Online lecture

FEMALE REPRODUCTIVE SYSTEM BEFORE PREGNANCY **LECTURE #3**

GUYTON & HALL, CHAPTER 82

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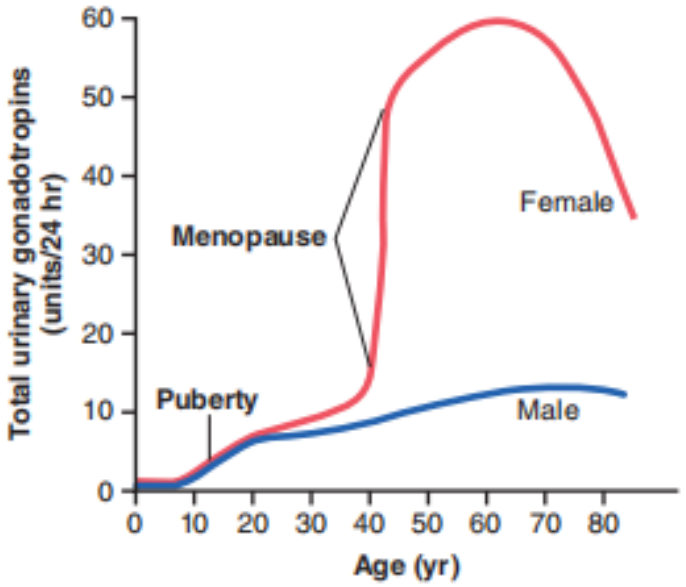
PUBERTY AND MENARCHE

- Puburty: physical maturation and capability to reproduce
- Menarche: the beginning of the cycle of menstruation.
- Gonadotropins, begin in about the eighth year of life, and usually culminating in the onset of puberty and menstruation between ages 11 and 16 years in girls (average, 13 years).
- In the female, as in the male, the infantile pituitary gland and ovaries are capable of full function if they are appropriately stimulated.
- However, as is also true in the male, and for reasons that are not understood, the hypothalamus does not secrete significant quantities of GnRH during childhood.
- Hypothalamus may be capable of secreting this hormone, but the appropriate signal is lacking.
- it is now believed that the onset of puberty is initiated by some maturation process that occurs elsewhere in the brain, perhaps in the limbic system



HYPOTHALAMIC CENTERS FOR RELEASE OF GONADOTROPIN RELEASING HORMONE.

- The neuronal activity that causes pulsatile release of GnRH occurs primarily in the mediobasal hypothalamus, (the arcuate nuclei of this area). Therefore, it is believed that these arcuate nuclei control most female reproductive activity
- The neurons located in the preoptic area of the anterior hypothalamus also secrete GnRH in moderate amounts.
- Multiple neuronal centers in the higher brain's "limbic" system (the system for psychic control) transmit signals into the arcuate nuclei to modify both the intensity of GnRH release and the frequency of the pulses, thus providing a partial explanation of why psychic factors often modify female sexual function.

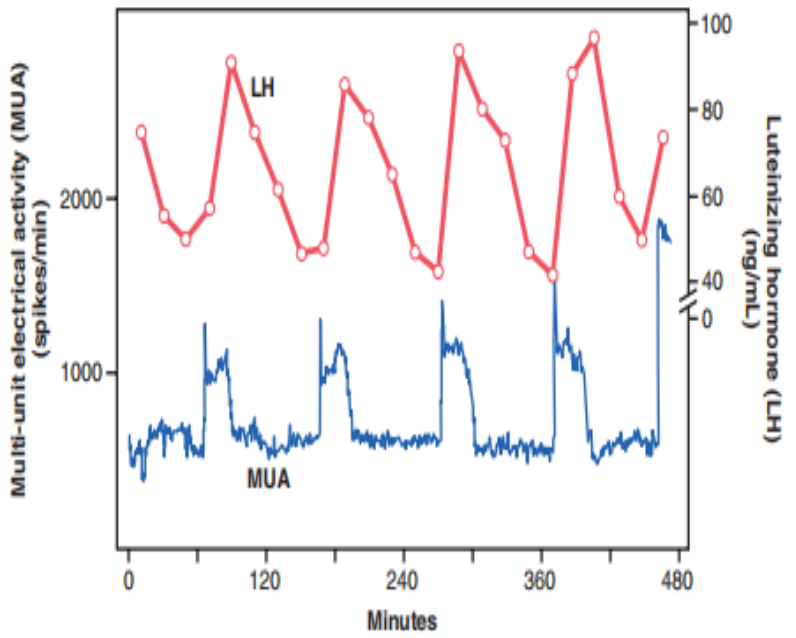
PUBERTY AND MENARCHE

- **Intermittent, Pulsatile Secretion of GnRH by the**

Hypothalamus Stimulates Pulsatile Release of LH from the Anterior Pituitary Gland.

- pulses lasting 5 to 25 minutes that occur every 1 to 2 hours.
- when GnRH is infused continuously its ability to cause the release of LH and FSH by the anterior pituitary gland is lost.
- The pulsatile release of GnRH also causes intermittent

output of LH secretion about every 90 minutes

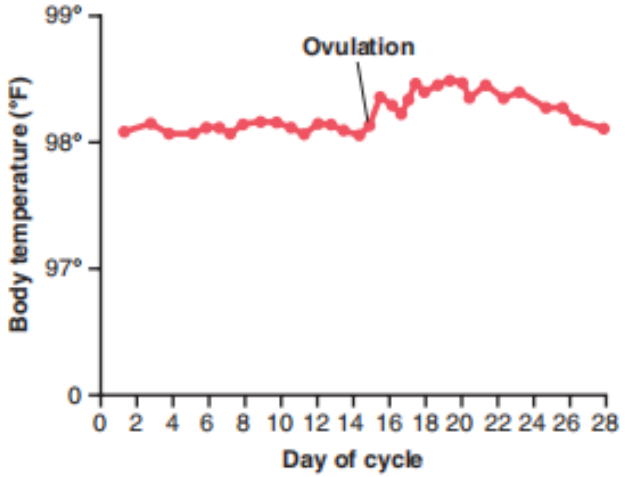


FEMALE FERTILITY

- Fertile Period of Each Sexual Cycle.
- The ovum remains viable and capable of being fertilized probably no longer than 24 hours after it is expelled from the ovary. Therefore, sperm must be available soon after ovulation if fertilization is to take place.
- A few sperm can remain fertile in the female reproductive tract for up to 5 days.
- Therefore, for fertilization to take place, intercourse must occur sometime between 4 and 5 days before ovulation up to a few hours after ovulation.
- Thus, the period of female fertility during each month is short—about 4 to 5 days.

BODY TEPMERATURE

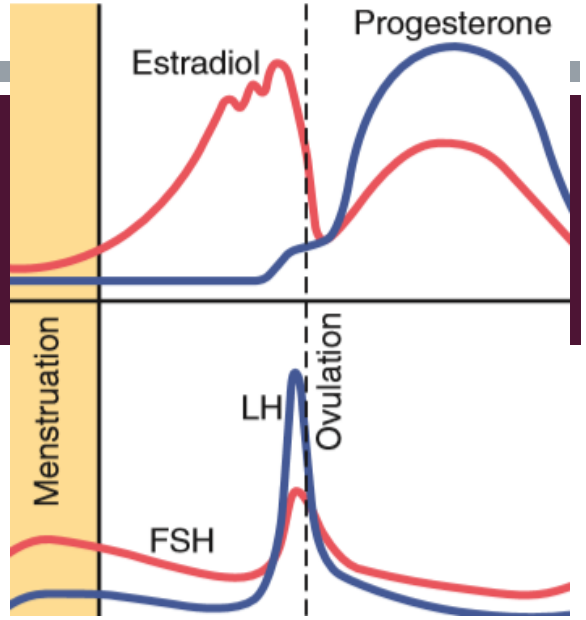
- Another common test is for the woman to chart her body temperature throughout the cycle. Secretion of progesterone during the latter half of the cycle raises the body temperature about 0.5°F , with the temperature rise coming abruptly at the time of ovulation. Such a temperature chart, showing the point of ovulation



CONTRACEPTION

- Rhythm Method of Contraception: To avoid intercourse near the time of ovulation.
- The difficulty with this method, is predicting the exact time of ovulation. Yet, the interval from ovulation until the next succeeding onset of menstruation is almost always between 13 and 15 days.
- If the menstrual cycle is regular, ovulation usually occurs within 1 day of the 14th day of the 28 cycle. (subtract 14 from the length of the cycle)
- ex, if the cycle is 40 days, ovulation usually occurs within 1 day of the 26th day of the cycle. if the periodicity of the cycle is 21 days, ovulation usually occurs within 1 day of the seventh day of the cycle.
- Therefore, avoidance of intercourse for 4 days before the calculated day of ovulation and 3 days afterward may prevent conception.
- The failure rate of this method of contraception, resulting in an unintentional pregnancy, may be as high as 20 to 25%/year.

HORMONAL SUPPRESSION OF FERTILITY—"THE PILL"



- It has long been known that administration of either

estrogen or progesterone, if given in appropriate quantities

during the first half of the monthly cycle, can inhibit ovulation.

The reason for this is that appropriate administration of either of these hormones can prevent the preovulatory surge of LH secretion by the pituitary gland, which is essential in causing ovulation.

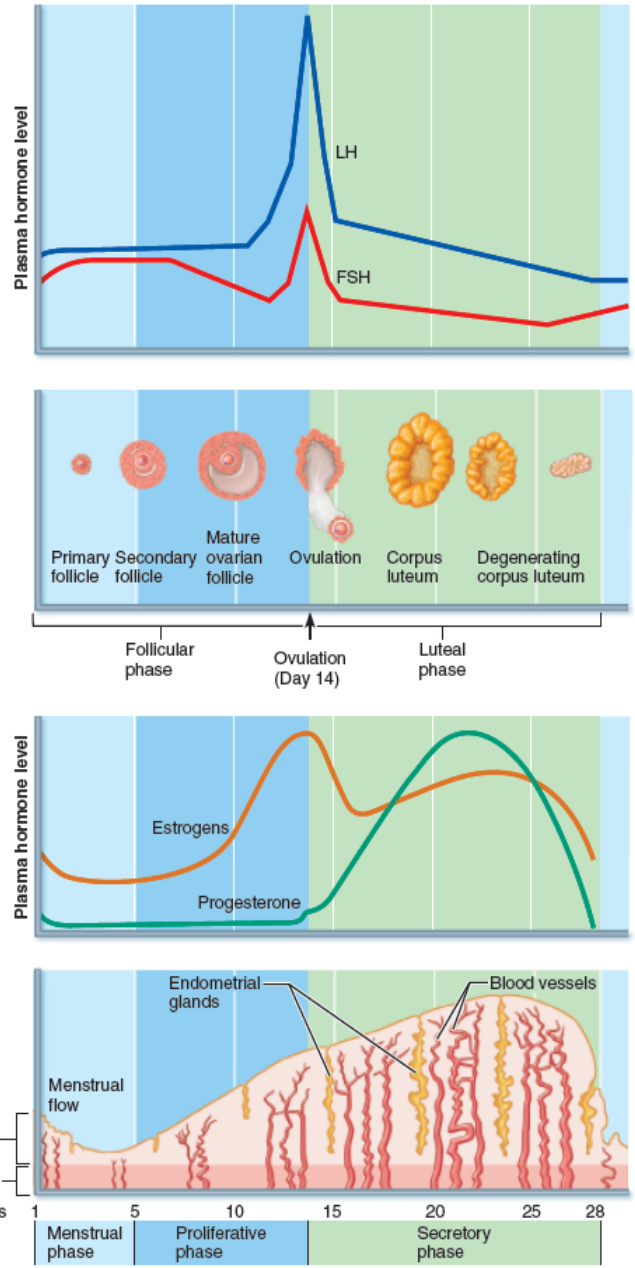
- Why administration of estrogen or progesterone prevents the preovulatory surge of LH secretion.

1-Immediately before the surge occurs, a sudden depression of estrogen secretion by the ovarian follicles probably occurs, which might be the necessary signal that leads to the LH surge. The administration of sex hormones (estrogens or progesterone) could prevent the initial ovarian hormonal depression that might be the initiating signal for ovulation. Progesterone has a negative feedback on GnRH and LH

2-Steady levels of OCP unlike normal cyclical female hormones

- Failure around 8-9 %year

Summary



(a) Fluctuation of gonadotropin levels: Fluctuating levels of pituitary gonadotropins (follicle-stimulating hormone and luteinizing hormone) in the blood regulate the events of the ovarian cycle.

(b) Ovarian cycle: Structural changes in the ovarian follicles during the ovarian cycle are correlated with (d) changes in the endometrium of the uterus during the uterine cycle.

(c) Fluctuation of ovarian hormone levels: Fluctuating levels of ovarian hormones (estrogens and progesterone) cause the endometrial changes of the uterine cycle. The high estrogen levels are also responsible for the LH/FSH surge in (a).

(d) The three phases of the uterine cycle
Menstrual: Shedding of the functional layer of the endometrium.
Proliferative: Rebuilding of the functional layer of the endometrium.
Secretory: Begins immediately after ovulation. Enrichment of the blood supply and glandular secretion of nutrients prepare the endometrium to receive an embryo.

Both the menstrual and proliferative phases occur before ovulation, and together they correspond to the follicular phase of the ovarian cycle. The secretory phase corresponds in time to the luteal phase of the ovarian cycle.

Human Anatomy / 8th edition / chapter 25