Male Reproductive System

A. Functions

1. – production of reproductive cells (sperm)

2. – transfer of sperm to female

3.

B. Structures

1. Scrotum

A)

B) Regulate temperature

2. Testes

A) Site of

B) Structures

1) – outer cell layer

2) Each testis is subdivided into lobules

3) Each lobule contains 1-4 highly convoluted

a) The tubules contain the which will mature into

sperm

b) In between the tubules are which produce hormones

i)

4) The tubules converge and unite to form the

5) The rete testis gives rise to several ducts which open into the

3. Epididymis

A) Site of

B) Takes 20 days for sperm to travel through it

C) Can store sperm for several months

4. Vas deferens

A)

B) Move upward in spermatic cord into pelvic cavity

C) Both sides join with ducts of the seminal vesicles to form the

which flows into urethra

5. Prostate gland

A) Chestnut shaped

B)

C) Expels thin, milky fluid through a series of ducts

1) Comprises about

2) Slightly , serves 2 purposes

a) Neutralizes acidic fluid created by the sperm’s metabolism

b) Neutralizes which would kill the sperm

6. Seminal vesicles

A) Yellowish, finger-shaped structures

B)

C) Produces a component of

1) Slightly

2) Contains to fuel the sperm

3) Also contains to initiate smooth muscle contractions in

female reproductive tract

7. Bulbourethral glands

A) Pea-sized; empty into

B) Secrete

1) Alkaline to neutralize acidic urine in urethra

2) Provides some lubrication for intercourse

8. Penis

A) Composed of 3 columns of erectile tissue

1) (2) – lie dorsally

2) – lie ventrally; surrounds urethra

B) Terminates in enlarged portion known as

1) Location of external urethral orifice

2) Highly innervated with sensory neurons

3) Involved w/

9. Urethra

A) Transports semen and urine to the outside of the body

B) 3 divisions

1) Prostatic – passes through prostate

2) Membranous – passes through urogenital diaphragm

3) Spongy – passes through penis

C. Spermatogenesis

1. The seminiferous tubules consist of 2 types of cells

A)

1) Give rise to

2) (46 chromosomes) and undifferentiated

B)

1) Support, nourish, and regulate spermatogonia

2. Process – starts during embryonic development

A) During development hormones activate a spermatogonium, which undergoes

mitosis

B) One of the daughter cells (Type A) remains undifferentiated and replaces the

parent, the other (Type B) enlarges to become a primary spermatocyte (diploid)

1) The process halts here until

C) At puberty, hormones restart the division (mitosis) of the spermatogonia

D) The primary spermatocyte undergoes meiosis I resulting in 2 secondary

spermatocytes which are (23 chromosomes)

E) The 2 secondary spermatocytes undergo meiosis II, resulting in

(2 from each secondary spermatocytes)

F) The spermatids will then mature into

1) The sperm cells collect in the seminiferous tubules, then pass through the rete

testis into the epididymis where they accumulate and mature

3. Sperm Structure

A)

B) About

C) Has 3 components

1)

a) Contains a compact nucleus with the genetic material

b)

i) Small protrusion at the anterior end

ii) Contains that help it penetrate the egg’s membrane

2)

a) Contains protein filaments and

3)

a) Allows the sperm to move

b) Gets ATP from mitochondria in the body

D. Erection, Orgasm, & Ejaculation

1. Erection

A) Hardening of a normally flaccid penis allowing its entry into the vagina

B) Results from a filling of the erectile tissue (corpus spongiosum & corpora

cavernosa) with blood

1) Triggered by tactile and/or psychological stimuli resulting in a

a) Causes a release of

2) Causes of arteries leading to penis

a) No change in the leaving the penis

b) As extra blood fills the penis, the veins compress reducing blood flow

leaving the penis

3) Extra blood fills the erectile tissue causing it to expand

4) Parasympathetic input also causes the bulbourethral glands to release their

secretions (pre-ejaculate)

2. Orgasm (a.k.a. climax)

A) Pleasurable feeling of physiological & psychological release

B) Results due to continuation of

C) Usually accompanies ejaculation

D) Physiological changes include:

1)

2)

3)

E) Followed by a latent period that prevents male from having second orgasm for

minutes to hours

3. Ejaculation

A) The forceful expulsion of semen into the urethra and out of the penis

B) Results from a triggered by same stimuli that

trigger erection & orgasm

1) Sympathetic impulses cause contraction of smooth muscle lining of the

accessory glands and ducts forcing secretions into the urethra (emission)

2) Emission triggers skeletal muscle contractions at the base of the penis forcing

semen out of the urethra at a high rate of speed (200 inches/sec)

3) Also causes constriction of

to prevent urine from escaping the bladder

C) Sympathetic impulses over-ride parasympathetic ones causing the penis to return to

its flaccid state

4. Characteristics of semen

A) pH –

B) Normal discharge –

1) Average =

C) Sperm count is roughly

1) Average =

D) Morphology –

E) Motility –

F) Survival – can live after ejaculation

1) Can be stored for 18 hours to 10 days in the male reproductive tract before

losing their ability to fertilize an egg

E. Hormones

1. Testes (interstitial cells)

A) Release

1) Causes secondary sex characteristics

a) Increased hair growth on most of body

i) May slow hair growth on scalp

b) Enlargement of larynx and vocal folds

i) Results in a deeper voice

c) Thickening of the skin

d) Increased muscular development

e) Broadening of the shoulders

f) Narrowing of the waist

g) Thickening and strengthening of the bones

h) Increased release of erythropoietin 🡪 increases RBC count

2) Inhibits release of

F. Disorders

1. Testicular cancer (1 in every 20,000 males) – most common cancer in men ages

15 to 35

2. Prostatomegaly – enlargement of the prostate

A) Leads to anuria or inability to achieve an erection

3. Prostatitis – inflammation of the prostate

4. Orchitis – inflammation of the testis

5. Epididymitis – inflammation of the epididymis

6. Impotence – inability to achieve an erection

A) Usually caused by reduced nitric oxide levels or hardening of the arterioles leading

to the penis

1) Nitric oxide release decreases with age

a) Drugs such as Viagra, Levitra, and Cialis work by increasing nitric oxide

levels

2) Can also be reduced by stress, alcohol, and drugs

3) Smoking causes hardening of the arterioles

a) #1 cause in men under 40

B) 50% of men over 40 and 70% of men over 70 experience it to varying degrees

7. Priapism – prolonged and painful erection that can last for hours to days

A) Treatment ranges from simple medications to surgery depending on severity

8. Cryptorchidism – failure of testes to descend into the scrotum

A) #1 precursor for testicular cancer

9. Sexually transmitted diseases – variety of disorders usually caused by a bacteria or

virus

A) Can often lead to reproductive difficulty or dysfunction in males and females

B) Examples include gonorrhea, syphilis, chlamydia, genital warts, genital herpes

10. Sterility – low sperm counts (<20 million/ml)