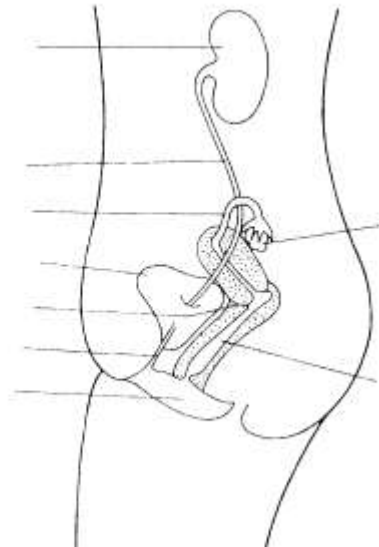
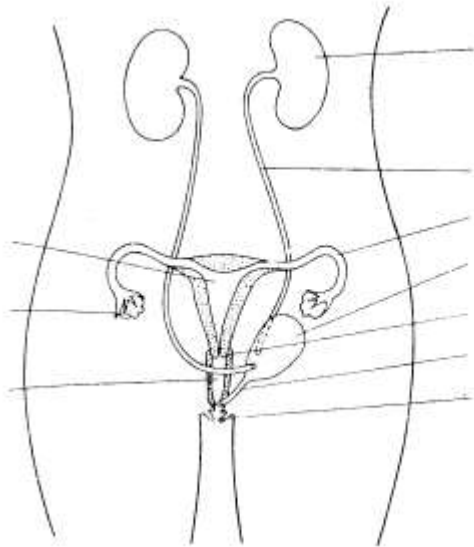


Human reproduction and development



Female reproductive system

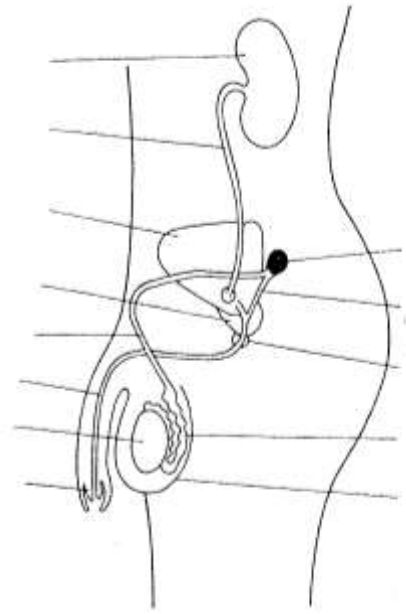
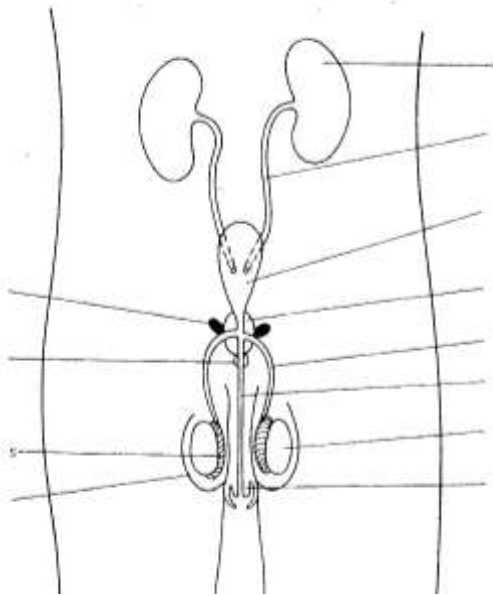
Diagram to label

use the following words to label the diagram

fallopian tube bladder uterus
uterus urethra ovary
cervix vagina kidney

functions of the main parts of this system.

Ovaries	
Oviducts (fallopian tubes)	
Uterus (womb)	
Vagina	



Male reproductive system

Diagram to label

use the following words to label the diagram

- | | | |
|--------------|---------------|-----------------|
| penis | epididymis | prostate gland |
| urethra | scrotum | seminal vesicle |
| vas deferens | testis | kidney |
| bladder | urethra | ureter |
| scrotal sac | cowpers gland | |

function of the main parts of this system.

Testes	
Epididymis (and other ducts)	
Seminal vesicle and prostate gland	
Penis	

The menstrual cycle

The hormonal control of the menstrual cycle involves:

1. Oestrogen and progesterone - the female sex hormones, which are secreted by the ovaries.
2. The secretion of oestrogen and progesterone is under the direct control of two other hormones, luteinising hormone (LH) and follicle stimulating hormone (FSH). These are secreted by the pituitary gland and are called gonadotrophic hormones.

Oestrogen

1. Stimulates the repair of the uterus lining.
2. The vaginal epithelium increases in thickness.
3. The mammary glands increase in size.
4. At its height oestrogen causes the female to be willing to receive a male.

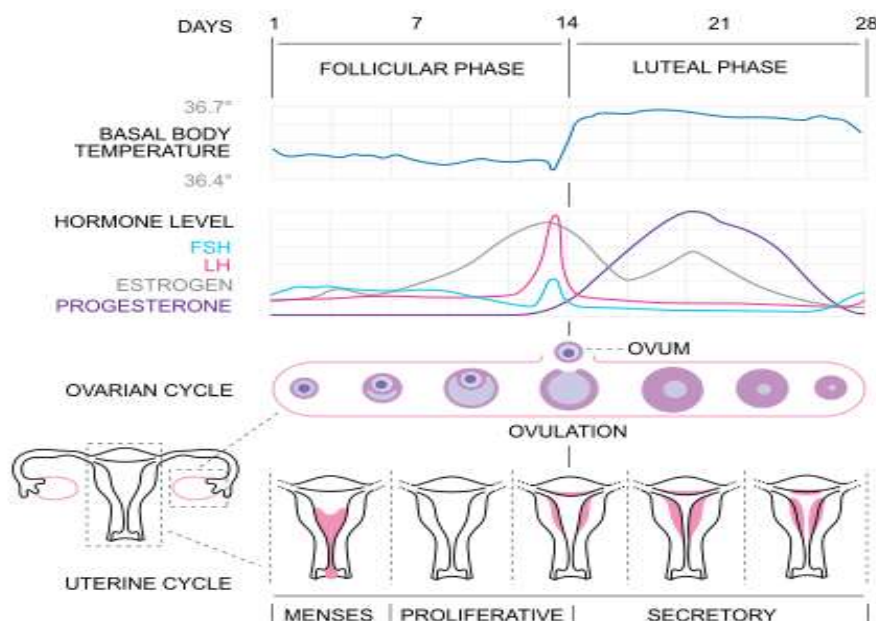
The rising level of oestrogen in the blood has a negative feedback - this prevents the possibility of other follicles being stimulated to develop.

Progesterone

1. Increases the lining of the uterus.
2. Increases the thickness of the uterus lining

The lack of progesterone causes the lining of the uterus to go into spasm the lining to break down. This passes out of the vagina as the menstrual flow.

The falling levels of progesterone mean the release of FSH by the pituitary is no longer inhibited, so that FSH is again secreted, starting a new cycle.



Fertilisation and implantation

1. Erection of the penis requires specialised vascular tissue.
 - Erection of penis is necessary to deliver sperm into vagina during intercourse
 - Erection is analogous to blowing up a balloon: arterioles dilate and allow special vascular chambers to fill with blood
 - This is a parasympathetic nervous reflex; the reflex is strongly influenced by impulses coming from the brain
2. Ejaculation is a spinal reflex.
 - Sperm suspended in semen are delivered to the female by ejaculation
 - About 4 ml, containing 300,000,000 sperm
 - About 20 % of these will be non functional
 - Ejaculation is caused by rhythmic contractions of muscle
3. To fertilise an egg, a sperm must undergo a long, hazardous journey.
 - Successful fertilization occurs in the fimbria of the Fallopian tube, close to the ovary
 - Sperm take several hours to travel this distance and in the attempt most of them die or become hopelessly lost
 - At the entrance to the Fallopian tube only 300,000 sperm are left and only 100 or so make it to the upper end of this tube
 - The sperm must then fight its way through the layers of cells surrounding the egg, using enzymes from its acrosomal tip
 - Only a single sperm will be successful
4. Fertilisation causes rapid changes leading to zygote formation.
 - When 1 sperm penetrates an egg reactions take place on the surface of the egg that block penetration by other sperm; this is necessary because polyspermy is lethal
 - The egg cell nucleus is triggered into finishing meiotic division, finally producing a haploid nucleus
 - The sperm loses its tail and its nucleus swells
 - The 2 haploid nuclei, from the sperm and egg, fuse to form a single nucleus
5. As the zygote moves down the fallopian tube its cells divide to form a blastocyst.
 - The new zygote starts to divide by mitosis (about once every 20 hours)
 - Single Cell -> Morula (berry-shaped) -> Blastocyst (hollow sphere)
 - Movement along tube is caused by cilia which sweep the zygote along
6. Implantation occurs about 7 days after fertilisation

- For the first 7 days the embryo has been using food materials originally stored in the egg cell
 - Now it imbeds itself into the uterine lining so that it can be nourished by the mother
 - Elaborate connections are made between embryonic and maternal tissue, forming the placenta
 - Functions of placenta:
 - supplies maternal food and oxygen to embryo
 - removes embryonic waste products to mother
 - becomes an endocrine organ, producing many hormones
7. The placenta begins taking over hormone secretion required for pregnancy
- At about 7 days blastocyst cells produce human chorionic gonadotropin (hCG)
 - hCG replaces LH, stimulating the corpus luteum to continue producing progesterone
 - hCG is the basis of the pregnancy test
 - Later in fetal development the placenta takes over the production of progesterone
 - Also produces oestrogen and several other hormones that promote growth

Birth

When the foetus reaches a certain size (approximately 9 months after conception), birth or parturition takes place. Hormonal levels change, and oxytocin hormones trigger off contractions of the muscles of the uterus. When the woman is giving birth, she is said to "be in labour". The baby will usually have already orientated itself head first towards the cervix. This is known as the first stage of birth. This stage lasts for a while varying from individual to individual.

Then the second stage begins. The mucus plug, which plugged the cervix, and the amniotic membranes break, allowing the amniotic fluid to escape. The woman's "waters have been broken" and birth will follow shortly. What follows is the actual appearance of the baby from the vagina. The head is usually born first - although there are other presentations, such as breech - followed by the rest of the body. Stage three is completed slightly after the baby is born. The placenta detaches itself from the uterine wall, and is expelled. It is called the afterbirth. It must be expelled in its entirety or it will go septic.

Hormones involved in birth

Hormone	Fetal or maternal	Function
Oxytocin		
Corticotrophin releasing hormone		
ACTH		
Cortisol		
Prostaglandin		

Lactation

The synthesis and secretion of milk from the mammary glands is stimulated by prolactin, a hormone secreted from the pituitary gland. When the baby suckles, it stimulates the secretion of oxytocin in the mother, which increases milk production and secretion.

The milk produced in the first 3 days after birth is called colostrum. It contains lot of proteins and salts. Milk is a source of proteins, fat, calcium, vitamins and other nutrients, and also gives the baby immunity due to the presence of maternal antibodies.

Growth and development

This can be split into sections.

1. Infancy - birth to 18 months
2. Childhood - 18 months to puberty
3. Adolescence - usually 13-19 years
4. Adulthood
5. Older adulthood - where organ systems decline

Effects of ageing

Write summaries of:

- osteoarthritis
- osteoporosis
- effect of ageing on the cardiovascular system
- menopause
- HRT

Cell division

The type of cell division involved in growth, repair and asexual reproduction is

The type of cell division involved in sexual reproduction is

This involves a "reduction division" from the normal chromosome number (.....) to produce cells which have half the normal number of chromosomes (.....) These cells are called

Normal human body cells have chromosomes. Human gametes have chromosomes. When fertilisation occurs the male and female gametes fuse together, forming a and restoring

the number, so the embryo has
chromosomes.