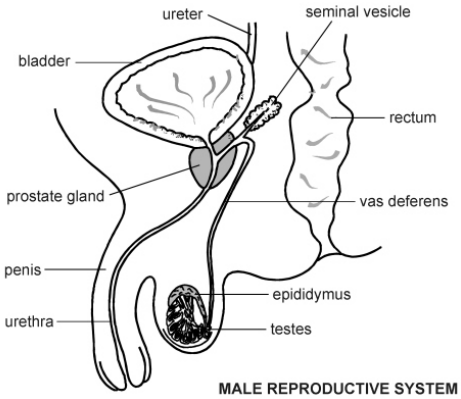
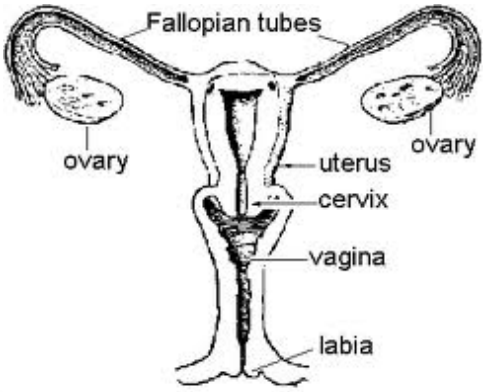
6.6.1 Draw and label diagrams of the adult male and female reproductive systems.

Male



MALE REPRODUCTIVE SYSTEM

Female

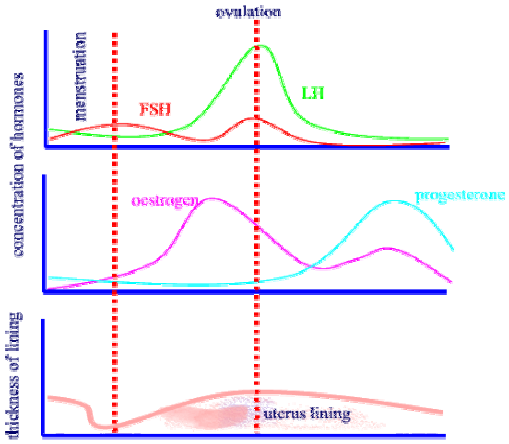


6.6.2 Outline the role of hormones in the menstrual cycle, including FSH (follicle stimulating hormones), LH (luteinizing hormone), estrogen and progesterone.

The menstrual cycle:

. FSH is secreted by the pituitary gland and its levels start to rise. This stimulates the follicle to develop and the follicle cells to secret estrogen.
. Estrogen then causes the follicle cells to make more FSH receptors so that these can respond more strongly to the FSH.
. This is positive feedback and causes the estrogen levels to increase and stimulate the thickening of the endometrium (uterus lining).
. Estrogen levels increase to a peak and by doing so it stimulates LH secretion from the pituitary gland.
. LH then increases to its peak and causes ovulation (release of egg from the follicle).
. LH then stimulates the follicle cells to secrete less estrogen and more progesterone. Once ovulation has occurred, LH stimulated the follicle to develop into the corpus luteum.
. The corpus luteum then starts to secrete high amounts of progesterone. This prepares the uterine lining for an embryo.
. The high levels of estrogen and progesterone then start to inhibit FSH and LH.
. If no embryo develops the levels of estrogen and progesterone fall. This stimulates menstruation (break down of the uterine lining). When the levels of these two hormones are low enough FSH and LH start to be secreted again.
. FSH levels rise once again and a new menstrual cycle begins.

6.6.3 Annotate a graph showing hormone levels in the menstrual cycle, illustrate the relationship between changes in hormone levels and ovulation, men struation and the thickening of the endometrium.



a) Follicle Stimulating Hormone (FSH) is secreted by the pituitary gland of the brain and stimulates the development of a primary follicle.
b) Primary follicle cells secrete estrogen which in turn increases the secretion of FSH in a positive feedback.
c) The estrogen thickens the lining of the uterus in preparation for a fertilized egg.
d) The peak of estrogen secretion at day 12 causes the pituitary to release a surge of LH. This loosens the now mature egg which is released in ovulation:

I. LH reduces the secretion of Estrogen
II. LH stimulates the empty follicle to develop into the corpus luteum

a) Progesterone and estrogen together stop any more LH and FSH being secreted from the pituitary. (negative feedback)
b) Progesterone maintains the lining of the thickened endometrium in preparation for the implantation of a fertilized egg.
c) If implantation does not take place then the Corpus luteum degenerates and fails.

- The progesterone production stops.
- The endometrium breaks down and the 'menstrual period' begins
- The inhibition of FSH and LH by ovarian hormones has been removed and so they begin their secretions again of FSH.
- A new cycle has begun.

6.6.4 List three roles of testosterone in males.

Roles:

. Stimulates the development of prenatal genitalia.
. Stimulates the development of the male secondary sexual characteristics such as growth of the skeletal muscle and pubic hair.
. During adulthood it maintains the sex drive.

6.6.5 Outline the process of in vitro fertilization (IVF).

Process:

. For a period of three weeks, the women has to have a drug injected to stop her normal menstrual cycle.
. After these three weeks, high doses of FSH are injected once a day for 10-12 days so that many follicles develop in the ovaries of the women.
. HCG (another hormone) is injected 36 hours before the collection of the eggs. HCG loosens the eggs in the follicles and makes them mature.
. The man needs to ejaculate into a jar so that sperm can be collected from the semen. The sperm are processed to concentrate the healthiest ones.
. A device that is inserted through the wall of the vagina is used to extract the eggs from the follicles.
. Each egg is then mixed with sperm in a shallow dish. The dishes are then put into an incubator overnight.
. The next day the dishes are looked at to see if fertilization has happened.
. If fertilization has been successful, two or three of the embryos are chosen to be placed in the uterus by the use of a long plastic tube.
. A pregnancy test is done a few weeks later to find out if any of the embryos have implanted.

A scan is done a few weeks later to find out if the pregnancy is progressing normally.