- LH \rightarrow \text{TESTOSTERONE} \rightarrow \text{FSH} \rightarrow \text{SPERM}

**PRODUCTION.**

- **Secondary sexual characteristics** are features that distinguish males from females, but are not part of the reproductive system. (hormones responsible are testosterone/oestrogen)
  - **Males**= facial hair, pubic hair, growth of Adam’s apple, broadening of the shoulders and chest.
  - **Females**= pubic hair, growth of breasts, enlargement of the hips.

- The **menstrual cycle** is a series of cyclical changes that occur in the female reproductive system over a 28-day period. The three phases are:

  1. **Follicular phase** (days 1-13): starts with **menstruation** which is the shedding of the lining of the endometrium. The **proliferative** stage follows which is the regeneration of the lining of the uterus and the development of the egg in the ovary. The secretion of FSH from the pituitary stimulates the formation of new **graafian follicles** in the ovaries therefore **oestrogen** levels begin to increase, this **inhibits the secretion of FSH** from the pituitary (E.g. of a negative feedback) generally resulting in only **one graafian follicle** developing fully. Towards the end of the follicular phase, **oestrogen levels reach a critical level.** The pituitary gland responds by producing a **surge of LH.**
2. **Ovulation** (day 14): *an egg is released from the ovary* as a result of the surge of LH. The *Graafian follicle becomes a yellow body called the corpus luteum*. Oestrogen levels decrease slightly as a result.

3. **Luteal phase** (days 15-28): the *corpus luteum secretes progesterone* (causes the body temperature to increase in the days following ovulation) and a small amount of *oestrogen*. These continue to exert a negative feedback effect on FSH. *Progesterone also retains the endometrium* to the end of the cycle, ensuring the uterus is ready to receive a fertilised egg. As the *corpus luteum degenerates progesterone and oestrogen levels drop removing the inhibition on FSH and the cycle repeats*. If fertilisation occurs the fertilised egg produces a hormone maintaining the corpus luteum in the ovary.

- **Fibroids** are benign tumours that grow in the muscular wall of the uterus. Ultrasound can be used to break up the tumour, in severe cases the tumours are removed surgically. A *hysterectomy* is the removal of the whole uterus.
- **Copulation** is the insertion of an erect penis into the vagina.
- **Orgasm** occurs when sexual arousal reaches a climax.
- **Ejaculation** is the release of semen from the penis.
- **Fertilisation** is the fusion of a haploid sperm cell with a haploid egg cell to produce a diploid zygote.
- The **fertile period** of the menstrual cycle is the time at which the female is most likely to become pregnant. *Implantation* is the embedding of the embryo into the lining of the uterus.
- The **placenta** is an organ made from embryonic and uterine tissue which forms in the uterus during pregnancy and provides a link between the mother and child. It allows nutrients, H2O, O2, antibodies, drugs and hormones to pass from the mother's bloodstream to the baby's bloodstream and wastes to come from the baby. The mother's blood is kept separate from the baby's blood (preventing a *haemolytic reaction* = mix of blood types)
- A **morula** is a ball of undifferentiated cells that forms as a result of mitosis.
- A **blastocyst** is a fluid filled sac containing an *inner cell mass* (ICM) that gives rise to the embryo. The **trophoblast** is the outer layer of the blastocyst. The inner cell mass continues to divide by mitosis and cells are organised into three distinct germ layers: *ectoderm* (skin, nervous system), *mesoderm* (musculoskeletal system, kidneys) and the *endoderm* (liver, pancreas)
- **Implantation** is the embedding of the embryo in the lining of the uterus.
FOETUS.

@fertilisation  mitosis (1,2,4,8...)  @ about day 7  forms from ICM  @ 8th week

CHILDBIRTH:

1. **Labour**: the pituitary secretes *Oxytocin*, which stimulates *contractions of the uterus* resulting in the amniotic sac bursting and amniotic fluid being released (AKA water breaking). These contractions cause *cervix to dilate*.

2. **Parturition**: once the cervix is dilated enough the baby can pass out from the vagina. The *umbilical cord is then clamped and cut*.

3. **Afterbirth**: the *placenta passes from the uterus* a few minutes afterbirth due to continued contractions of the uterus.

- **Lactation** is the production and secretion of milk by the breasts of the female in response to the hormone *Prolactin*.

- **Breast-feeding** is the feeding of a baby/infant directly from the breast. *Colostrums* is secreted by the breasts after childbirth and is a very nutritious and concentrated form of milk that also contains antibodies to protect the baby from diseases in the first few days of life.

- **Birth control** refers to the procedures taken to control the number of offspring produced.

- **Abortion** is the physical removal of a foetus from the uterus.

- **Contraception** is the intentional prevention of pregnancy by stopping fertilisation or implantation from occurring. There are *natural, mechanical, chemical* and *surgical* methods.

- **Infertility** is the inability to contribute to conception. A couple are described as infertile if, after 12 months of contraceptive-free sexual intercourse, they have failed to conceive. Causes include *endocrine gland failure, low sperm count* in males and *fallopian tube blockage* in females.

- **In vitro fertilisation** is the process of fertilising an egg cell with a sperm cell outside the body, usually in a petri dish, to produce a diploid zygote that is then implanted back into the uterus.