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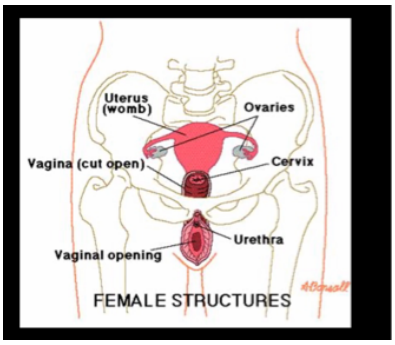
Course: PHYSIOLOGY

Cyclic Change in Virginia

Vagina is a short tubular organ. It is lined by mucus membrane, which is formed by stratified epithelial cells.



1. Vaginal cytology was evaluated weekly over 12 months in 20 adult female Cynomolgus monkeys (Macaca fascicularis). After sacrifice of the animals the histology of the ovaries, uterus and vagina were studied in different phases of the menstrual cycle.

Studies in nonhuman primates indicate that changes in the thickness and integrity of the vaginal epithelium affect the transmission rates of HIV-1, but few studies have examined the normal variations that may occur in the vagina of normal macaques as a result of aging or changes in the menstrual cycle. This study was conducted to determine if differences occur in the thickness of the vaginal mucosa with age or menses. Vaginal mucosal thickness was

compared in 46 rhesus macaques grouped as juvenile (1-3 years old), mature cycling (3-21 years old), and geriatric (> 21 years old). Epithelia of mature cycling macaques were also compared at different stages of the menstrual cycle. Older females (> 21 years) had the thinnest and least keratinized epithelium of all groups, followed by the youngest females (< 3 years). The vaginal epithelium was also thinner in cycling macaques during menses compared to the follicular stage. In addition, young, geriatric, or cycling macaques during menses had minimal keratinization.

Describe the cyclic changes in the cervix.

The mucous membrane of the cervix shows cyclic change during different phases of menstrual cycle. These include;

Proliferative phase: During this phase, the mucus membrane of the cervix becomes thinner and more alkaline due to the influence of estrogen. It helps in the survival and motility of spermatozoa.

secretory phase: During this phase, the mucus membrane of the cervix becomes more thick and adhesive because of the action of progesterone.

Cervical mucus at midcycle is increased in amount, acellularity, water content, and fluidity. Furthermore, cervical mucus at this time is well supplied with carbohydrate and presumably amino acids. From a teleologic standpoint, we may conclude that because of these characteristics the sperm, on deposition in the vagina, find an environment propitious for their nutrition and migration through the cervical canal.

Menstrual cycle

The menstrual cycle is the hormonal driven cycle; Day 1 is the first day of your period (bleeding) while day 14 is the approximate day you ovulate and if an egg is not fertilized, hormone levels eventually drop and at about day 25; the egg begins to dissolve and the cycle begins again with the period at about day 30. Menstruation begins day 1 and normally ends days 3-5 of the menstrual cycle.

Menstruation is bleeding from the vagina that happens about once a month,

as a normal part of the menstrual cycle. It is also known as having a period.

During this cycle, your hormones make the lining of the uterus become thicker, getting ready in case of pregnancy. Hormones also cause an egg to be released from an ovary, which is known as ovulation.

If you don’t become pregnant, your periods start about two weeks after you ovulate. The lining of the uterus falls away and, along with some blood, flows out through the vagina. Periods can be light or heavy, and the blood can range from bright red to dark brown. You might also notice small clots.

When do girls start their period?

Girls have their first period during puberty. Most often that is around the age 12 or 13 years old, but girls can start menstruating as young as 9, or as late as 16.

bleeding. When you menstruate, your body sheds the lining of the uterus (womb). Menstrual blood flows from the uterus through the small opening in the cervix and passes out of the body through the vagina. Most menstrual periods last from 3 to 5 days.

How long do periods last?

Menstruation affects every woman, but the experience can differ between women. When periods (menstruations) come regularly, this is called the menstrual cycle. Having regular menstrual cycles is a sign that important parts of your body are working normally. The menstrual cycle provides important body chemicals, called hormones, to keep you healthy. It also prepares your body for pregnancy each month. A cycle is counted from the first day of 1 period to the first day of the next period. The average menstrual

cycle is 28 days long. Cycles can range anywhere from 21 to 35 days in adults and from 21 to 45 days in young teens. The rise and fall of levels of hormones during the month control the menstrual cycle.

2. Hormonal Regulation of Menstrual Cycle

The menstrual cycle is a cycle of events that occurs in the womb (uterus) and ovaries of female mammals. It is associated with the production of eggs and preparing the uterus for the implantation of fertilised eggs.

The menstrual cycle occurs over a period of about 28 days. The changes during the cycle are due to four hormones, progesterone, oestrogen, FSH (follicle stimulating hormone) and LH (luteinising hormone). Progesterone and oestrogen have wide ranging effects on the body but in the context of the menstrual cycle progesterone is mainly involved in maintaining the lining of the uterus and oestrogen is mainly concerned with building up the lining of the uterus. FSH stimulates the production of eggs and LH stimulates the release of the egg. FSH and LH are produced by the pituitary gland in the brain.

There are four stages in the menstrual cycle.

Stage 1. Days 1-4. Menstruation (bleeding) occurs. The lining of the uterus disintegrates and is shed. This is due to low levels of progesterone.

Stage 2. Days 4-14. The uterine lining grows back. This is due to high levels of oestrogen.

Stage 3. Day 14. The egg (called an ovum) is released. This is due to LH.

Stage 4. Days 14-28. The lining of the uterus is maintained in case the egg becomes fertilised and implanted in the uterus. Maintenance of the lining is

due to high levels of progesterone.

The four hormones interact with each other. FSH causes Oestrogen release and oestrogen inhibits FSH. LH stimulates both oestrogen and progesterone production. Before ovulation LH release is stimulated by oestrogen but after ovulation it is inhibited by both oestrogen and progesterone.

In summary, the hormones have the following effects:

Oestrogen: causes growth of the uterine lining. Inhibits FSH. Stimulates release of LH and hence release of the egg. Inhibits LH after ovulation.

Progesterone: maintains the uterine lining. Inhibits LH after ovulation.

LH: Stimulates the release of the egg (called ovulation). Stimulates oestrogen and progesterone production.

FSH: Stimulates egg development and the release of oestrogen.

Birth control tablets contain high levels of progesterone and oestrogen. The oestrogen inhibits FSH production so that eggs cease to develop.

FSH is used to treat infertility because it stimulates the production of eggs.

Learning the menstrual cycle Edit

The menstrual cycle is easy to learn. The best approach is probably to break it down into parts.

Menstrual cycle - stages and changes in uterus

Menstrual cycle - changes in oestrogen and progesterone

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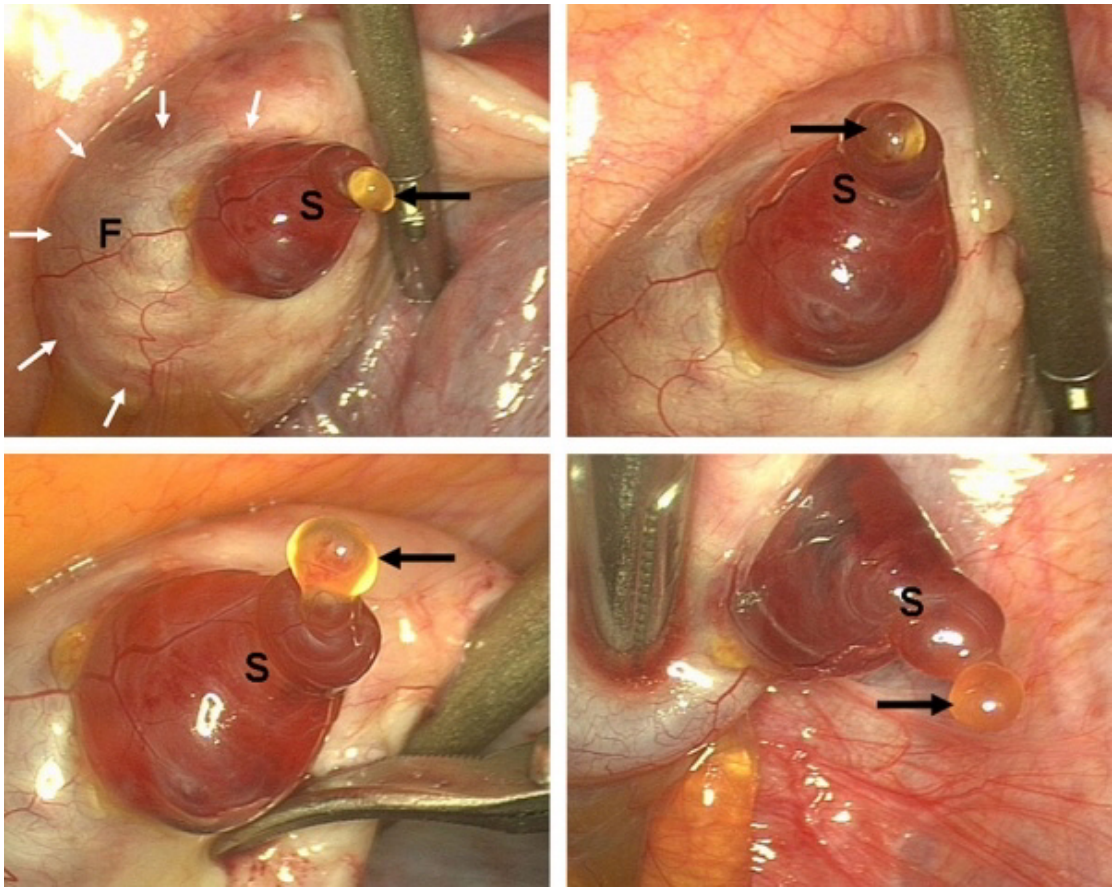

Diagram of the human ovary undergoing ovulation.