Functions of the Male Reproductive System

- Production of gametes.
- Synthesis of androgens.
- Delivery of sperm into the female reproductive tract.
- Sac of skin and superficial fascia
- Male gonads (testes)
- Midline septum
Cremaster Muscle

- Slight elevation of testes within scrotum
- Contraction
- Temperature decrease (T°)
Dartos Muscle – Action and Reflex

↓ T°

- Contraction
- Tightening of scrotal skin
- Decreased scrotal surface area
Seminiferous Tubules = Sperm Factories
Epididymides = Sperm Storage & Maturage

- Ductus deferens
- Mediastinum testis (housing rete testis)
- Body of epididymis
- Tail of epididymis
- Head of epididymis
- Duct of epididymis
- Seminiferous tubule
- Septum
- Lobule
- Visceral layer of tunica vaginalis
- Parietal layer of tunica vaginalis
- Tunica albuginea
Testes – Lobules

• 1-4 seminiferous tubules

• Interstitial cells
Testicular Blood Supply

- Testicular artery
- Testicular vein
- Pampiniform plexus.
- Countercurrent exchange
Spermatic Cords
Inguinal Canals

- Ductus deferens
- Pampiniform plexus
- Testicular artery
- Testicular nerve
- Inguinal ligament
- Superficial inguinal ring
- Spermatic cord

A. Suprarenal gland
B. Testis, Kidney, Caudal inguinal fold
C. X, Gubernaculum
D. Closed processus vaginalis, Gubernaculum (vestigial)
Intestines

Weak abdominal layer

Inguinal hernia

Inguinal Hernia
Epididymides & Ductus Deferentia
Seminal Vesicles

- Found on posterior bladder.
- Secrete seminal fluid.
  - 60% of semen.
  - Fructose
  - Prostaglandins
  - Coagulating enzyme.
- Join vas deferentia
Prostate Gland

- Inferior to bladder

- Encircles urethra.

- Secretes prostatic fluid.
  - 30% of semen.
  - Citrate
  - PSA

- Ejaculatory ducts

- Prostatic ducts
Urethra

- Carries urine and semen
- Prostatic urethra
- Membranous urethra
- Penile (spongy) urethra
- Bounded by external and internal urethral orifices.
Bulbourethral Glands

- Secretes
- Flushes and lubricates
- Dangerous?
Semen Composition

10% testicular fluid + 60% seminal fluid + 30% prostatic fluid = SEMEN

Protects
Activates
Transports
Erectophysiology

Arousal

- Increased parasympathetic output to penile arterioles
- Release of ACh onto penile arteriole smooth muscle
- Production of NO within penile arteriole smooth muscle
- Vasodilation of penile arterioles (and compression of penile venules)

Engorgement of corpora cavernosa and corpus spongiosum

Erection
Sexual sensory stimuli reach threshold level

Increased sympathetic motor output to the penis

- Closing of internal urethral sphincter
- Contraction of penile smooth muscle
- Emptying of reproductive ducts and glands into the urethra
- Prevention of urine release or semen reflux

Ejaculation
Chromosomes

• All body cells except for sperm and eggs are **diploid**
  – They have 2 copies of each…
  – *How many total?*
  – *How many pairs?*

• Sperm and eggs are **haploid**
  – They have…
  – *How many total?*
Haploid $\rightarrow$ Diploid
ZYGOTE (46)

Diploid body cells such as skin cells, muscle cells, nerve cells, etc.

Diploid spermatogonia

Mitosis

Diploid body cells such as skin cells, muscle cells, nerve cells, etc.

Spermatogenesis

- Sperm formation.
- Consists of 2 phases: meiosis and spermiogenesis.
Spermatogenesis

Spermatogonium (46)

Type B Spermatogonium (46) → Primary Spermatocyte (46)

Type A Spermatogonium (46)

Divides via mitosis

Replicates its DNA

Stays at the periphery of the seminiferous tubule to maintain a population of germ cells.
Spermatogenesis

Primary Spermatocyte (46) → Secondary Spermatocyte (23)

Meiosis I: Secondary Spermatocyte (23) → Spermatid (23)

Meiosis II: Spermatid (23) → Spermatid (23)
Spermatid (23) → Spermatid (23)
Spermiogenesis

1. Spermatid nucleus
2. Centrioles
3. Microtubules
4. Mitochondria
5. Acrosome
6. Excess cytoplasm
7. Tail
Sustentacular Cells (Sertoli Cells)

- Support
- Nourishment
- Testicular fluid
- Blood-testis barrier
Sperm Structure

- Head
- Midpiece
- Tail (flagellum)
- Acrosome
- Nucleus
- Centrioles
- Mitochondrial spiral
- Microtubules
Male Reproductive Hormones

Hypothalamus releases GnRH

Anterior pituitary releases FSH and LH

- FSH causes sustentacular cells to release ABP
- LH causes interstitial cells to release testosterone
Male Reproductive Hormones

ABP concentrates testosterone in the seminiferous tubules

Testosterone enters the bloodstream

Testosterone stimulates spermatogenesis

Testosterone stimulates male sexual characteristics
Testosterone levels in the blood are too high

Testosterone inhibits pituitary release of FSH and LH

Testosterone release by interstitial cells declines
Rate of sperm synthesis is too high

Sustentacular cells release inhibin

Inhibin decreases hypothalamic GnRH release

Pituitary release of FSH and LH declines

Testosterone release by interstitial cells and ABP release by sustentacular cells decline

Rate of sperm synthesis declines
What would you block?

a. GnRH
b. FSH
c. LH
d. Testosterone
e. ADH
Testosterone

- Masculinizes embryonic genitalia
- Pubescent development of reproductive structures
- Growth of axillary and facial hair
Testosterone

• Enlarges larynx

• Enhances skeleton and muscle mass

• Boosts metabolic rate

• Thickens skin