Male and Female Reproductive Hormones
Testosterone in Males

• Steroid hormone
• Produced by testes in men and a small amount in ovaries of females
• Stimulates spermatogenesis (the making of sperm)
Testosterone continued…

• It influences the development of secondary male sexual characteristics at puberty, stimulating the maturation of the testes and penis.
• Testosterone levels have also been associated with sex drive.
• It also promotes the development of facial and body hair, the growth of the larynx, and the strengthening of muscles.
• Increases the secretion of body oils and has been linked to acne.
Gonadotropic Hormones (Gonadotrophin) in males

- Released by the anterior pituitary gland
- At puberty gonadotropin-releasing hormone (Gn-RH) is produced and released from the hypothalamus.
- Gn-RH release stimulates the secretion of both follicle-stimulating hormone (FSH) and lutenizing hormone (LH) from the pituitary gland (gonadotropinic hormones).
- In males, FSH causes spermatogenesis in the testes.
- In males, LH stimulates the interstitial cells of the testes to produce testosterone.
Testosterone increases sperm production. Once high levels of testosterone are detected by the hypothalamus, a negative feedback system is activated. Decreased Gn-RH production slows down LH leading to lessen testosterone production.
Estrogen in Females

- During puberty, estrogen stimulates breast development and causes the vagina, uterus and fallopian tubes to mature.
- It also plays a role in the growth spurt and alters the distribution of fat on a girl's body, typically resulting in more being deposited around the hips, buttocks and thighs.
- From puberty onwards, LH, FSH, estrogen and progesterone all play a vital part in regulating a woman's menstrual cycle, which results in her periods.
Progesterone in Females

- Secreted at ovulation, helps to prepare the endometrium (womb lining) for the implantation of an egg
- Prepares mammary glands for milk production
- Primarily concerned with procreation and survival of the fetus.
FSH in Females

• Stimulates the follicles to ripen several eggs.
LH in Females

- Further develops the follicles, triggers ovulation and stimulates production of other hormones necessary for the post ovulatory stage of the menstrual cycle.
What is the Menstrual Cycle?

• It is a recurring cycle of changes that occurs in reproductive-age females
• The menstrual cycle is under the control of the endocrine system.
• It may be divided into several phases: menstruation, the follicular phase, and the luteal phase.
• Counted from the first day of menstrual flow, the length of each phase varies from woman to woman and cycle to cycle. The average cycles length is 28 days.
• http://kidshealth.org/misc/movie/bodybasics/bodybasics_female_repro.html
Phase 1: Menstruation

- The shedding of the uterine lining
- Lasts 2 - 7 days
- Menstrual cycle counted from first day of menstrual bleeding
- Usually a sign that a woman is not pregnant
Phase 2: Follicular Phase

- Stimulated by increasing amounts of estrogen in the follicular phase, the lining of the uterus thickens.
- Follicles in the ovary begin developing (one will become an egg)
- A rise in FSH is present during the first few days of this phase
Folliculogenesis

- Folliculogenesis is the maturation of an ovarian follicle
- A follicle contains immature primary oocyte and granulosa cells
- Oocyte contains 46 chromosomes and transforms into an ovum after meiosis
- Granulosa cells provide nourishment
- The oocyte divides forming a secondary oocyte containing 23 chromosomes and a polar body that dies
- A fluid filled cavity forms as the secondary oocyte forms
• The dominant follicle pushes outward, ballooning the outer wall of the ovary. Blood vessels along the wall collapse, causing the wall to weaken.
• The outer surface of the wall bursts and the secondary oocyte is released. This is ovulation.
• Depletion in follicle supplies signal menopause.
• Order of changes in ovary.

1 - Menstruation
2 - Developing follicle
3 - Mature follicle
4 - Ovulation
5 - Corpus luteum
6 - Deterioration of corpus luteum
Structure of an Ovary

- Primordial follicle
- Primary follicle
- Secondary follicle
- Mature vesicular follicle
- Rupturing follicle
- Corpus albicans
- Mature corpus luteum
- Corpus luteum
Ovulation

• Release of egg into fallopian tube
• When egg is almost mature, estrogen stimulates the release of LH from the anterior pituitary (around day 12)
Phase 3: Luteal Phase

• After ovulation the surrounding follicle cells stay in the ovary and are transformed into the corpus luteum, which secretes hormones necessary for pregnancy.
• If pregnancy does not occur, the corpus luteum degenerates after about 10 days.
• Corpus luteum development signals the start of this phase.
• The phase lasts about 2 weeks
• While the corpus luteum is developing in the ovary, it releases a lot of progesterone, which would support pregnancy, if fertilization occurred.

• FSH and LH are responsible for making the corpus luteum. The corpus luteum then produces progesterone and estrogen. Progesterone and estrogen then suppress FSH and LH which are necessary for the corpus luteum to survive. The corpus luteum dies and progesterone levels fall, triggering menstruation.

• However, if pregnancy occurs, the corpus luteum survives because the embryo makes human chorionic gondotropin (HCG), which is very similar to LH and can preserve the corpus luteum.
(Average values. Durations and values may differ between different females or different cycles.)