Notes for Wednesday, December 4, 2002

Duct system

Outline:
Male reproductive system: testes - structure & function
Male duct system
Accessory glands
Semen
Penis

Male Reproductive System

• Scrotum = support structure for testes
• Dartos & cremaster muscles help regulate temp. of testes
• Sperm production occurs at 2-3 degrees C below normal core body temp.

Testes

• Surrounded by fibrous capsule = tunica albuginea
• 200-300 lobules/testis
• 2-3 seminiferous tubules/testis where spermatogenesis occurs

• Cryptorchidism
• Testicular cancer

• Structure of the seminiferous tubule:
  spermatogonia (2n; stem cell)
  primary spermatocytes (2n)
  secondary spermatocytes (n)
  spermatids (n)
  sperm cells (n)

• Sertoli cells = sustentacular cells: protect & nourish sperm; secrete hormone INHIBIN
• Leydig cells = interstitial cells: secrete testosterone

Sperm cell

• 65-75 days to mature
• 300 million/day
• Head: nucleus + acrosome
• Midpiece: mitochondria
• Tail = propeller

Hormonal control of spermatogenesis
• Hypothalamus secretes Gonadotropin Releasing Hormone (GnRH)
• Anterior pituitary secretes:

  Gonadotrophic hormones:
  1. Luteinizing hormone (LH) stimulates Leydig cells to secrete TESTOSTERONE
  2. Follicle stimulating hormone (FSH) stimulates spermatogenesis

Testosterone
• Prenatal development
• Development of male sexual characteristics
• Development of sexual function
• Stimulates protein synthesis

• Epididymis (x2)
• Ductus (vas) deferens (x2)
• Spermatic cord (x2)
• Inguinal canal (hernia)
• Ejaculatory ducts (x2)
• Urethra (x1)

Accessory sex glands
• Seminal vesicles (x2) secrete alkaline viscous fluid - 60% of semen
• Prostate gland (x1) secretes slightly acidic fluid - 25% of semen
• Bulbourethral glands (x2)
Semen
= sperm + secretions from accessory glands

• 50-150 million sperm/ml
• Slightly alkaline
• Transports & nourishes sperm; neutralizes acidic male urethra & female vagina

Penis
• Contains urethra
• Passageway for urine & semen
• Root
• Glans

Body
• Three masses of erectile tissue: 2 x corpora cavernosa
  1 x corpus spongiosum
• Erection: vasodilation of arteries to penis      sinuses become engorged with blood

Ovaries
• Gamete production and sex hormone secretion
• Ovarian cortex (ovarian follicles)
• Ovarian medulla (blood vessels & nerves)

Ovarian Cortex
• Ovarian follicle contains primary oocyte
• Mature (Graafian) follicle contains secondary oocyte
• Mature follicle ruptures => secondary oocyte is expelled = OVULATION
• Corpus luteum = remains of the mature follicle; secretes progesterone & estrogen

Oogenesis
= formation of gametes
• Begins in female fetus BUT stops at prophase I
• In utero Oogonia (2n = diploid) => primary ooctyes 2n (prophase I) 200,000 - 1 million at birth

• By puberty 40,000 - 400,000 primary oocytes remain

• Onset of puberty meiosis I resumes each month in a few primary oocytes but only one will reach maturity

• End of meiosis I: one secondary oocyte (haploid) + one polar body (haploid)

• Secondary oocyte continues to metaphase II

• At ovulation secondary oocyte is expelled

• If fertilized by sperm, meiosis II concludes and OVUM & sperm unite to form zygote

• Oogenesis: 1 oogonium =>
  1 secondary oocyte + 3 polar bodies (all 4 = haploid)

Uterine tubes x 2
  = Fallopian tubes = oviducts

• Function to transport secondary oocytes from ovary to uterus

• Infundibulum surrounded by fimbriae

• Serosa; muscularis; ciliated mucosa

• Site of fertilization (up to 24 hours after ovulation)

• Ectopic (tubal) pregnancy

• Tubal ligation