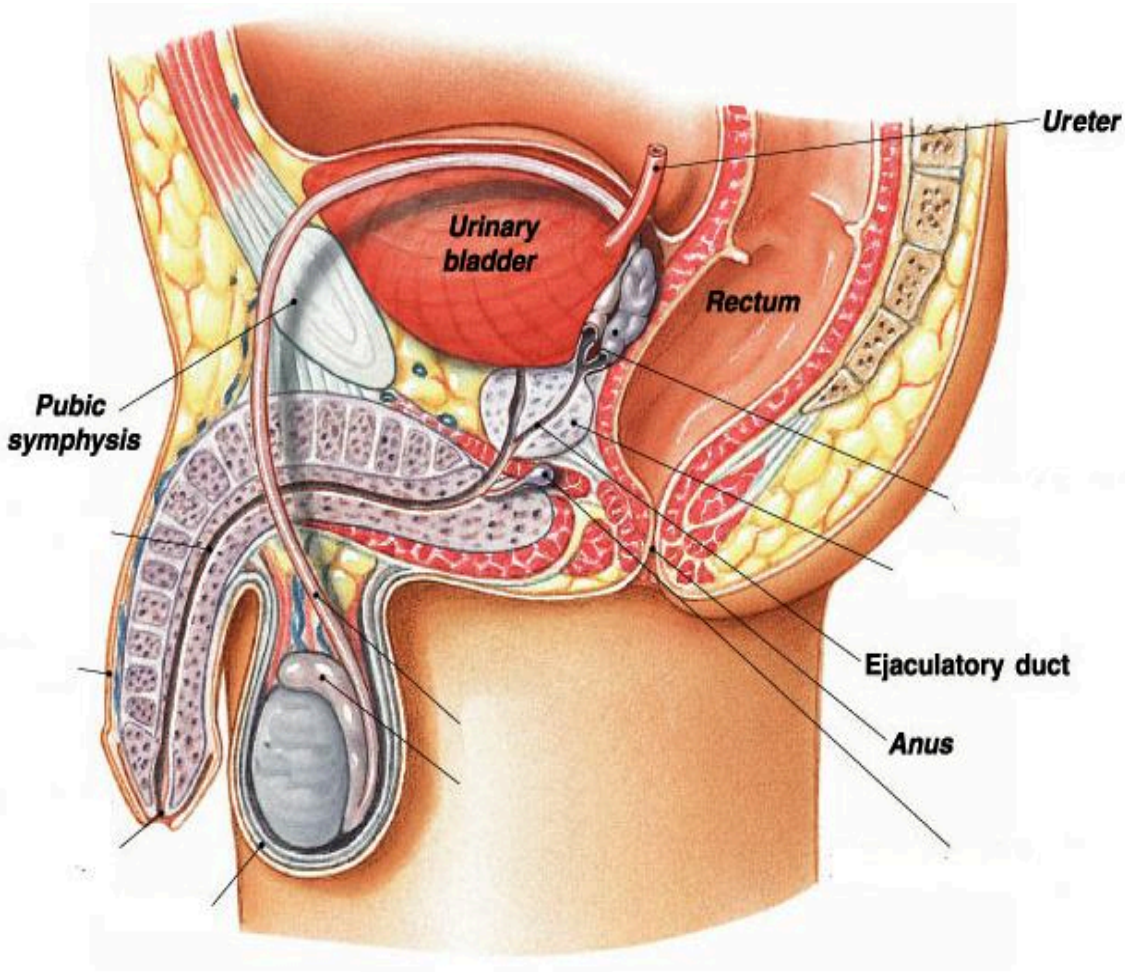
Reproduction I

Human sexual reproduction involves the fusion of two types of gametes. A small, motile **SPERM** from the male and a large, stationary **OVUM** (or egg) from the female. These **GAMETES** contain half the number of chromosomes (23) compared to regular body cells (46). Fusion (or fertilization) of the ovum by the sperm results in the formation of a **ZYGOTE** which will develop into an **EMBRYO** and then a **FETUS**. Birth follows. This unit will consider these ideas and relationships in greater detail.

The Male Reproductive System

The primary male reproductive organs are called the TESTES. In the fetus, they develop in the abdominal cavity. Just before birth (or very soon after), the testes descend into an external sac called the SCROTUM which is located outside the body cavity. The testes are held outside the body cavity **because sperm development requires a temperature of about 34° Celsius**. Human body temperature (37° Celsius) is too warm.

Use figure 20.1 to label the following diagram.



Reproduction I

PART	FUNCTION
Penis	
Urethra	
Prostate Gland	
Vas Deferens	
Bladder	
Seminal Vesicles (2)	
Cowper's Glands (2)	
Epididymis (2)	
Testis (2)	

Spermatogenesis

The testes are divided into lobules, each of which contains 1 to 3 tightly coiled **SEMINIFEROUS TUBULES**. Special cells called **SPERMATAGONIA** within the seminiferous tubules undergo meiosis to produce the **HAPLOID** sperm. Millions of sperm are produced each day. The sperm in the seminiferous tubules are still immature and must undergo certain changes.

The **EPIDIDYMIS** are the areas of sperm storage and maturation.

The Epididymis join the **VAS DEFERENS** which connect to the **URETHRA**. The vas deferens also function in storing the sperm.

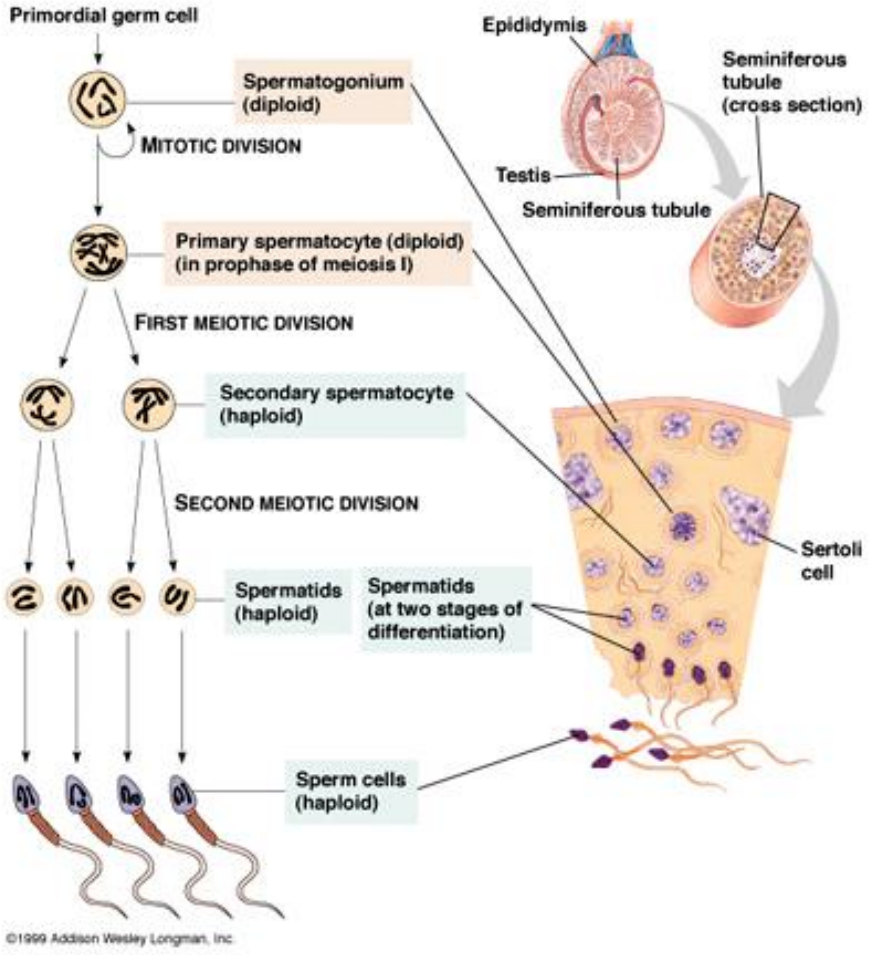
During intercourse, the sperm are forced from the epididymis and the vas deferens, through the **URETHRA** (out the **URETHRAL OPENING**) when muscular contractions called **EJACULATIONS** occur.

The path of sperm is:

SEMINIFEROUS TUBULES (TESTES) ☾ EPIDIDYMIS ☾ VAS DEFERENS ☾ URETHRA ☾ URETHRAL OPENING

SPERMATOGENESIS

Reproduction I



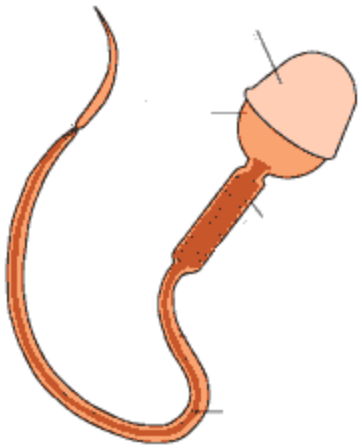
Seminiferous Tubule Cross Section

Reproduction I

SPERM

A sperm is a **SINGLE CELL** which consists of the following parts:

1. **HEAD** ☾ contains the highly condensed nucleus (23 chromosomes).
2. **ACROSOME** ☾ adheres to the head (cap like), contains enzymes which facilitate penetration of the egg.
3. **MIDPIECE** ☾ contains energy producing mitochondria.
4. **TAIL** ☾ flagellum which propels the sperm forward.



Label the sperm to the right.

SEMINAL FLUID

At the time of ejaculation, approximately 400 million sperm leave the penis in the **SEMINAL FLUID** (also called semen). Sperm makes up only about 2% of the seminal fluid. The rest of the fluid consists of secretions from three glands.

1. **SEMINAL VESICLES**: lie at the base of the bladder and each has a duct that joins the vas deferens.

2. **PROSTATE GLAND**: a single doughnut shaped gland that surrounds the upper portion of the urethra just below the bladder.

3. **COWPER'S GLANDS**: pea sized glands that lie below the prostate on either side of the urethra.

The seminal fluid serves three important functions:

1. It has a slightly **BASIC pH** (7.5). This protects the sperm in the male urethra and female vagina, both of which are slightly acidic.

2. It contains the sugar **FRUCTOSE** which serves as an energy source for the swimming sperm.

3. It contains **PROSTOGLANDINS** which are chemicals that cause the female's **UTERUS** to contract. These contractions propel the sperm towards the egg.