CHAPTER 27, REPRODUCTION

2 Reproductive system – Function: Reproduce the species
   • Reproductive system stays dormant until adolescence
   • Primary sex organs or gonads – testes in males and ovaries in females
   • Both produce sex cells or gametes - sperm from males and eggs or ova in females
   • Sperm and ova unite and form a zygote

3 Gonads also produce male & female hormones
   • Remaining reproductive structures are: accessory reproductive organs

4 Testes are located in a sac of skin called the scrotum
   Internally the scrotum is divided by a septum and with 2 layers of fascia providing a separate compartment for each testes
   [Testes need to be 34 degrees C, to produce sperm] therefore, they maintain a vulnerable position
   They can be raised & lowered depending on the temperature
   The dartos (smooth) muscle contracts and wrinkles the skin.

5 The cremaster muscles (suspender) are bands of skeletal muscles that elevate the testes

6 Figure 27.2 pg. 1026
7 TESTES
1.5 X 2.5 inches produce mail gametes-sperm
Surrounded by 2 tunics: tunica vaginalis - outpocketing of peritoneum
albujina – fibrous capsule divisions of the albuginea divide the testes into 250 wedge-shaped lobules
Each lobule contains 4 seminiferous tubules – these are the sperm producing factories (spermatogonia/spermatogenesis)

8 Figure 27.2 pg. 1026

9 Interstitial Cells (Leydig cells)
In soft tissue around seminiferous tubules
Produce male sex hormones – Androgens ex. Testosterone (major hormone)

10 Fig. 27.3a pg. 1027

11 Fig. 27.3 c; pg. 1027

12 Testicular cancer
Males – 15-35, 1 in 50,000
Excellent prognosis if discovered early - 90%
Self Exam - hard lump

13 Male duct system
Sperm is produced in testes, but it needs to get out of the body with other things added to it
Testicular ducts
Straight tubules lead from seminiferous tubules to the rete testes to the epididymis

14 Fig: 27.3 pg. 1027
15 Epididymis (beside the testes)
Tightly coiled thread like tubes about 20 ft. long if uncoiled.
It emerges from the top of the testes then descends down the posterior aspect of the testes, loops around and continues to ascend upwards (superiorly)
The top, proximal aspect is called the head which receives the sperm from the rete testes through the efferent ductles ("carrying away from")  [ afferent: carrying to]

16. The epididymis ascends posteriorly as the head until the region it “loops” around which is called the tail. It continues superiorly until the next segment the ductus deferens

17. Figure 27.3; page 1027

18. Ductus Deferens/vas deferens (carrying away)
18 inches long
From epididymis → up the spermatic cord → through the inguinal canal → into the pelvic cavity → joins with the duct of seminal vesicle → forms the ejaculatory duct → enters the urethra

Vasectomy: cut through ductus deferens/vas deferens in the scrotum – close to 100% effective – 50% reversible

19. Figure 27.4a; page: 1029

20. Figure 27.2 pg. 1026

21 Accessory Glands
Seminal vesicle/gland: On posterior bladder – secretes seminal fluid: viscous, yellowish, alkaline fluid that enhances fertilization – joins with vas deferens forming ejaculatory duct to urethra
Sperm and seminal fluid form semen which is about 70% seminal fluid
22. Prostate
Doughnut shaped organ that circles urethra just below/inferior of bladder
Smooth muscles forces fluid into urethra, during ejaculation. Fluid enhances fertilization – about 30% of semen –
Prostatic hyperplasia – squeezes on urethra – making it difficult to urinate – males age related.
Prostatic cancer – 2nd most common cancer death in men

23. Penis
Cylindrical organ that conveys urine and semen to the outside
It has 3 sections: root, shaft and, an enlarged tip, the glans penis, where the urethra orifice is.
The outer skin is loose, and forms a fold to cover the glans. This is called a prepuce or foreskin
Circumcision: Surgical removal 60/15

24. The body, or shaft has three internal columns of erectile tissue – a dorsal pair, corpora cavernosa and a single corpus spongiosum. Each covered by a sheath of dense fibrous CT

25. Figure: 27.4 pg. 1029

26. Figure: 27.4 pg. 1029

27. Upon sexual stimulation parasympathetic nerves cause arteries to dilate, bringing in more blood to the erectile tissue. This same pressure closes down the thinner walled veins making the organ firm.
29. Ejaculation however, is under sympathetic ns control – this makes the arteries constrict and the and the excess blood goes back into the general circulation and the rigidity is lost.
Refractory period: Period of muscular & physiological relaxation, Takes some time for parasympathetic to take over again

31. Anatomy of the female reproductive system
Complex: a. produce gametes – egg cells (ova/ovum)
b. produce sex hormones – estrogen (estradiol*, estrone, estriol) and progesterone
c. prepare body to suport & nurture developing fetus
Ovaries: Primary female sex organs - Produce gametes and hormones
Accessory organs (ducts): internal genitalia, located within pelvic cavity: uterine tubes (fallopian), uterus & vagina

32. Accessory organs (ducts):
Internal genitalia, located within pelvic cavity: uterine tubes (fallopian), uterus & vagina
External genitalia: external sex organs

33. Ovaries  Two, on either side of the uterus – almond shaped and twice as big
Held in place by a series of 3 ligaments
- **Ovarian ligament:** anchors the medial ovaries to uterus
  **Broad ligament:** A double layered peritoneal fold that drapes over the the uterus and supports the uterine tubes, uterus and vagina
- **Suspensory ligament & mesovarium** are parts of the broad ligament that support the ovaries to the pelvic wall & uterus.

34. Figure: 27.10; pg. 1040

35 Figure: 27.10; pg. 1040
36. Ovary surface anatomy
   • Hilus: Surface region where blood vessels and nerves enter ovary
   • Germinal epithelium: Highly vascularized epithelium that covers ovaries and gives rise to new gametes
   • During puberty, FSH production stimulates primordial oocytes (immature egg) to turn into ovarian follicles
   • Ovarian follicles consist of an oocyte encased by one or more layers of surrounding cells called follicle cells

37 Ovarian follicles, the oocytes and their surrounding follicle cells progress through stages of maturity.
   • A later stage is called a Vesicular (Graffian) follicle – It is a large fluid filled follicle that will soon rupture and release an ovum in a process known as ovulation
   • Corpus luteum: Remains of the ovulated follicle, that secretes hormones

38 Ovary internal anatomy
   • Germinal layer: Outer layer
   • Tunica albuginea (like testes): White, dense, fibrous CT layer just under the germinal layer
   • Outer cortex that houses the developing gametes
   • Inner medulla contains the larger blood vessels and nerves

39 Figure: 27.11; pg. 1041

40. Figure: 27.11b; pg. 1041
41 Uterine tubes/Fallopian tubes
4 inches long – receives ovulated egg – fertilization normally occurs here
• **Ampulla**: distal end that curves around the ovary. – Fertilization usually occurs at this point
• **Infundibulum**: End of ampulla – open funnel shaped structure with finger-like ciliated projections called **fimbriae** – create currents of peritoneal to carry oocyte into fallopian tube
• **Isthmus**: Remaining proximal part to uterus

42 Figure 27.12; pg. 1043

43 Uterus: Thick walled muscular organ – receives, retains and nourishes fertilized zygote.
Pear size & shape, posteriosuperior to bladder
Anatomy
• **Fundus**: Rounded region superior to fallopian tubes
• **Body**: Major portion, like inverted pair
• **Uterine cavity**: hollow lumen of body
• **Isthmus**: Narrowed inferior section of body cavity leading to cervix

44.
Cervix: Narrow section leading to vagina
Cervical canal: Internal lumen of cervix

45. Figure 27.12; pg. 1043
46 Supporting ligaments
   Broad: Attaches uterus to pelvic cavity wall
   Uterosacral: attaches uterus to sacrum
   Cardinal: From cervix to lateral walls of pelvic cavity
   Round ligament: anchors uterus to anterior pelvic wall (within broad ligament)

47 Figure 27.12; pg. 1043

48 Uterine wall- three layers – (deep to superficial) - endometrium, myometrium and perimetrium
   • Endometrioum: mucosal lining very vascularized, zygote “burrows” into this and resides there until birth.
     Two layers:
     1. Stratum functionalis – shed after menstration
     2. stratum basalis: produces new functionalis after menstruation

49. Myometrium: Bulk of uterus – three layers of smooth muscle – contraction forces delivery
   Perimetrium: Outer layer – visceral peritoneum

50 Figure: 27.12 a  pg. 1043

51 Figure: 27.13; pg. 1045

52 Vagina
   Provides a passageway for child birth, menstruation and entrance way for sperm
   1. Fornix: recessed area that surrounds the attachment of the cervix to the vagina
   2. Rugae: tranverse folds of tissue inside the vaginal wall allows the vagina to expand
   3. Vaginal orifice: inferior opening to the outside
   4. Hymen: Thin fold of mucous membrane that forms a boarder around the vaginal opening and partially covering it
53 Vulva: Female external genitalia
   1. mons pubis: A raised area of adipose tissue, anterior to the vagina that cushions the symphysis pubes. Two longitudinal folds of skin that extend inferiorly from the mons pubis. Contain adipose tissue, oil and sweat glands.
   3. Labia minora (small lips): small folds of skin medial to the labia majora. No adipose tissue, minimal sweat glands but many oil glands.

54.
   4. Clitoris: Small cylindrical mass of nerves and erectile tissue, located at anterior junction of labia minora.
   5. prepuce: folds of skin formed at the junction of the labia minora, that covers the clitoris – glans: exposed portion of the clitoris.
   6. Vestibule: Area between the labia minora that contains the vaginal orifice and the external urethral orifice.
   7. Glands: Several mucous secreting glands open into the vestibule.

55

   Figure 27.14 a&b pg. 1046
   slides 52,53 & 54

56 Mammary glands: Found in both males & females. Not functional in males – modified sweat glands – only functional due to reproduction in females. Internally each mammary gland consists of 15-25 lobes. Lobes are separated & padded by fibrous CT and fat. This CT tissue forms suspensory ligaments that attach the breasts to underlying muscle and overlying skin. The lobes are subdivided into lobules that contain glandular alveoli, that produce milk.
Myoepithelial cells: contractile cells around alveoli that propel milk to nipple. Milk is passed from the alveoli to the lactiferous ducts that in turn go to the nipple. However, before it gets to the nipple, each duct has an enlarged area, called a lactiferous sinus, where milk can accumulate. Around the nipple is a pigmented ring called the areola. This contains sebaceous glands that make it “bumpy” and secrete sebum that prevents chapping and cracking.

58 Figure: 27.15; pg. 1047