CHAPTER 3

12083CH03

HUMAN REPRODUCTION

As you are aware, humans are sexually reproducing and viviparous. The reproductive events in humans include formation of gametes (gametogenesis), i.e., sperms in males and ovum in females, transfer of sperms into the female genital tract (insemination) and fusion of male and female gametes (fertilisation) leading to formation of zygote. This is followed by formation and development of blastocyst and its attachment to the uterine wall (implantation), embryonic development (gestation) and delivery of the baby (parturition). You have learnt that these reproductive events occur after puberty. There are remarkable differences between the reproductive events in the male and in the female, for example, sperm formation continues even in old men, but formation of ovum ceases in women around the age of fifty years. Let us examine the male and female reproductive systems in human.

3.1 The Male Reproductive System

The male reproductive system is located in the pelvis region (Figure 3.1a). It includes a pair of **testes** alongwith **accessory ducts, glands** and the **external genitalia**.

The testes are situated outside the abdominal cavity within a pouch called **scrotum**. The scrotum helps in maintaining the low temperature of the testes (2–2.5° C lower than the normal internal body temperature) necessary for spermatogenesis. In adults, each testis is oval in shape, with a length of about 4 to 5 cm and a width of about 2 to 3 cm. The testis is covered by a dense covering. Each testis has about 250 compartments called **testicular lobules** (Figure 3.1b).

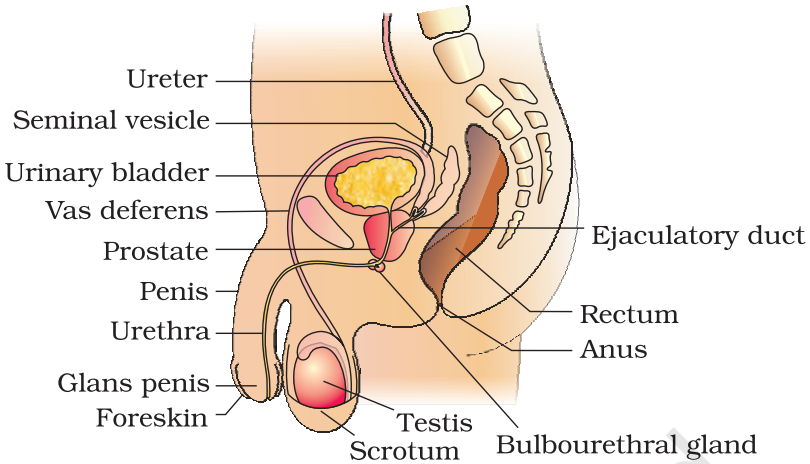

Figure 3.1(a) Diagrammatic sectional view of male pelvis showing reproductive system

Each lobule contains one to three highly coiled **seminiferous tubules** in which sperms are produced. Each seminiferous tubule is lined on its inside by two types of cells called **male germ cells** (*spermatogonia*) and **Sertoli cells** (Figure 3.2). The male germ cells undergo meiotic divisions finally leading to sperm formation, while Sertoli cells provide nutrition to the germ cells. The regions outside the seminiferous tubules called interstitial spaces, contain small blood vessels and **interstitial cells** or **Leydig cells** (Figure 3.2). Leydig cells synthesise and secrete testicular hormones called androgens. Other immunologically competent cells are also present.

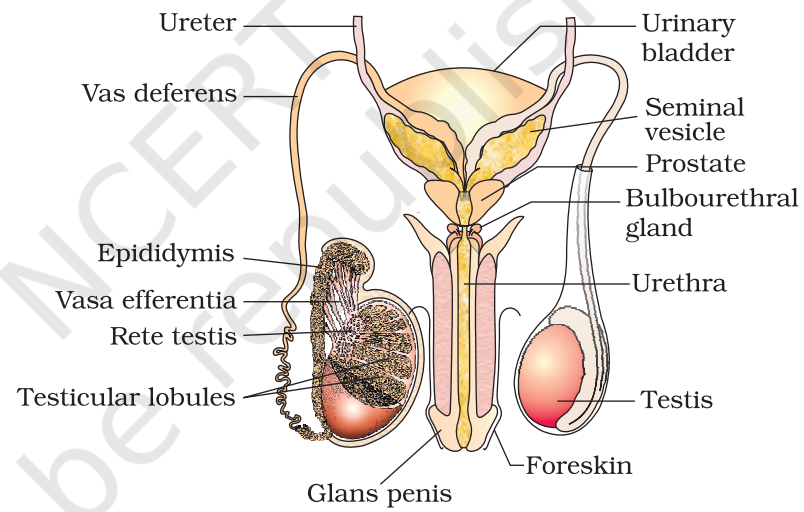

Figure 3.1(b) Diagrammatic view of male reproductive system (part of testis is open to show inner details)

The male sex accessory ducts include **rete testis, vasa efferentia**, **epididymis** and **vas deferens** (Figure 3.1b). The seminiferous tubules of the testis open into the vasa efferentia through rete testis. The vasa efferentia leave the testis and open into epididymis located along the posterior surface of each testis. The epididymis leads to vas deferens that ascends to the abdomen and loops over the urinary bladder. It receives a duct from seminal vesicle and opens into urethra as the ejaculatory duct (Figure 3.1a). These ducts store and transport the sperms from the testis to the outside through urethra. The urethra originates from the urinary bladder and extends through the penis to its external opening called **urethral meatus**.

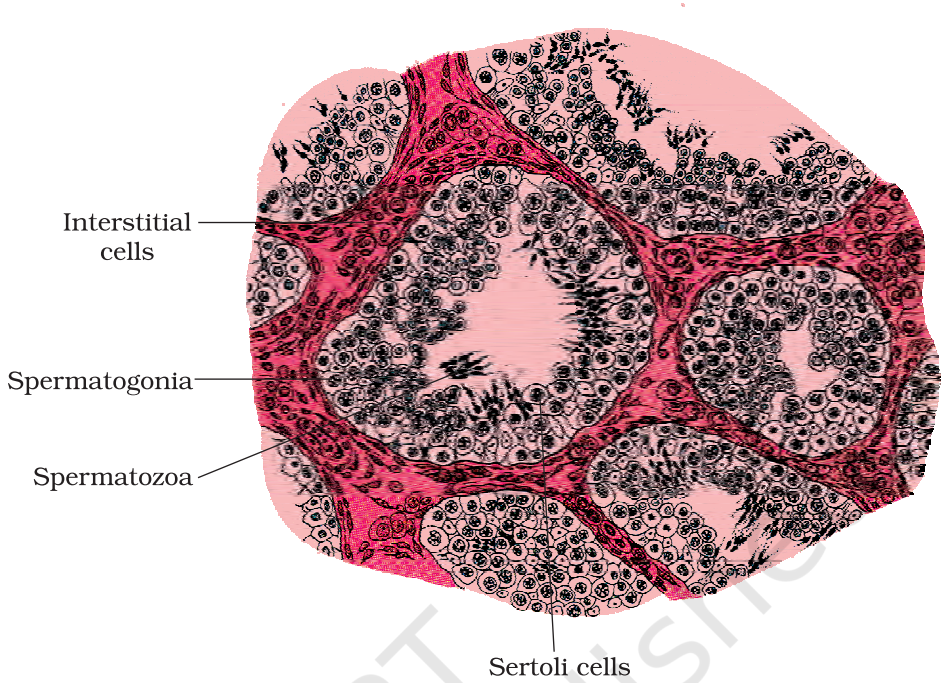

Figure 3.2 Diagrammatic sectional view of seminiferous tubule

The penis is the male external genitalia (Figure 3.1a, b). It is made up of special tissue that helps in erection of the penis to facilitate insemination. The enlarged end of penis called the glans penis is covered by a loose fold of skin called **foreskin**.

The male accessory glands (Figure 3.1a, b) include paired **seminal vesicles**, a **prostate** and paired **bulbourethral** glands. Secretions of these glands constitute the seminal plasma which is rich in fructose, calcium and certain enzymes. The secretions of bulbourethral glands also helps in the lubrication of the penis.

3.2 The Female Reproductive System

The female reproductive system consists of a pair of **ovaries** alongwith a pair of **oviducts, uterus, cervix, vagina** and the **external genitalia** located in pelvic region (Figure 3.3a). These parts of the system alongwith a pair of the **mammary glands** are integrated structurally and functionally to support the processes of ovulation, fertilisation, pregnancy, birth and child care.

Ovaries are the primary female sex organs that produce the female gamete (ovum) and several steroid hormones (ovarian hormones). The ovaries are located one on each side of the lower abdomen (Figure 3.3b). Each ovary is about 2 to 4 cm in length and is connected to the pelvic wall and uterus by ligaments. Each ovary is covered by a thin epithelium which encloses the ovarian stroma. The stroma is divided into two zones – a peripheral cortex and an inner medulla.