

# Human Reproduction

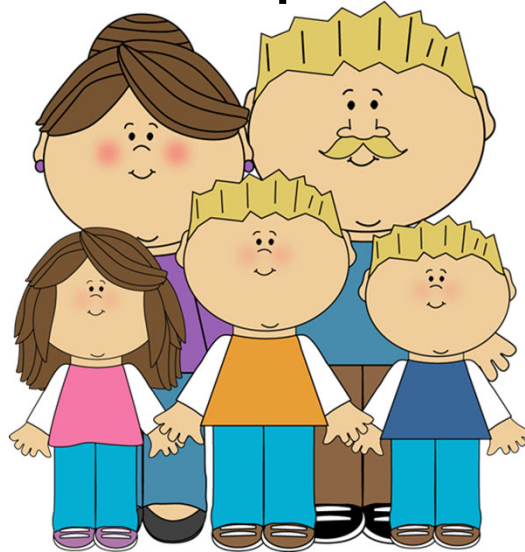
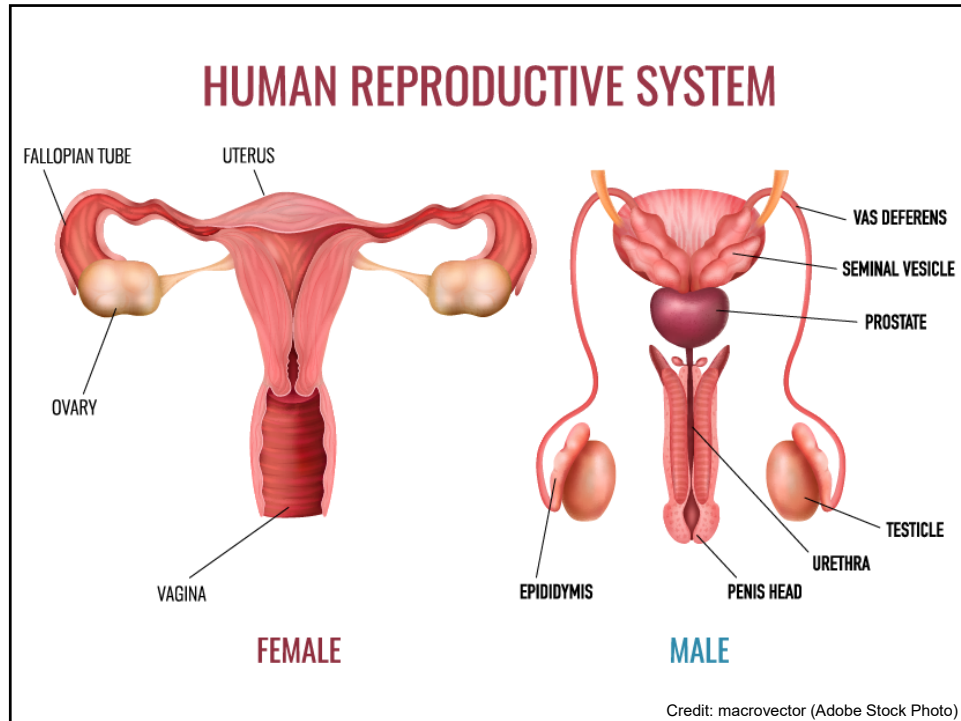


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## Female Reproductive System

- Vagina
  - It receives sperm and provides a passageway for a baby to leave the mother's body during birth.
- Uterus
  - This is where a fetus grows and develops until birth.
- Ovaries
  - They produce eggs and secrete estrogen.
    - Each egg is located inside a structure called a follicle.
    - Cells in the follicle protect the egg and help it mature.

- Fallopian Tubes
  - The fallopian tubes connect ovaries to the uterus.
    - This is the pathway for eggs to the uterus.
  - Each tube reaches (but is not attached to) one of the ovaries.
    - The ovary end of the tube has a fringelike structure that moves in waves sweeping eggs from the ovary into the tube.

# Male Reproductive System

[youtu.be/-XQcnO4iX\\_U](https://youtu.be/-XQcnO4iX_U)

- Penis
  - Sperm pass out of the body through the urethra.
- Testes
  - The testes produce sperm and secrete testosterone.
- Epididymis
  - Sperm are stored here until they leave the body.

- Vas Deferens
  - Ducts that transport sperm from the epididymis to the urethra.
- Seminal Vesicles and Prostate Gland
  - Glands that secrete substances that become part of semen.

## Hormonal Control of Reproduction

- The human male and female reproductive cycles are controlled by the interaction of hormones from the **hypothalamus** and anterior **pituitary** with hormones from reproductive tissues and organs.
  - The hypothalamus sends a gonadotropin-releasing hormone (GnRH) to the anterior pituitary causing the release of **follicle stimulating hormone (FSH)** and **luteinizing hormone (LH)** from the anterior pituitary into the blood.

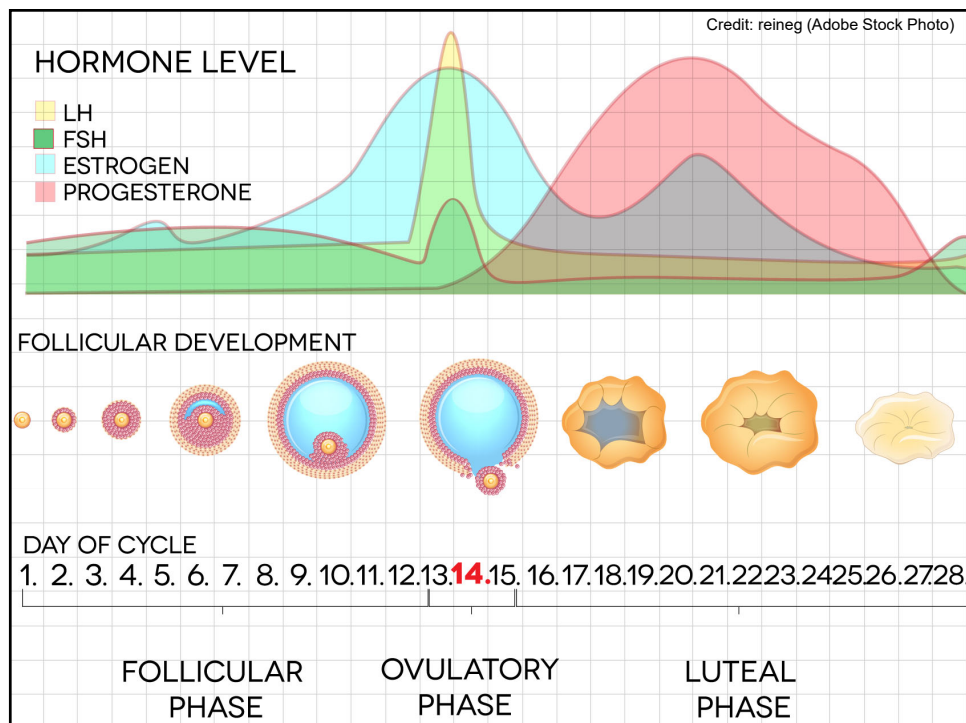
## Male Hormones

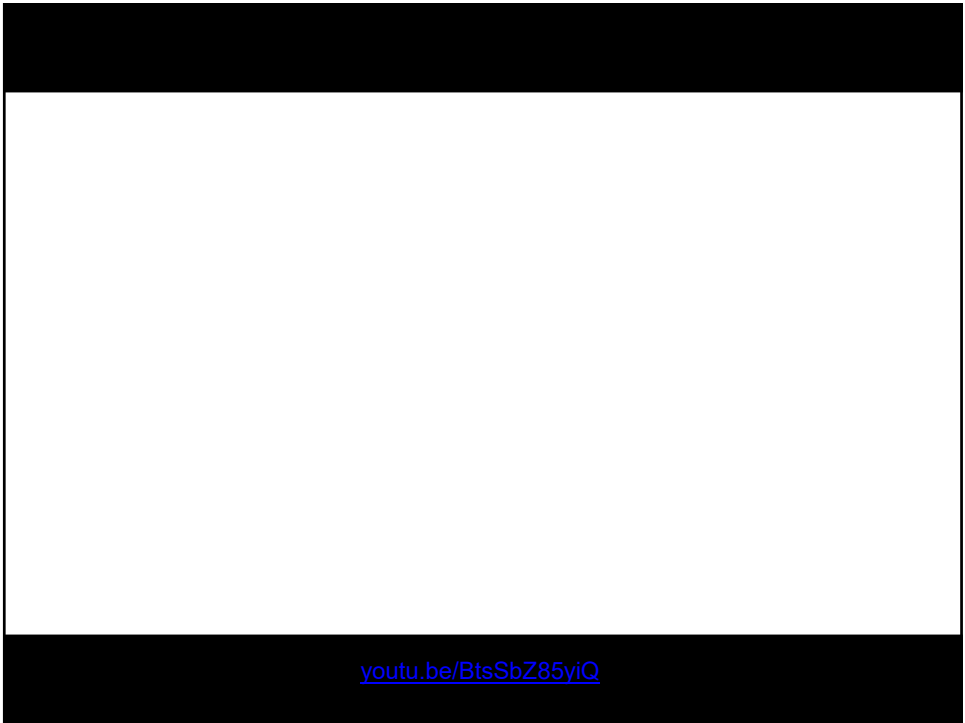
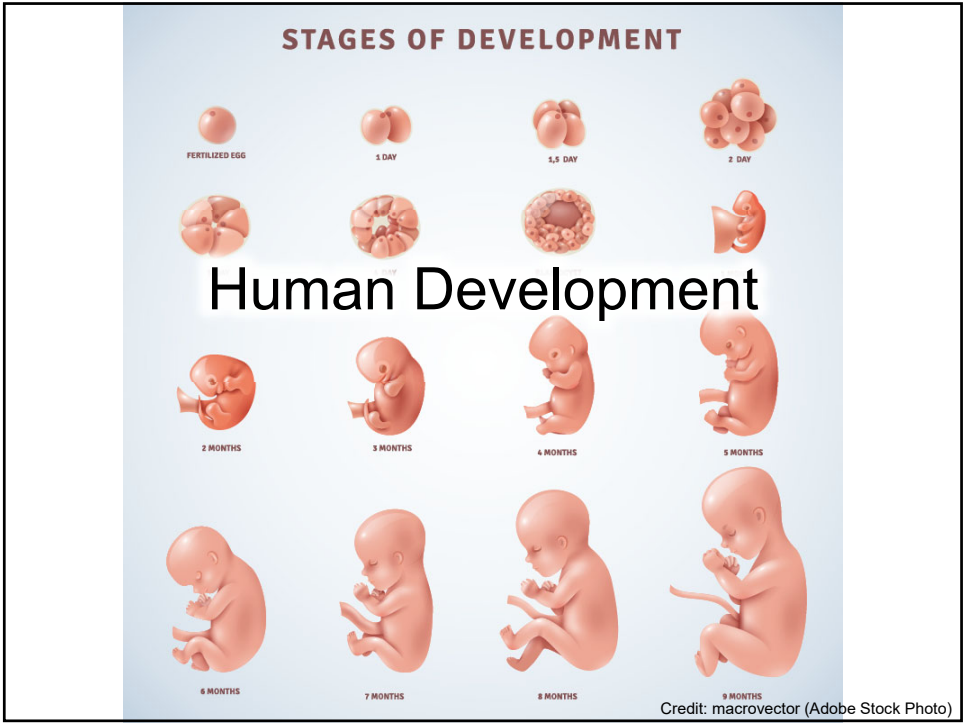
- FSH and LH stimulate sperm production and **testosterone** secretion by the testes.
- **Testosterone** stimulates sperm production and operates as a feedback control to the hypothalamus.
  - Testosterone is also responsible for the secondary sexual characteristics that develop in the male during adolescence.
    - Examples: deepening of the voice, the growth of facial, axillary, and pubic hair, an increase in muscle bulk

## Female Hormones

- The female reproductive cycle is divided into the **ovarian cycle** and the **menstrual cycle**.
- The **ovarian cycle** governs the preparation of endocrine tissues and release of eggs.
- The **menstrual cycle** governs the preparation and maintenance of the uterine lining.

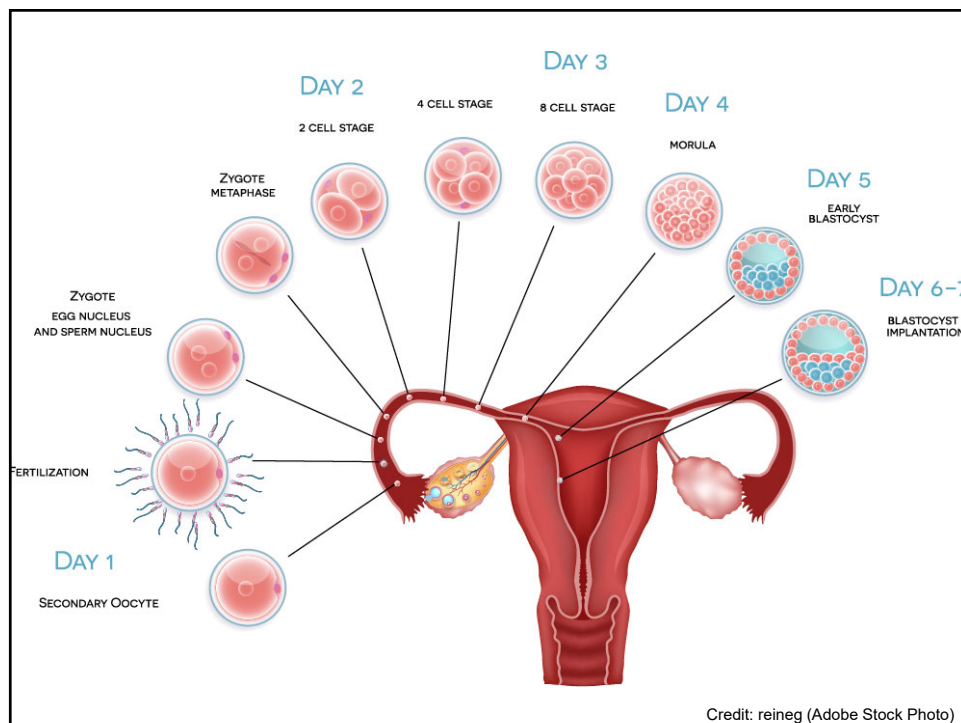
- FSH and LH, along with **estrogen** and **progesterone** control these two cycles.
- **Estrogen** is also responsible for the secondary sexual characteristics of females.
  - Examples: breast development, flaring of the hips, shorter period for bone growth



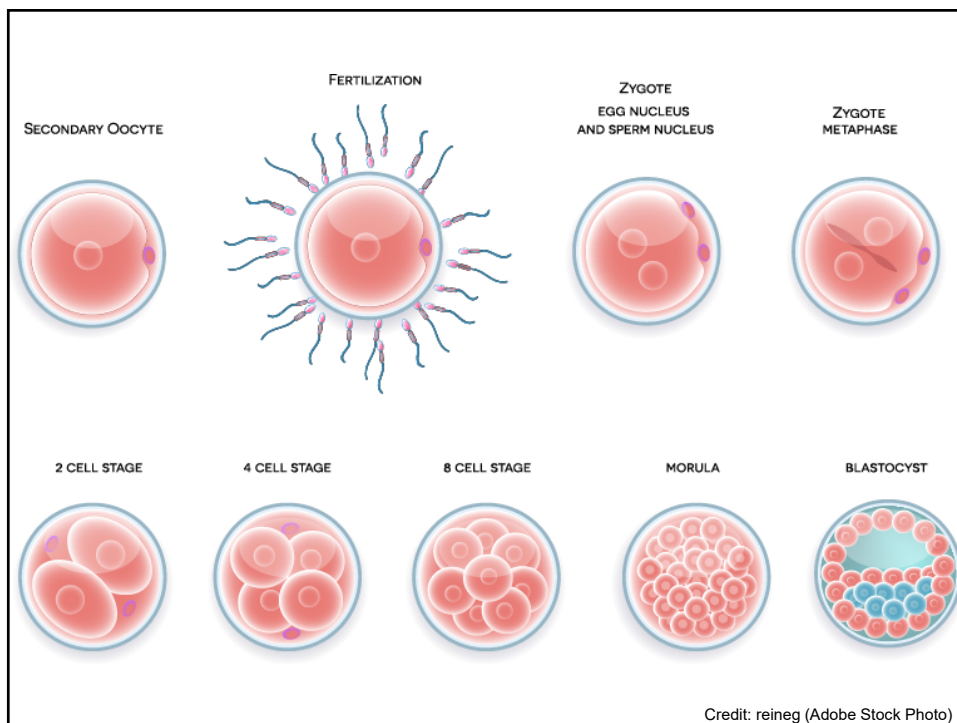




- The first seven days of pregnancy simplistically contain three events:
  - Fertilization
  - the transfer of the transfer of the zygote to the uterus
  - implantation



- Fertilization
  - The male gamete (sperm cell) and the female gamete (the egg) fuse to produce a **zygote**.
- The **zygote** travels down the fallopian tube towards the uterus.
  - It divides by mitosis several times (cleavage) and eventually becomes a fluid-filled cavity inside a ball of cells (blastocyst).
- Implantation
  - The blastocyst embeds in the lining of the uterus.
  - It is now called an **embryo**.



# Embryonic Development

- Weeks 4-8
  - The embryo grows and becomes more complex.
  - Specialized cells and tissues form.
  - Most organs start to form.
  - It is now referred to as a **fetus**.

## Embryonic Development (weeks 4-8)

- Heart begins to beat
- Arm buds appear
- Week 4 • Liver, pancreas, and gall bladder start to form
- Spleen appears
- Eyes start to form
- Leg buds appear
- Week 5 • Hands appear as paddles
- Blood begins to circulate
- Facial features start to develop
- Lungs start to form
- Week 6 • Fingers and toes form
- Hair follicles start to form
- Week 7 • Elbows and toes are visible
- Face begins to look human
- Week 8 • External ears start to form



Embryo at 4 weeks

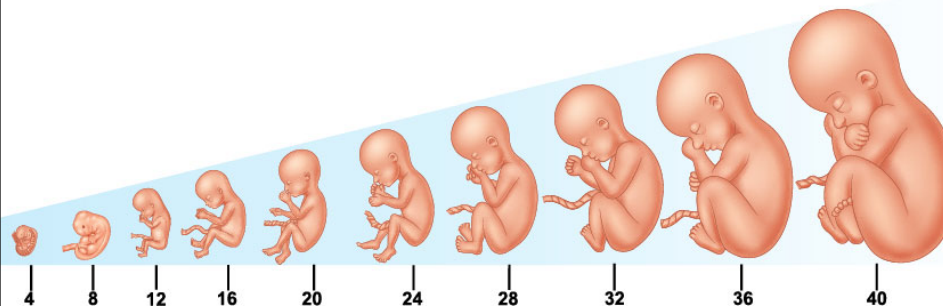


Embryo at 8 weeks

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# Fetal Development

- Weeks 8 – 38
  - The organs complete their development.
  - There is rapid growth in length and weight.



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