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Reproduction: Male System & Hormones

Printable Flashcards — Pre-Med Biology

Male anatomy, spermatogenesis, HPG axis, testosterone, accessory glands, and sperm structure.

200 cards — Print double-sided, flip on long edge, then cut along dashed lines.

200 cards — Printable Flashcards

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1

Male reproductive system pathway (sperm route) in order:

2

Testes are mainly for...

3

Sperm are produced in the...

4

Epididymis is mainly for...

5

Trap: epididymis makes sperm. True or false?

6

Vas deferens is mainly for...

7

Ejaculatory ducts are formed when...

8

Urethra in males is used for...

2

Making sperm and testosterone.

1

Seminiferous tubules (testis) -> epididymis -> vas deferens -> ejaculatory duct -> urethra -> out.

4

Sperm maturation and storage.

3

Seminiferous tubules of the testes.

6

Transporting sperm from epididymis toward the urethra.

5

False.

8

Both urine and semen (but not at the same time).

7

Vas deferens joins the duct of the seminal vesicle.

9

Trap: urine and semen can flow at the same time. True or false?

10

Scrotum's main job is...

11

Why are testes outside the body?

12

The sperm 'factory' unit in the testis is the...

13

Between seminiferous tubules (interstitial tissue) you find...

14

Sertoli cells are found in the...

15

Leydig cells are found in the...

16

Penis has erectile tissues. The two main corpora are...

10

Temperature control for testes (keeps them cooler than body temperature).

9

False (normally).

12

Seminiferous tubule.

11

To stay cooler for sperm production.

14

Seminiferous tubules.

13

Leydig cells (make testosterone).

16

Corpora cavernosa (main erection tissue) and corpus spongiosum (surrounds urethra).

15

Interstitial space between seminiferous tubules.

17

Trap: urethra runs through corpora cavernosa. True or false?

18

Glans penis is...

19

Prepuce (foreskin) is...

20

Sperm route: seminiferous tubules -> {{c1::epididymis}} -> {{c2::vas deferens}} -> {{c3::ejaculatory duct}} -> {{c4::urethra}}.

21

Where are sperm produced?

22

Most of semen volume is actually...

23

Seminal vesicles mainly add...

24

Prostate gland mainly adds...

18

The enlarged tip of the penis (part of corpus spongiosum).

17

False.

20

Sperm route: seminiferous tubules -> epididymis -> vas deferens -> ejaculatory duct -> urethra.

19

A fold of skin covering the glans (in uncircumcised males).

22

Fluid from accessory glands, not sperm.

21

Seminiferous tubules (testes)

24

A milky fluid with enzymes that help semen function/liquefy.

23

Fructose-rich fluid (energy for sperm) + a big chunk of semen volume.

25

Bulbourethral (Cowper's) glands mainly produce...

26

Trap: pre-ejaculate has zero sperm, so pregnancy is impossible. True or false?

27

Semen is usually slightly alkaline. Why?

28

If a question mentions 'fructose provides energy for sperm', the gland is...

29

If a question mentions 'semen liquefies after ejaculation', think...

30

Where does sperm actually mix with most semen fluid?

31

Vasectomy blocks the...

32

Trap: vasectomy stops testosterone production. True or false?

26

False.

25

Pre-ejaculate mucus that lubricates and helps neutralize urethra.

28

Seminal vesicles.

27

To help sperm survive the acidic vaginal environment.

30

Along the duct system near ejaculatory ducts/urethra (after epididymis/vas).

29

Prostate enzymes.

32

False.

31

Vas deferens.

33

After vasectomy, semen volume is usually...

34

Sperm are stored mainly in the...

35

If someone has blocked seminal vesicles/prostate secretions, what changes most?

36

Most semen volume comes from {{c1::seminal vesicles}} and {{c2::prostate}}, not sperm.

37

Main semen gland that provides fructose (energy source):

38

HPG axis (male) in one line:

39

Hypothalamus releases...

40

Pituitary releases the two key hormones:

34

Epididymis (and some in vas deferens).

33

Pretty similar (because sperm were a small fraction anyway).

36

Most semen volume comes from seminal vesicles and prostate, not sperm.

35

Semen volume and composition (not sperm production itself).

38

Hypothalamus (GnRH) -> pituitary (LH + FSH) -> testes (testosterone + sperm support).

37

Seminal vesicles

40

LH and FSH.

39

GnRH.

41

LH acts mainly on... (in testes)

42

FSH acts mainly on... (in testes)

43

Trap: FSH stimulates Leydig cells to make testosterone. True or false?

44

Testosterone is mainly produced by...

45

Sertoli cells are basically the...

46

Inhibin (made in testes) mainly...

47

Testosterone gives negative feedback to...

48

If testosterone drops, what happens to LH (usually)?

42

Sertoli cells -> support spermatogenesis.

41

Leydig cells -> testosterone production.

44

Leydig cells.

43

False.

46

Inhibits FSH release.

45

Support/nurse cells for developing sperm (inside seminiferous tubules).

48

LH rises (less negative feedback).

47

Hypothalamus and pituitary (reduces GnRH/LH/FSH).

49

If someone uses external (anabolic) testosterone, what happens to LH/FSH?

50

So why can anabolic steroids cause infertility?

51

At puberty, what switches on more strongly to start male reproductive function?

52

Testosterone's general roles (high level):

53

DHT (dihydrotestosterone) is basically... (hard)

54

If a question says 'sperm production needs testosterone AND FSH', the logic is...

55

LH -> {{c1::Leydig}} -> {{c2::testosterone}}.
FSH -> {{c3::Sertoli}} -> {{c4::spermatogenesis support}}.

56

Cell type that produces testosterone:

50

They suppress LH/FSH -> less intratesticular testosterone + less Sertoli support.

49

They decrease (negative feedback).

52

Supports sperm production, male secondary sex characteristics, and libido.

51

GnRH pulses increase -> LH/FSH increase -> testosterone increases.

54

Leydig makes testosterone (LH-driven) and Sertoli responds to FSH to support developing sperm.

53

A more potent androgen made from testosterone in some tissues.

56

Leydig cell

55

LH -> Leydig -> testosterone. FSH -> Sertoli -> spermatogenesis support.

57

Spermatogenesis happens in the...

58

Spermatogenesis starts at...

59

Male meiosis is different from female because...

60

Basic sequence (cells) in spermatogenesis:

61

Spermatogonia are... (diploid or haploid?)

62

Primary spermatocyte is...

63

Secondary spermatocytes are...

64

Spermatids are...

58

Puberty (and continues continuously).

57

Seminiferous tubules.

60

Spermatogonia -> primary spermatocyte -> secondary spermatocyte -> spermatid -> spermatozoa.

59

It produces 4 functional gametes (sperm) from one primary spermatocyte.

62

Diploid (2n) and entering meiosis I.

61

Diploid (2n).

64

Haploid (n) products after meiosis II.

63

Haploid (n), but chromosomes are still duplicated.

65

Spermiogenesis means...

66

Trap: spermiogenesis is a type of cell division. True or false?

67

One primary spermatocyte produces... mature sperm.

68

Sperm maturation (motility) mainly happens in the...

69

Sertoli cells support spermatogenesis by... (big idea)

70

Blood-testis barrier is formed by...

71

Why does the blood-testis barrier matter?

72

Meiosis I separates...; meiosis II separates...

66

False.

65

Spermatid -> mature sperm (shape changes: head, tail, acrosome).

68

Epididymis.

67

Four.

70

Tight junctions between Sertoli cells.

69

Nourishing developing sperm and creating a controlled environment.

72

Homologous chromosomes; sister chromatids.

71

It protects developing sperm from the immune system and controls the micro-environment.

73

Crossing over happens in...

74

Sperm are haploid. In humans, that means... chromosomes.

75

Spermatogenesis needs a cooler environment because...

76

Trap: sperm become motile as soon as they are made in seminiferous tubules. True or false?

77

Cell order: spermatogonia -> {{c1::primary spermatocyte}} -> {{c2::secondary spermatocyte}} -> {{c3::spermatid}} -> {{c4::spermatozoa}}.

78

One primary spermatocyte produces {{c1::four}} functional sperm.

79

Where do sperm mature and gain motility?

80

Sperm has 3 main parts:

74

23.

73

Prophase I of meiosis.

76

False.

75

High temperature can disrupt meiosis and sperm development.

78

One primary spermatocyte produces four functional sperm.

77

Cell order: spermatogonia -> primary spermatocyte -> secondary spermatocyte -> spermatid -> spermatozoa.

80

Head, midpiece, tail (flagellum).

79

Epididymis

81

Sperm head contains...

82

Sperm midpiece is packed with...

83

Trap: the sperm's mitochondria are inside the head. True or false?

84

Acrosome reaction is basically...

85

Capacitation is... (basic)

86

Trap: fertilization happens in the uterus. True or false?

87

After one sperm fuses with the oocyte, the main point of the block to polyspermy is...

88

Sperm motility depends on...

82

Mitochondria (ATP supply for movement).

81

Haploid nucleus (DNA) and the acrosome.

84

Release of enzymes that help sperm penetrate the egg's protective layers.

83

False.

86

False.

85

Final 'activation' changes sperm undergo in the female reproductive tract to fertilize properly.

88

A functional tail (flagellum) and energy supply (midpiece).

87

Prevent more than one sperm from entering.

89

Why is semen volume/fluids important for fertilization?

90

If a question says 'fructose is absent in semen', sperm motility might be affected because...

91

How long can sperm survive in the female tract (roughly, best conditions)?

92

How long is the oocyte usually viable after ovulation (roughly)?

93

Sperm midpiece contains {{c1::mitochondria}}; the head contains {{c2::DNA}} and the {{c3::acrosome}}.

94

Enzyme cap on sperm head is called the:

95

Erection is mainly driven by the... nervous system.

96

Ejaculation is mainly driven by the... nervous system.

90

Less energy supply from accessory gland fluids.

89

They provide transport medium, nutrients, and pH protection for sperm.

92

~12-24 hours.

91

Up to ~3-5 days.

94

Acrosome

93

Sperm midpiece contains mitochondria; the head contains DNA and the acrosome.

96

Sympathetic.

95

Parasympathetic.

97

Trap: erection is sympathetic and ejaculation is parasympathetic. True or false?

98

Erection works mainly by...

99

Nitric oxide (NO) is important for erection because it...

100

Why does corpus spongiosum matter during erection?

101

Emission vs ejaculation (if they split it): emission is...

102

Expulsion phase of ejaculation is...

103

During ejaculation, why doesn't semen go backward into the bladder?

104

If the internal urethral sphincter fails to close, the result can be...

98

Increasing blood inflow and trapping blood in erectile tissue.

97

False.

100

It keeps the urethra open so semen can pass.

99

Causes smooth muscle relaxation and vasodilation (more blood flow).

102

Rhythmic muscle contractions that push semen out.

101

Movement of semen into the urethra (duct/gland contractions).

104

Retrograde ejaculation (semen goes into bladder).

103

The internal urethral sphincter closes.

105

Erection is mainly {{c1::parasympathetic}}; ejaculation is mainly {{c2::sympathetic}}.

106

Nervous system branch that drives erection:

107

Testes temperature is normally... compared to core body temperature.

108

Dartos muscle does what when it's cold?

109

Cremaster muscle does what when it's cold?

110

When it's warm, scrotum helps cool testes by...

111

Pampiniform plexus is a... (high-level)

112

Varicocele is basically... (high-level)

106

Parasympathetic

105

Erection is mainly parasympathetic; ejaculation is mainly sympathetic.

108

Contracts and wrinkles scrotal skin to reduce heat loss.

107

A bit lower (a few degrees cooler).

110

Relaxing muscles -> testes hang lower and surface area increases.

109

Pulls testes closer to the body.

112

Dilated veins in the scrotum that can increase testicular temperature.

111

Heat-exchange network of veins that cools arterial blood going to testes.

113

Cryptorchidism means...

114

Why can cryptorchidism affect fertility?

115

Scenario: frequent hot baths/fever. What can happen to sperm count temporarily?

116

Testes are kept {{c1::cooler}} than core body temperature to support {{c2::spermatogenesis}}.

117

Why can an enlarged prostate cause urinary problems?

118

BPH stands for...

119

Testicular torsion is dangerous because...

120

If the vas deferens is blocked, what changes directly?

114

Because the testis is kept too warm, disrupting spermatogenesis.

113

Undescended testis (stays in abdomen/inguinal canal).

116

Testes are kept cooler than core body temperature to support spermatogenesis.

115

It can drop.

118

Benign prostatic hyperplasia (non-cancerous enlargement).

117

Because the urethra passes through the prostate and gets compressed.

120

Sperm can't reach semen (infertility), but testosterone can still be normal.

119

It cuts off blood supply to the testis.

121

If Leydig cells are damaged, what drops first: sperm count or testosterone?

122

If Sertoli cells are damaged, what is hit hardest?

123

Scenario: high LH, low testosterone. Where is the problem likely?

124

Scenario: low LH, low testosterone. Where is the problem likely?

125

Structure that commonly compresses urethra when enlarged:

126

Spermatogonia divide by... to keep producing new sperm cells.

127

Meiosis is needed in spermatogenesis because it...

128

Sertoli cells respond to FSH and also make... (hard but classic)

122

Spermatogenesis (sperm development/support).

121

Testosterone (directly).

124

Hypothalamus/pituitary (secondary hypogonadism).

123

Testes (Leydig cells) not responding properly (primary hypogonadism).

126

Mitosis.

125

Prostate

128

Androgen-binding protein (ABP) to concentrate testosterone locally.

127

Halves chromosome number so fertilization restores diploid.

129

Why is high local testosterone inside seminiferous tubules important?

130

Spermatogenesis requires... (two key hormonal signals)

131

Trap: testosterone is made by Sertoli cells. True or false?

132

Inhibin is produced mainly by...

133

If inhibin rises, FSH tends to...

134

Spermatogenesis is continuous, meaning...

135

Rough time to make a mature sperm cell (high-level):

136

Seminal vesicles contribute the largest share of semen volume. Roughly it's...

130

FSH (Sertoli) + testosterone (from LH -> Leydig).

129

It supports sperm development (spermatogenesis).

132

Sertoli cells.

131

False.

134

Sperm production happens all the time after puberty (not monthly).

133

Decrease.

136

About half or more (often ~60%).

135

On the order of weeks (about ~2-3 months).

137

Seminal vesicle fluid can include prostaglandins. Why might that matter? (basic)

138

Prostate sits... relative to the bladder and urethra.

139

Bulbourethral glands empty into the...

140

Trap: seminal vesicles store sperm. True or false?

141

If a question says 'sperm are stored for weeks', the best answer is...

142

Semen composition = sperm + fluids from...

143

If a question says 'energy source for sperm in semen', think...

144

Don't confuse: sperm are made in...; sperm mature in...

138

Just below the bladder, surrounding the first part of the urethra.

137

They can help contractions in the female tract to move sperm.

140

False.

139

Urethra (before ejaculation).

142

Seminal vesicles + prostate + bulbourethral glands.

141

Epididymis.

144

Seminiferous tubules; epididymis.

143

Fructose from seminal vesicles.

145

Don't confuse: LH acts on...; FSH acts on...

146

Don't confuse: Leydig cells are located...; Sertoli cells are located...

147

Don't confuse: seminal vesicles make...; they do NOT...

148

Don't confuse: semen vs sperm.

149

Don't confuse: erection is mainly...; ejaculation is mainly...

150

Don't confuse: vasectomy blocks...; it does NOT directly reduce...

151

Don't confuse: sperm are haploid (n=23) but after meiosis I they are...

152

Scenario: Semen volume is very low, but sperm production in testes is normal. Best suspect?

146

Between tubules; inside tubules.

145

Leydig; Sertoli.

148

Semen = fluid mixture; sperm = the cells.

147

Fluid (fructose); store sperm.

150

Vas deferens; testosterone.

149

Parasympathetic; sympathetic.

152

Accessory gland fluid problem
(seminal vesicles/prostate).

151

Haploid but still have duplicated
chromosomes until meiosis II finishes.

153

Scenario: Semen has no sperm but volume looks normal. Best explanation?

154

Scenario: Semen lacks fructose. Which gland is most likely not contributing properly?

155

Scenario: High FSH but normal LH/testosterone. Best suspect cell type?

156

Scenario: Trouble starting urination + weak stream in an older man. Best suspect structure?

157

Scenario: Sudden severe testicular pain after sport. Biggest fear?

158

Scenario: A boy has undescended testes. Long-term risk for fertility?

159

Scenario: Male takes anabolic steroids. Testes may shrink because...

160

Scenario: A question says 'parasympathetic stimulation increases blood flow to penis'. What's the outcome?

154

Seminal vesicles.

153

Blocked vas deferens / vasectomy.

156

Prostate (BPH).

155

Sertoli cell dysfunction (low inhibin feedback).

158

Higher risk of reduced fertility (too warm).

157

Testicular torsion (loss of blood supply).

160

Erection.

159

LH/FSH drop -> less stimulation of testes.

161

Scenario: A question says 'sympathetic stimulation causes duct contractions and semen expulsion'. Outcome?

162

Inside the testis, seminiferous tubules ultimately drain toward the...

163

Epididymis sits on the... side of the testis.

164

Vas deferens runs from epididymis up into the...

165

Prostate is located... (anatomy landmark)

166

Seminal vesicles are located... (high-level)

167

Bulbourethral glands are located... (high-level)

168

Older term: ICSH (interstitial cell-stimulating hormone) is basically...

162

Epididymis (via collecting ducts).

161

Ejaculation.

164

Pelvic cavity (toward prostate/urethra).

163

Posterior (back) side.

166

Behind the bladder, adding fluid to ejaculatory ducts.

165

Below the bladder, around the urethra.

168

LH.

167

Near the base of the penis, emptying into urethra.

169

Sertoli cells produce two 'FSH-linked' things:

170

If GnRH is constant (not pulsatile), LH/FSH release tends to...

171

In humans, eggs always carry... chromosome; sperm can carry...

172

If an X-bearing sperm fertilizes the egg, the zygote is...

173

If a Y-bearing sperm fertilizes the egg, the zygote is...

174

So in standard biology, which parent determines the child's chromosomal sex?

175

Egg always contributes {{c1::X}}.
Sperm contributes {{c2::X or Y}}.

176

Before meiosis starts, DNA replication happens in...

170

Decrease (axis gets suppressed).

169

Inhibin and androgen-binding protein (ABP).

172

XX (typically female).

171

X; X or Y.

174

The father (sperm provides X or Y).

173

XY (typically male).

176

S phase (once).

175

Egg always contributes X.
Sperm contributes X or Y.

177

After meiosis I in males, a secondary spermatocyte has...

178

After meiosis II, a spermatid has...

179

Independent assortment happens in...

180

FSH is called 'follicle-stimulating' but in males it stimulates...

181

Castration (removal of testes) vs vasectomy (cut vas deferens):

182

Condoms prevent pregnancy mainly by...

183

Why is the 'pull-out method' unreliable (biology reason)?

184

After vasectomy, why is it not instantly effective?

178

23 chromosomes, one chromatid each.

177

23 chromosomes, still duplicated
(two chromatids each).

180

Sertoli cells in seminiferous tubules.

179

Metaphase I (random alignment of homolog pairs).

182

Blocking sperm from entering
the female reproductive tract.

181

Castration removes testosterone + sperm;
vasectomy blocks sperm transport only.

184

Because sperm already in ducts need time to clear.

183

Sperm can be present in pre-ejaculate
or early fluid, and timing is hard.

185

Sperm tail is a type of...

186

Trap: sperm tail movement is powered by actin. True or false?

187

Why can a cilia/flagella movement defect cause male infertility?

188

Independent connection: If someone has chronic respiratory infections + male infertility, a possible link is...

189

Testosterone is responsible for many male secondary sex characteristics like...

190

Testosterone also supports... in the reproductive system.

191

DHT is important (high-level) because it...

192

Trap: high testosterone always increases fertility. True or false?

186

False.

185

Flagellum (microtubule-based movement structure).

188

Cilia/flagella motility defect (same type of structure).

187

Sperm can't swim effectively to reach the egg.

190

Spermatogenesis (sperm production).

189

Deeper voice, increased muscle mass, facial/body hair (general).

192

False.

191

Has strong androgen effects in some tissues (like prostate/hair follicles).

193

Spermarche means... (term)

194

Leydig cells respond to {{c1::LH}}
and produce {{c2::testosterone}}.

195

Sertoli cells respond to {{c1::FSH}}
and support {{c2::spermatogenesis}}.

196

Epididymis = sperm
{{c1::maturation}} + {{c2::storage}}.

197

Two pituitary gonadotropins:

198

Accessory gland that secretes
pre-ejaculate (lubrication):

199

Accessory gland that contributes
most semen volume + fructose:

200

Nervous system branch that
mainly drives ejaculation:

194

Leydig cells respond to LH and produce testosterone.

193

First ejaculation / start of sperm release (male puberty milestone).

196

Epididymis = sperm maturation + storage.

195

Sertoli cells respond to FSH and support spermatogenesis.

198

Bulbourethral (Cowper's) gland

197

FSH and LH

200

Sympathetic

199

Seminal vesicles