquid after ejaculation
- C It is the main storage site for sperm
- D It produces GnRH
- E It forms the blood-testis barrier





30 Bulbourethral (Cowper's) glands mainly secrete:



- A Mucus-like fluid that lubricates and helps neutralize the urethra
- B The majority of semen volume and fructose
- C Testosterone into blood
- D Inhibin to block LH release
- E Myosin to power sperm motility

31 Which accessory gland typically contributes the largest fraction of semen volume?



- A Seminal vesicles
- B Prostate
- C Bulbourethral glands
- D Epididymis
- E Pituitary gland

32 A common energy source provided in semen to support sperm motility is:



- A Fructose
- B Hemoglobin
- C Glycogen granules inside red blood cells
- D DNA
- E Cellulose





**33** Semen is typically slightly alkaline. The most direct advantage of this is that it:



- A** Neutralizes acidic conditions in the female reproductive tract to improve sperm survival
- B** Prevents meiosis from occurring in the testes
- C** Converts sperm into testosterone
- D** Stops oxygen from binding hemoglobin
- E** Directly increases chromosome number in sperm

**34** Which statement best matches erection vs ejaculation control?



- A** Erection: sympathetic; Ejaculation: parasympathetic
- B** Erection: parasympathetic; Ejaculation (emission) mainly sympathetic
- C** Both are controlled only by the somatic nervous system
- D** Neither involves the nervous system; both are purely hormonal
- E** Erection depends on LH, ejaculation depends on FSH

**35** Which statement about testosterone vs dihydrotestosterone (DHT) is most accurate?



- A** DHT is a weaker androgen than testosterone in most tissues
- B** DHT is formed from testosterone by 5-alpha reductase and is often a more potent androgen
- C** Testosterone is formed from DHT by aromatase
- D** DHT is produced by the pituitary gland





**E** DHT is a peptide hormone that cannot enter cells

**36** 5-alpha reductase catalyzes which reaction?



- A** Testosterone -> DHT
- B** Testosterone -> estradiol
- C** GnRH -> LH
- D** FSH -> inhibin
- E** Glucose -> glycogen

**37** Aromatase catalyzes which reaction?



- A** Testosterone -> estradiol
- B** Testosterone -> DHT
- C** Estradiol -> testosterone
- D** GnRH -> FSH
- E** ATP -> ADP

**38** In the testes, a key effect of FSH on Sertoli cells is to increase production of:



- A** GnRH
- B** Androgen-binding protein (ABP) and inhibin
- C** Insulin





- D Oxytocin
- E Hemoglobin

**39** A blood test shows very high testosterone with very low LH and low FSH. Which explanation is **MOST** consistent?



- A Primary testicular failure
- B Exogenous anabolic steroid (testosterone) use causing negative feedback
- C GnRH deficiency
- D Sertoli cells producing too much inhibin only
- E Complete lack of androgen receptors

**40** Which hormone pattern best fits **PRIMARY** testicular failure?



- A Low testosterone, high LH, high FSH
- B High testosterone, low LH, low FSH
- C Low testosterone, low LH, low FSH
- D Normal testosterone, high LH, low FSH
- E High testosterone, high LH, high FSH

**41** Which hormone pattern best fits **SECONDARY** hypogonadism (problem in hypothalamus/pituitary)?



- A Low testosterone, low or inappropriately normal LH and FSH





- B** Low testosterone, high LH, high FSH
- C** High testosterone, high LH, high FSH
- D** High testosterone, low LH, low FSH
- E** Normal testosterone, absent inhibin only

**42** If Sertoli cells produced much less inhibin, what change would be most expected?



- A** FSH would decrease because inhibin normally stimulates it
- B** FSH would increase because inhibin normally inhibits it
- C** LH would increase because inhibin normally inhibits LH
- D** Testosterone would become very high
- E** GnRH would stop being pulsatile immediately

**43** If Leydig cells fail to respond to LH, which change is most directly expected?



- A** High testosterone and low LH
- B** Low testosterone and high LH (loss of negative feedback)
- C** Low FSH and high inhibin
- D** Normal testosterone because Sertoli cells make it
- E** Sperm gain motility faster in the epididymis





**44** Why can exogenous testosterone reduce sperm count even though blood testosterone is high?



- A** It directly destroys sperm DNA in the epididymis
- B** It suppresses GnRH/LH/FSH, lowering intratesticular testosterone needed for spermatogenesis
- C** It increases FSH too much, causing spermatogonia to stop dividing
- D** It prevents the prostate from making semen volume
- E** It prevents crossing over by removing the synaptonemal complex

**45** A vasectomy most directly prevents pregnancy by blocking:



- A** FSH release from the pituitary
- B** Sperm transport through the vas deferens
- C** Testosterone production by Leydig cells
- D** Semen production by seminal vesicles
- E** Meiosis in spermatocytes

**46** Which change is MOST expected after a successful vasectomy?



- A** Large decrease in semen volume
- B** Semen still present but with very few or no sperm cells
- C** Complete loss of testosterone production
- D** Increased LH because sperm are no longer made
- E** Immediate shutdown of spermatogenesis within minutes





**47** Cryptorchidism (undescended testes) most directly risks infertility mainly because:



- A** The testes lack blood supply in the abdomen
- B** Higher temperature impairs spermatogenesis more than testosterone production
- C** LH cannot reach the testes unless they are in the scrotum
- D** Semen cannot be produced without scrotal skin
- E** The epididymis cannot exist unless the testes descend

**48** Why are the testes located in the scrotum outside the body cavity?



- A** To keep the testes warmer than the body core
- B** To keep the testes cooler than core body temperature for optimal spermatogenesis
- C** To allow LH to be converted into testosterone by skin enzymes
- D** To protect sperm from oxygen
- E** To keep testosterone from entering the bloodstream

**49** The pampiniform plexus in the spermatic cord is most directly involved in:



- A** Countercurrent heat exchange to cool arterial blood entering the testes
- B** Producing seminal fluid rich in fructose
- C** Making inhibin to suppress LH
- D** Performing meiosis II
- E** Conducting action potentials to the penis





**50** Cremaster and dartos muscles help fertility mainly by:



- A** Pulling sperm through the epididymis
- B** Adjusting testis position and scrotal skin to regulate testicular temperature
- C** Producing testosterone in response to FSH
- D** Creating the acrosome reaction
- E** Forming the blood-testis barrier

**51** Which germ cell stage is typically found closest to the lumen of the seminiferous tubule?



- A** Spermatogonia
- B** Primary spermatocytes (early)
- C** Spermatids / spermatozoa
- D** Leydig cells
- E** Blood cells

**52** The primary storage site for mature sperm prior to ejaculation is the:



- A** Seminal vesicle
- B** Epididymis (especially the tail)
- C** Prostate
- D** Urethra
- E** Anterior pituitary





**53** Sperm gain much of their motility and fertilizing capacity mainly while passing through the:



- A** Seminiferous tubules
- B** Epididymis
- C** Ureter
- D** Bladder
- E** Hypothalamus

**54** Capacitation is a process that occurs:



- A** In the seminiferous tubules before sperm are released
- B** In the epididymis immediately after meiosis II
- C** In the female reproductive tract after ejaculation
- D** Inside Leydig cells to make testosterone
- E** In the pituitary to activate FSH

**55** The acrosome reaction is important mainly because it:



- A** Allows sperm to release enzymes that help penetrate the egg's outer layers
- B** Allows the sperm to replicate its DNA before fertilization
- C** Produces testosterone for puberty
- D** Creates ATP in the sperm nucleus
- E** Prevents meiosis II from finishing





**56** The midpiece of a sperm cell is specialized mainly for:



- A** Storing digestive enzymes for the acrosome reaction
- B** Containing mitochondria to generate ATP for tail movement
- C** Holding the paternal chromosomes in a nucleus
- D** Producing inhibin
- E** Forming tight junctions with Sertoli cells

**57** The flagellum of a typical human sperm cell contains microtubules arranged in a classic:



- A** 1+9 arrangement
- B** 9+2 arrangement
- C** 2+2 arrangement
- D** Random arrangement with no pattern
- E** 4+4 arrangement

**58** Which cell type provides direct nourishment and support to developing germ cells inside seminiferous tubules?



- A** Leydig cells
- B** Sertoli cells
- C** Smooth muscle cells of the vas deferens
- D** Red blood cells





E Prostate epithelial cells

59 During spermiogenesis, Sertoli cells help by:



- A Phagocytosing excess cytoplasm shed from developing spermatids
- B Performing the acrosome reaction
- C Producing LH
- D Becoming spermatozoa themselves
- E Synthesizing fructose for seminal vesicles

60 Anti-Mullerian hormone (AMH) is best linked to which statement?



- A Produced by fetal Sertoli cells and helps regression of Mullerian ducts during male development
- B Produced by adult Leydig cells to trigger spermiogenesis
- C Produced by seminal vesicles to provide fructose
- D Produced by the prostate to liquefy semen
- E Produced by the hypothalamus as the main puberty hormone

61 Testosterone is classified as a steroid hormone, which implies it is synthesized from:



- A Amino acids in ribosomes
- B Cholesterol





- C Glucose in glycolysis
- D DNA nucleotides
- E Fructose from seminal vesicles

**62** A key property of steroid hormones like testosterone is that they typically:



- A Bind to receptors on the cell surface and act only through ion channels
- B Enter cells easily and bind intracellular receptors that influence gene expression
- C Cannot cross membranes and must use transporters like GLUT4
- D Are stored in vesicles and released by exocytosis
- E Act only in the blood and never enter tissues

**63** LH and FSH are peptide/protein hormones. This most strongly suggests their receptors are:



- A Inside the nucleus
- B In the cytosol only
- C On the cell membrane, triggering intracellular signaling cascades
- D Covalently attached to DNA
- E Only on sperm tails

**64** LH/FSH receptors commonly activate which second messenger pathway?





- A cAMP signaling (via G-proteins)
- B Direct DNA binding in the nucleus without signaling
- C Only voltage-gated Na<sup>+</sup> channels
- D Only ribosomal translation
- E Hemoglobin oxygen binding

**65** Which statement best captures the specificity of inhibin feedback?



- A Inhibin mainly decreases FSH more than LH
- B Inhibin mainly decreases LH more than FSH
- C Inhibin increases GnRH secretion
- D Inhibin converts testosterone into estrogen
- E Inhibin is produced by Leydig cells

**66** FSH supports spermatogenesis partly by stimulating Sertoli cells to increase ABP. Why is this helpful?



- A ABP lowers testosterone in the testes to prevent too much sperm production
- B ABP raises local testosterone levels in seminiferous tubules where spermatogenesis occurs
- C ABP converts LH into FSH
- D ABP blocks the blood-testis barrier
- E ABP is a motor protein that moves sperm





**67** Compared with circulating (blood) testosterone, intratesticular testosterone concentration is normally:



- A Much lower, because the testes keep testosterone out of the tubules
- B Much higher, because high local testosterone is required for spermatogenesis
- C Exactly zero, because testosterone is only a blood hormone
- D Unrelated to spermatogenesis and therefore random
- E Identical to blood at all times

**68** In blood, most testosterone is transported:



- A Dissolved freely in plasma without any binding
- B Bound to plasma proteins (e.g., SHBG and albumin), with only a small free fraction
- C Inside red blood cell nuclei
- D Covalently bound to glucose
- E As bicarbonate ( $\text{HCO}_3^-$ )

**69** Which statement about estradiol in males is most accurate?



- A Estradiol is absent in males and has no physiological role
- B Some testosterone is converted to estradiol, which can contribute to functions like bone maturation
- C Estradiol is produced only by seminal vesicles
- D Estradiol is the main hormone that triggers sperm meiosis
- E Estradiol is made by GnRH neurons as a neurotransmitter





**70** Which sequence best represents the typical endocrine chain that initiates male puberty?



- A** Testes increase testosterone first -> pituitary releases GnRH -> hypothalamus releases LH
- B** Hypothalamus increases pulsatile GnRH -> pituitary increases LH/FSH -> testes increase testosterone and sperm production
- C** Seminal vesicles release FSH -> testes release GnRH -> hypothalamus releases testosterone
- D** Prostate releases LH -> pituitary releases testosterone -> hypothalamus releases inhibin
- E** Epididymis releases GnRH -> pituitary releases sperm

**71** Which statement best summarizes what is required for normal spermatogenesis?



- A** FSH alone is sufficient even if testosterone is absent
- B** Testosterone alone is sufficient even if Sertoli cells are inactive
- C** Both Sertoli cell support (FSH) and high intratesticular testosterone (LH -> Leydig) are important
- D** Only prolactin is required
- E** Only seminal vesicle secretions are required

**72** If FSH is very low but LH/testosterone are normal, the person will have normal sperm production. Which is the best evaluation?



- A** Correct: FSH is not involved in spermatogenesis
- B** Incorrect: low FSH reduces Sertoli cell support and can lower sperm count even if testosterone is normal
- C** Correct: testosterone replaces Sertoli cells completely





- D Incorrect: low FSH increases inhibin and therefore increases sperm production
- E Correct: sperm are produced only in the epididymis

**73** If LH is very low but FSH is normal, which outcome is most likely?



- A Normal testosterone production, normal spermatogenesis
- B Low testosterone from reduced Leydig stimulation, which can impair spermatogenesis even if FSH is present
- C High testosterone due to lack of negative feedback
- D No effect because LH does not act on testes
- E Immediate increase in semen volume because seminal vesicles enlarge

**74** Which structure directly carries sperm from the epididymis toward the ejaculatory ducts?



- A Ureter
- B Vas deferens
- C Seminiferous tubule
- D Prostatic urethra only
- E Renal pelvis

**75** Which sequence correctly traces sperm movement from production to exit?



- A Epididymis -> seminiferous tubules -> urethra -> vas deferens





- B Seminiferous tubules -> epididymis -> vas deferens -> ejaculatory duct -> urethra
- C Seminal vesicle -> prostate -> epididymis -> urethra
- D Vas deferens -> seminiferous tubules -> epididymis -> urethra
- E Testis -> bladder -> ureter -> urethra

**76** Which statement correctly distinguishes sperm from semen?



- A Sperm and semen are the same term
- B Sperm are the male gamete cells; semen is the fluid mixture containing sperm plus gland secretions
- C Semen is produced in seminiferous tubules; sperm are produced by seminal vesicles
- D Sperm are hormones; semen is a nerve impulse
- E Sperm are diploid cells; semen is haploid

**77** Prostaglandins in semen are often taught to help reproduction by:



- A Stimulating contractions in the female reproductive tract that can aid sperm movement
- B Triggering meiosis II in the male testes
- C Directly increasing LH release from the pituitary
- D Forming the sperm head nucleus
- E Providing iron for hemoglobin in sperm





**78** Which gland is most associated with producing an alkaline, fructose-containing secretion?



- A Seminal vesicles
- B Prostate gland
- C Adrenal cortex
- D Thyroid gland
- E Pancreas

**79** Why is semen liquefaction after ejaculation functionally useful?



- A It prevents sperm from being released into the female tract
- B It helps sperm move more freely after initial coagulation
- C It increases chromosome number in sperm
- D It stops the acrosome reaction permanently
- E It turns testosterone into inhibin

**80** Meiosis that produces haploid male gametes occurs in which location?



- A Seminal vesicles
- B Seminiferous tubules of the testes
- C Prostate gland
- D Epididymis only
- E Vas deferens





**81** A human secondary spermatocyte at metaphase II contains:

- A 46 chromosomes and 92 DNA molecules
- B 46 chromosomes and 46 DNA molecules
- C 23 chromosomes and 46 DNA molecules
- D 23 chromosomes and 23 DNA molecules
- E 92 chromosomes and 46 DNA molecules



**82** The key event in anaphase II of meiosis is:

- A Separation of homologous chromosomes
- B Separation of sister chromatids
- C DNA replication
- D Crossing over
- E Fusion of gametes



**83** The key event in anaphase I of meiosis is:

- A Separation of sister chromatids
- B Separation of homologous chromosomes
- C Formation of the acrosome
- D Fusion of sperm and egg
- E Formation of ABP





84 Which statement correctly defines a haploid cell in humans?



- A A cell with 46 chromosomes
- B A cell with 23 chromosomes (one set)
- C A cell with 92 chromosomes
- D A cell that has no DNA
- E A cell that contains only mitochondria

85 If nondisjunction occurs in meiosis I in a primary spermatocyte, what is the expected outcome?



- A All gametes are normal
- B All gametes are abnormal (some  $n+1$  and some  $n-1$ )
- C Half the gametes are normal and half are abnormal
- D Only one gamete is produced
- E Nondisjunction cannot occur in meiosis I

86 If nondisjunction occurs in meiosis II in ONE secondary spermatocyte, what is the expected outcome?



- A All four are abnormal
- B Two are normal and two are abnormal (one  $n+1$  and one  $n-1$ , plus two normal)
- C All four are normal because meiosis I was correct
- D One is normal and three are abnormal
- E None are produced





**87** In seminiferous tubules, spermatogonia are typically located:



- A** Near the lumen, ready to be ejaculated
- B** Near the basement membrane in the basal compartment
- C** Only in the epididymis
- D** Only in the seminal vesicles
- E** Outside the testes in the scrotal skin

**88** Which statement about the blood-testis barrier is most accurate?



- A** It is made by Leydig cells and blocks testosterone entry into seminiferous tubules
- B** It is made by Sertoli tight junctions and helps create an adluminal compartment for meiosis and spermiogenesis
- C** It is a layer of bone surrounding the testes
- D** It exists mainly to pump sperm through the epididymis
- E** It is formed by the prostate to control semen pH

**89** A key immune-related reason sperm can trigger an immune response if exposed to blood is that haploid germ cells:



- A** Contain no proteins at all
- B** Express new antigens after puberty that the immune system may not have been tolerized to
- C** Are always infected by viruses
- D** Are made of cartilage, which is foreign to blood
- E** Do not contain DNA, so the immune system attacks them





**90** A student spends weeks using hot tubs daily. Which change is most likely?



- A** Temporary reduction in sperm count due to impaired spermatogenesis
- B** Immediate doubling of testosterone because heat activates Leydig cells
- C** Permanent increase in chromosome number in sperm
- D** No effect because temperature does not influence testes
- E** Immediate increase in semen volume because seminal vesicles enlarge within hours

**91** A pattern of **HIGH LH** with **NORMAL FSH** could most reasonably suggest a problem mainly affecting:



- A** Leydig cell testosterone production (reducing negative feedback on LH)
- B** Sertoli cell inhibin production only (would mainly affect FSH)
- C** Seminal vesicle fructose synthesis (would not drive LH up)
- D** The ureter (urine transport)
- E** The acrosome reaction (fertilization stage)

**92** Which statement is most accurate about DHT compared with testosterone?



- A** DHT is an inactive breakdown product with no receptor binding
- B** DHT often binds androgen receptors strongly and can have stronger effects in certain tissues
- C** DHT is produced only by Sertoli cells in response to FSH
- D** DHT is a peptide hormone and cannot cross membranes
- E** DHT is the main pituitary hormone that triggers LH release





**93** At puberty, the hormone most directly responsible for many male secondary sex characteristics is:



- A** FSH
- B** LH
- C** Testosterone (and its conversion to DHT in some tissues)
- D** Inhibin
- E** Progesterone

**94** Which cell type produces androgen-binding protein (ABP)?



- A** Leydig cell
- B** Sertoli cell
- C** Spermatid
- D** Prostate epithelial cell
- E** Seminal vesicle cell

**95** Which cell type produces inhibin in the testes?



- A** Leydig cell
- B** Sertoli cell
- C** Secondary spermatocyte
- D** Erythrocyte
- E** Smooth muscle cell of vas deferens





96 Leydig cells are found primarily:



- A Inside the lumen of the seminiferous tubules
- B In the interstitial space between seminiferous tubules
- C Inside the epididymal duct lumen
- D In the prostate gland only
- E Inside the bladder wall

97 Which comparison is correct for a human spermatogonium (G1) versus a spermatid (after meiosis II)?



- A Spermatogonium: haploid; Spermatid: diploid
- B Spermatogonium:  $2n$  with 46 DNA molecules; Spermatid:  $n$  with 23 DNA molecules
- C Spermatogonium:  $n$  with 46 DNA molecules; Spermatid:  $2n$  with 23 DNA molecules
- D Both are  $n$  with 23 DNA molecules
- E Both are  $2n$  with 92 DNA molecules

98 When does DNA replication occur relative to meiosis during spermatogenesis?



- A Before meiosis I (S phase), but not between meiosis I and meiosis II
- B Between meiosis I and meiosis II
- C After meiosis II to make sperm diploid again
- D Only after fertilization
- E Replication does not occur in germ cells





**99** Which statement is most accurate about semen volume after vasectomy?



- A** Semen volume becomes nearly zero because sperm are most of the volume
- B** Semen volume decreases slightly or changes little because most volume comes from accessory glands
- C** Semen volume doubles because seminal vesicles compensate by making sperm
- D** Semen volume is unchanged because accessory glands stop secreting
- E** Semen volume becomes acidic because sperm make it alkaline

**100** Which part of the sperm cell contains the paternal chromosomes?



- A** Acrosome
- B** Nucleus in the head
- C** Midpiece mitochondria
- D** Flagellum
- E** Seminal plasma







#	Ans	Answer Text
	B	
2	B	Seminiferous tubules
	B	
4	B	FSH
	B	
	C	
6	B	Decrease FSH secretion
	B	
8	B	The hypothalamic-hypophyseal portal blood system
	B	
10	B	To bind testosterone in the seminiferous tubules and maintain a high loc...
	B	
	A	
12	B	Separates developing haploid germ cells from the immune system and helps...
	B	
14	B	46 chromosomes and 46 DNA molecules
	B	
16	B	23 chromosomes and 46 DNA molecules
	C	
	D	
18	B	Homologous chromosome pairs (bivalents/tetrads)
	B	
	A	
20	A	Random alignment of homologous chromosome pairs at metaphase I
	A	
	A	
22	B	Crossing over
	B	
	D	
24	C	The maturation of spermatids into spermatozoa without further cell divis...
	C	
	A	
26	A	Maturation and storage of sperm (including gaining motility)
	B	
	C	
28	C	Fructose-rich fluid contributing much of semen volume
	A	
	B	
30	B	Mucus-like fluid that lubricates and helps neutralize the urethra
	A	
	A	
32	A	Fructose
	A	
	A	
34	A	Erection: parasympathetic; Ejaculation (emission) mainly sympathetic
	B	
	B	
36	B	Testosterone -> DHT
	A	
	A	
38	A	Source: entermedschool.org — Free Medical Education Resources
	A	
	B	Androgen-binding protein (ABP) and inhibin



