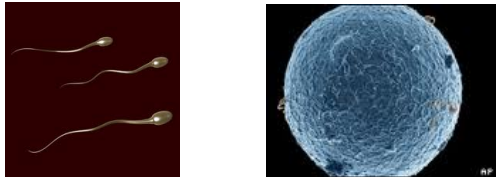


The reproductive system (TB ch. 39-3, p. 1009)

The reproductive system is the only organ system that can fail without being life-threatening.

This is because its purpose is to create new life, not sustain your current life.

The reproductive system is responsible for producing, storing and releasing gametes.



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Development

For the first 6 weeks of development, both male and female embryos are more or less identical.

In the seventh week of development, the first reproductive organs develop.

In males, the testes develop and produce testosterone, which begins the development of the male reproductive system.

In females, the ovaries produce estrogen, which begins the development of the female reproductive system.

After birth, the role of testosterone and estrogen remains minimal until puberty.

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Puberty

Puberty begins when the hypothalamus instructs the pituitary gland to release follicle-stimulating hormone (FSH) and luteinizing hormone (LH).

These hormones act on the gonads.

Dec 18-2:07 PM

Male Reproductive System

In males, the presence of FSH and LH increases testosterone production.

The combination of FSH and testosterone stimulates the production of sperm cells. Puberty ends once a large number of sperm cells have been produced.

The sperm are produced in the testes, which hang *outside* the body in the scrotum sac. This allows them to exist at a temperature **lower** than regular body heat.

Regular body temperatures of 37° are high enough to destroy sperm cells, or at least render them unfunctional.

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Each sperm cell is made of three parts:

- 1) Head: contains the nucleus and an enzyme necessary for fertilization
- 2) Midpiece: contains multiple mitochondria to produce energy.
- 3) Tail: similar to a flagella; used for propulsion.

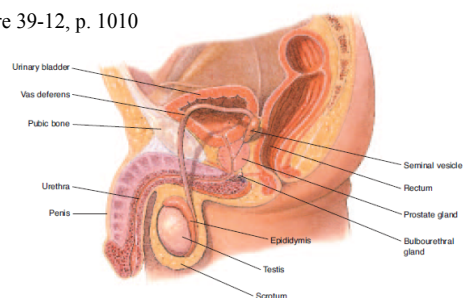
▲ Figure 39-13 The sperm is the male gamete, or sex cell.

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After production, the sperm cells move into the **epididymis**, where they are stored.

In order to leave the body, the sperm must travel into the **vas deferens** - a canal that will merge with the **urethra** from which it can exit the penis.

Figure 39-12, p. 1010



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Female Reproductive System

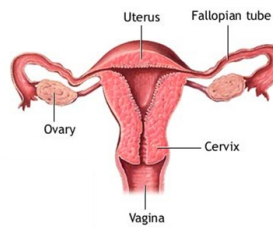
In females, FSH and LH stimulate an increase in the production of estrogen.

Estrogen will stimulate the production of mature egg cells and serve to prepare the female body for a developing embryo (*pregnancy*).

Egg cells mature within a cluster of follicles. Approximately 400 eggs will become mature over the course of a lifetime, and their timed-release is controlled by the level of FSH in the body.

When an egg cell has fully matured, its follicle will release it in a process called ovulation.

The cell will travel down one of the Fallopian tubes with the help of the cilia-lined walls of the canal. It is in this location that an egg can be fertilized.



Once it reaches the end of the tube, it enters the uterus. If it has been fertilized, it will implant itself here and develop into an embryo.

If it has not been fertilized it will be expelled from the body, along with all the tissues prepared by the body for pregnancy.

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Dec 18-2:42 PM

The menstrual cycle

The menstrual cycle is controlled by hormones produced by the hypothalamus, the pituitary gland and the ovaries.

The process occurs on a 28-day cycle and last until the body stops producing estrogen.

The process occurs in 4 stages:

- 1) Follicular stage
- 2) Ovulation stage
- 3) Luteal stage
- 4) Menstruation

Follicular phase

Low levels of estrogen in the body cause the hypothalamus to act on the pituitary gland to increase the production of FSH and LH.

These hormones travel to the ovaries where they cause a follicle to develop to maturity. Sometimes, more than one follicle develops, which has the potential to result in twins, triplets or more!

As the follicle develops, it produces estrogen, which will cause the uterus lining to thicken.

The phase lasts about 10 days.

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Ovulation

This phase lasts 2 - 4 days.

During this time, the pituitary glands release large amounts of FSH and LH, which will cause the follicle to rupture and release the egg cell.

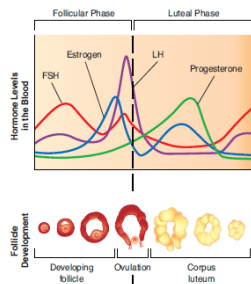


Figure 39-16, p.1014

Luteal phase

As the egg moves through the Fallopian tube, it changes and starts producing progesterone.

Progesterone stimulated the development of the blood supply to the uterine lining in preparation for pregnancy.

If an egg is fertilized in this stage, it will start to undergo mitosis right away. The ball of cells resulting from this process will implant themselves in the lining of the uterus.

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Dec 18-3:09 PM

Menstruation phase

If fertilization does not occur, the egg cell will start to disintegrate. Once this happens, it stops producing estrogen and progesterone.

When estrogen levels are low enough, the lining will detach itself from the uterus and the tissue, with associated blood supply, will be discharged through the vagina.

Dec 18-3:09 PM