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DEPARTMENT; PHARMACOLOGY

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**QUESTIONS;**

A. Briefly discuss the CYCLIC CHANGES in any two of the following:

a) CERVIX (b) VAGINA (c) BREASTS

B. Explicate any one of the following:

1) Menstrual cycle

2) Hormonal regulation of the menstrual cycle

ANSWERS;

**CYCLICAL CHANGES THAT HAPPEN TO THE BREASTS**

Each month, women go through changes in the hormones that make up the normal menstrual cycle. The hormone estrogen is produced by the ovaries in the first half of the menstrual cycle. It stimulates the growth of milk ducts in the breasts. The increasing level of estrogen leads to ovulation halfway through the cycle. Next, the hormone progesterone takes over in the second half of the cycle. It stimulates the formation of the milk glands. These hormones are believed to be responsible for the cyclical changes that many women feel in their breasts just before menstruation. These include swelling, pain, and soreness.

During menstruation, many women also have changes in breast texture. Their breasts may feel very lumpy. This is because the glands in the breast are enlarging to get ready for a possible pregnancy. If pregnancy does not happen, the breasts go back to normal size. Once menstruation starts, the cycle begins again.

**CYCLICAL CHANGES THAT OCCURS IN THE VAGINA**

Your cervix is pretty deep inside your body. It acts as a canal connecting the lower part of your uterus to your vagina. During menstrual bleeding, the cervix is normally low and hard and slightly open to allow the blood to flow out. It feels like the tip of your nose. After your period stops, the cervix remains low and hard and the opening to the uterus (uterine) remains closed. As you approach ovulation, the cervix rises up to the top of the vagina and becomes softer and moister.

At the height of ovulation, you are at your most fertile. The cervix feels more like your lips than your nose, and the uterine os is open to allow sperm to enter. Sometimes the cervix seems to disappear, which just means it has become so soft that the cervix changes position during the cycle. For example, it may rise alongside ovulation to prepare for conception or lower to allow menstrual tissue to pass through the vagina. Each change in position is tied to a particular phase in your menstrual cycle or other hormonal change, such as pregnancy.

**HORMONAL REGULATION OF THE MENSTRUAL CYCLE**

The female reproductive system is a wonderfully complex system involving continuous communication between the brain centers and the ovary. Hormones secreted by the hypothalamus, the pituitary and the ovary are the messengers that regulate the monthly cycle.

**The Hypothalamus and the Pituitary**.

The hypothalamus is located centrally in the brain and communicates by way of an exchange of blood with the pituitary gland. Several neuroendocrine agents, or hormones, are produced by the hypothalamus. The most important hormone for reproduction is called gonadotropin releasing hormone, better known as GnRH. It is released in a rhythmic fashion every 60 to 120 minutes.

GnRH stimulates the pituitary gland to produce follicle stimulating hormone (FSH), the hormone responsible for starting follicle (egg) development and causing the level of estrogen, the primary female hormone, to rise. Leutinizing hormone (LH), the other reproductive pituitary hormone, aids in egg maturation and provides the hormonal trigger to cause ovulation and the release of eggs from the ovary.

**The Ovary**

The main function of the ovaries is the production of eggs and hormones. At birth, the ovaries contain several million immature eggs. No new eggs will be developed. These eggs are constantly undergoing a process of development and loss. Most will die without reaching maturity. This process of egg loss occurs at all times, including before birth, before puberty and while on birth control pills. The ovary undergoes a constant process of egg depletion throughout its lifetime. As the levels of FSH and LH in the blood increase with puberty, the eggs begin to mature and a collection of fluid — the follicle — begins to develop around each one. The first day of menses is identified as cycle day one. Estrogen is at a low point. Therefore, the pituitary secretes FSH and LH, a process which actually begins before the onset of your menses. These hormones in turn stimulate the growth of several ovarian follicles, each containing one egg. The number of follicles in the monthly "cohort" of developing follicles is unique to each individual. One follicle will soon begin to grow faster than others. This is called the dominant follicle. As the follicle grows, blood levels of estrogen rise significantly by cycle day seven. This increase in estrogen begins to inhibit the secretion of FSH. The fall in FSH allows smaller follicles to die off. They are, in effect, "starved" of FSH.