Menstrual cycle: involves pituitary, hypothalamus, ovaries, uterus (and placenta in pregnancy)

Estrogen
- produced at onset of puberty
- stimulates breast enlargement
- cessation of long bone growth
- menstrual events begin to cycle

Ovarian cycle (p 1072)
- follicular phase: FSH triggers development of several follicles at first
- luteal phase: post ovulatory phase, corpus luteum secretes estrogen and progesterone

Uterine phases: (p 1078)
- Flow: release of menses = menstruation
- Proliferative: estrogen triggers endometrium to proliferate
- Secretory: progesterone triggers secretion of nutrient rich mucoid material

Flow: In higher primates (others resorb the material.)

Estrogen has several effects:
- As follicle grows, moderate levels of estrogen are released:  
  1) shuts off release of FSH  
  2) terminates less developed follicles (atresia)  
  3) triggers the proliferation of the endometrium
- When Graafian follicle is mature, high levels are released:  
  4) high doses trigger the release of luteinizing hormone from the anterior pituitary  
  5) high doses induce estrus

Progesterone effects:
- 1) triggers endometrium to enter secretory phase
- 2) maintains enriched secreting endometrium
- 3) inhibits release of luteinizing hormone by anterior pituitary

Hormones used for pharmacological purposes:
- estrogen: primary ingredient in birth control pill, inhibits FSH release, no follicles mature
- hormone replacement during menopause
- diethylstilbestrol: estrogen analog, DES promoted by Squibb to “stabilize” pregnancy, caused higher CA in daughters
- DES fed to cattle to feminize steers...
- Follicle stim H: “Fertility drug” triggers follicle maturation (can lead to multiple births)
  Also to increase eggs for harvest in in vitro fertilization
- RU 486: (mifepristone) progesterone analog, blocks action of progesterone on uterus, causes endometrium to be shed, inducing menstruation
- morning after pill: “Plan B” contains progestin, probably prevents ovulation