Lecture notes for Monday & Friday, December 9 & 11, 2002

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 oocytes 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

**Uterus = womb**
- Site of menstruation, implantation, pregnancy and labor
- Perimetrium (serosa)
- Myometrium (muscularis)
- Endometrium (mucosa)
  - stratum functionalis - site of implantation (pregnancy) or shed during menstruation
  - stratum basalis - permanent layer that renews s. f.
- Cervix - secretes cervical mucus => prevents sperm entering uterus
  - At ovulation mucus becomes less viscous & more alkaline
- Cervical & uterine cancer detected by Pap smear
- Hysterectomy (hyster = uterus)

**Vagina**
- Muscular canal from cervix to exterior
- Mucosa secretes glycogen which is broken down by bacteria causing acidic environment
- Populated by many “friendly” microscopic organisms e.g. Lactobacilli
- Vaginitis caused by disruption to natural balance e.g. antibiotics; douching; birth control pills, stress etc...

**Female reproductive cycle**
• Ovarian cycle
• Menstrual = uterine cycle

**Hormonal regulation**

• Cycles are regulated by
  1. GnRH secreted from hypothalamus
  2. FSH & LH from anterior pituitary

**FSH initiates:**

• follicular growth
• secretion of estrogen from the follicles

LH: stimulates further development of ovarian follicles and increased secretion of estrogen from the follicles

• Ovulation
• Progesterone & inhibin secretion

**Estrogen**

• Promotes development & maintenance of female reproductive organs
• Secondary sex characteristics
• Reduces blood cholesterol levels

**Progesterone**

• Secreted mainly by corpus luteum
• Together with estrogen stimulates uterus to prepare for implantation

**Menstrual phase (day 1-5)**

• Ovaries: ~20 primary follicles begin to enlarge
• Uterus: Declining levels of progesterone causes strataum functionalis to slough off
• Endometriosis

**Pre-ovulatory/Proliferative phase (day 6-13)**
• Ovary: FSH follicles to growth and secrete estrogen & inhibin. Inhibin FSH secretion & LH estrogen secretion. One follicle dominates and others degenerate.

• When LH surges (day 12-13) primary oocyte resumes meiosis to metaphase II

• Uterus: Estrogen stimulates rebuilding of stratum functionalis

• Menstrual + proliferative = FOLLICULAR phase

**Ovulation (day 14)**

• Day 14 - LH surge causes rupture of mature follicle and expulsion of secondary oocyte

**Secretory/Luteal phase**

Day 15-28

• Ovary: LH stimulates remnants of follicle to become CORPUS LUTEUM, which secretes increasing amounts of progesterone (and some estrogen)

• Uterus: Progesterone (+estrogen) stimulates further growth of stratum functionalis in preparation for implantation