

Sperm Formation

by Sophia



WHAT'S COVERED

In this lesson, you will learn to identify the hormones involved in sperm formation. Specifically, this lesson will cover:

1. Spermatogenesis Overview

Spermatogenesis is the process of producing and maturing the male gametes (**sperm**). Recall that gametes are reproductive cells that have half the normal amount of DNA. Thus, when a male gamete (sperm) fertilizes a female gamete (oocyte), the result is an embryo with exactly the normal amount of DNA ($1/2$ DNA from sperm + $1/2$ DNA from oocyte = 1 DNA).



TERMS TO KNOW

Spermatogenesis

The process of sperm formation.

Sperm

Male gametes produced in the testes.

2. Spermatogenesis Step-By-Step

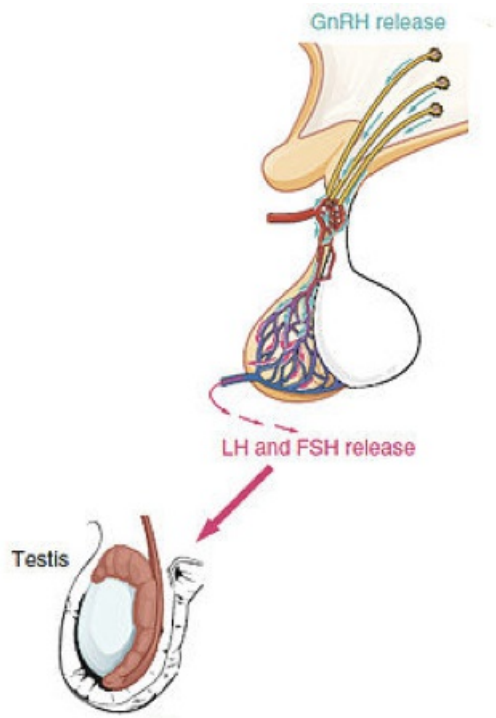
Let's follow the progress of spermatogenesis through the male reproductive system.



STEP BY STEP

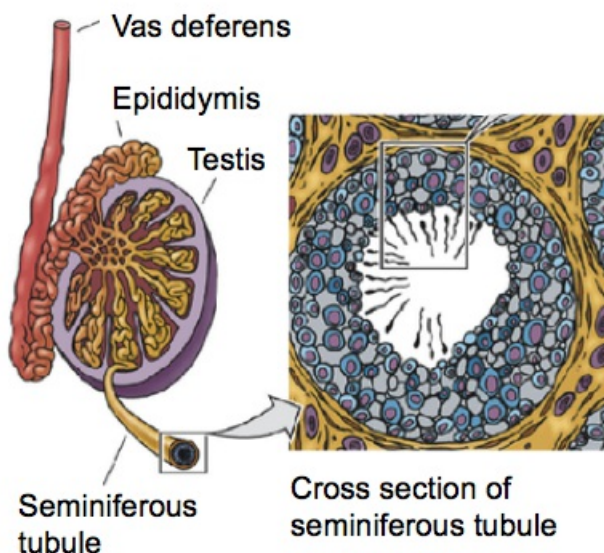
Step 1. Neurons in the hypothalamus release **gonadotropin-releasing hormone (GnRH)**.

Step 2. GnRH causes the release of **follicle-stimulating hormone (FSH)** and **luteinizing hormone (LH)** from the anterior pituitary gland.



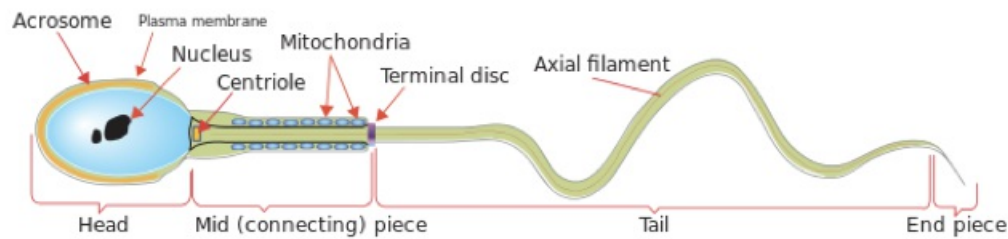
Step 3. FSH and LH promote cell division in the **seminiferous tubules** of the testes.

Seminiferous tubules wind around themselves within little compartments of the testes. Seminiferous tubules are lined with Sertoli cells, and Sertoli cells provide nourishment for developing sperm cells. FSH, or follicle stimulating hormone, acts on Sertoli cells specifically. It is here that stem cells divide so that the immature sperm have half the normal amount of DNA, instead of the normal amount that the stem cells started with.



This is also where:

- Microtubules grow to form a tail
- The midpiece packs with mitochondria so that the sperm has plenty of energy for swimming
- The Golgi apparatus forms the acrosome on the head of the sperm (the acrosome contains enzymes that will allow the sperm to penetrate the oocyte's zona pellucida and fertilize the oocyte)



Step 4. Leydig cells provide sufficient **testosterone** to mature sperm cells.

Testosterone helps the sperm cells get rid of unnecessary organelles. Each sperm has one job: To get to the oocyte first. Most organelles just slow the sperm down, so they are jettisoned.

Step 5. Mature sperm cells move to the epididymis to become motile.

Mature sperm cells aren't much good unless they can move; the epididymis is where sperm gain motility. They are then stored until arousal.



TERMS TO KNOW

Gonadotropin-releasing Hormone (GnRH)

A hormone secreted by the hypothalamus that stimulates the anterior pituitary gland to secrete FSH and LH.

Follicle Stimulating Hormone (FSH)

A hormone secreted by the anterior pituitary gland, follicle stimulating hormone stimulates the production of gametes (sperm in males and oocytes in females); FSH's secretion is regulated through negative feedback mechanisms and the hormone gonadotropin-releasing hormone (GnRH).

Luteinizing Hormone (LH)

A hormone secreted by the anterior pituitary gland, LH stimulates Leydig cells to secrete testosterone while in females it promotes ovulation.

Seminiferous Tubules

Tubules within chambers of the testes in which sperm are produced.

Leydig Cells

Cells of the testes that release testosterone.

Testosterone

The male sex hormone that controls the development of the male reproductive system, as well as many tissues in both the male and female body.



SUMMARY

This lesson has been an overview of sperm formation, otherwise known as **spermatogenesis**. Specifically, you learned about the **step-by-step of spermatogenesis**, including spermatogenesis hormones and the components of a sperm cell.

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND



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TERMS TO KNOW

Follicle Stimulating Hormone (FSH)

A hormone secreted by the anterior pituitary gland, follicle stimulating hormone stimulates the production of gametes (sperm in males and oocytes in females). FSH's secretion is regulated through negative feedback mechanisms and the hormone gonadotropin-releasing hormone (GnRH).

Gonadotropin-releasing Hormone (GnRH)

A hormone secreted by the hypothalamus that stimulates the anterior pituitary gland to secrete FSH and LH.

Leydig Cells

Cells of the testes that release testosterone.

Luteinizing Hormone (LH)

A hormone secreted by the anterior pituitary gland, LH stimulates Leydig cells to secrete testosterone while in females it promotes ovulation.

Secondary Sexual Traits

Traits controlled by testosterone such as deepening of the voice and facial hair development during puberty.

Seminiferous Tubules

Tubules within chambers of the testes in which sperm are produced.

Sperm

Male gametes produced in the testes.

Spermatogenesis

The process of sperm formation.

Testosterone

The male sex hormone that controls the development of the male reproductive system, as well as many tissues in both the male and female body.