

MALE AND FEMALE REPRODUCTIVE SYSTEMS

The male reproductive system consists of paired primary sex organs, the testes (singular, testis) and related ducts and glands. Not included in this plate are the external genital structures.

Color the heading Male Reproductive System, figures A through G, and the related structures. Color over the small dots representing A⁴.

The *testis* is the site for the formation of spermatozoa, the male sex (germ) cells (*sperm*). It is also the site of endocrine cells (the *interstitial cells*) that produce the male sex hormone testosterone. Each of the paired testes has a dense fibrous, sensitive capsule from which fibrous septa (partitions) turn inward to form a number of compartments. Within each compartment is a highly convoluted *seminiferous tubule*. A cross section through this tubule shows a number of layers in different stages in the development of sperm cells. Cells near the center undergo meiosis (Plates 66 and 67); the haploid cells resulting from previous divisions are at the center, growing tails (flagella) to become sperm cells. The head of a sperm cell consists of little more than a nucleus, carrying the genetic material (DNA) with very little cytoplasm surrounding it, and a cap (acrosome) containing enzymes for penetrating the female germ cell.

When fully formed, sperm cells migrate to the *epididymis*, a coiled mass of larger tubules lying adjacent to the testis, where they undergo a maturation period. With sufficient sexual stimulus, sperm cells are discharged into the sperm duct, called the *ductus deferens* (commonly called the vas deferens), which proceeds through the inguinal canal of the lower abdominal wall and passes along the side of the bladder. Each ductus deferens enters the prostate gland at the base of the bladder, where it is joined by the duct of one of the paired seminal vesicles to form the *ejaculatory duct*. Within the prostate, the ejaculatory ducts join the *urethra*. Just below the prostate, the ducts of the paired bulbourethral glands (not shown) also enter the urethra. The prostate, the seminal vesicles, and the bulbourethral glands produce secretions that nourish the sperm and enhance their mobility. The combination of sperm and glandular secretions is called semen (Latin: "seed") or seminal fluid. The semen is discharged from the ductus deferens into the prostatic urethra, through the membranous urethra (transiting the musculofoveal urogenital diaphragm), and through the penile urethra to the outside.

Color the heading Female Reproductive System, figures H through K, and the related structures. Use a light color for H and contrasting shades for H¹ (light) and H² (dark).

The primary sex organ of the female is the *ovary*. It is the site of production of female reproductive cells, called *ova* (singular, ovum), as well as the principal source of the female sex hormones estrogen and progesterone. The ovary consists of numerous groups of cells called *follicles* dispersed in a bed of highly vascularized ("well supplied with blood vessels") connective tissue. Each follicle has single or multiple layers of supporting cells and a centrally placed developing ovum. As the development of the ovum proceeds, the follicle gets larger, develops a fluid-filled space, and migrates to the surface of the ovary. Every 28 days or so (though this is highly variable), an ovum is discharged from the follicle and is drawn into the *uterine tube* (fallopian tube or oviduct) by the undulating fingers (fimbriae) of the funnel-shaped opening of the uterine tube. The developing ovum continues to migrate along the uterine tube, encouraged by peristaltic contractions of tubal smooth muscle as well as the action of the cilia of the cuboidal epithelial cells lining the tube. These same epithelia provide nutritional support for the transiting ovum. It is usually in the first third of the uterine tube that the ovum becomes fertilized by sperm if intercourse has occurred within the previous 48 hours or so. If not fertilized, the ovum will die before reaching the uterus. If fertilized, the blastocyst (an early stage of the developing embryo) will reach the uterus in a few days and implant itself in the uterine wall.

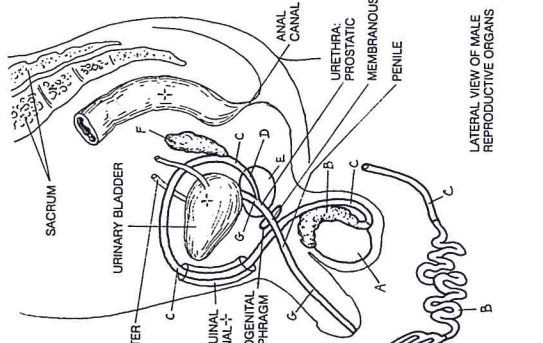
The uterus is a thickly muscular structure with a lining (endometrium) of columnar epithelium and a glandular, vascularized connective tissue layer. The endometrium is highly responsive to blood levels of estrogen and progesterone and, under their stimulus, will thicken significantly to become saturated with glandular secretions and coiled blood vessels. If implantation of an ovum occurs, the thickened tissue provides nutrition directly to the embryo and contributes to the formation of the placenta as well. If implantation does not occur, the extra lining will be sloughed off and discharged in the process called menstruation.

The neck of the uterus (cervix) fits into the upper part of the *vagina*. The vagina, lined with stratified squamous epithelium, is supported by fibromuscular tissue. It is open to the outside and receives the sperm deposited by the penis during sexual intercourse.

MALE AND FEMALE REPRODUCTIVE SYSTEMS.

TESTIS^A
SEMINIFEROUS TUBULE^{A1}
DUCTUS^{A2}/SPERM CELL^{A3}
INTERSTITIAL CELL^{A4}
EPIDIDYMIS^B
DUCTUS DEFERENS^C
EJACULATORY DUCT^D
PROSTATE GLAND^E
SEMINAL VESICLE^F
URETHRA^G

ACROSOMAL CAP
 DNA
 MITOCHONDRIA
 FLAGELLUM
 CROSS SECTION THROUGH SEMINIFEROUS TUBULE
 CAPSULE
 A'
 A''
 A'''
 CAPILLARY
 MEDIAN SECTION OF TESTIS
 SEPTUM
 A
 A'
 A''



FEMALE REPRODUCTIVE SYSTEM.

OVARY^H
FOLLICLE^{H1}
OVUM^{H2}
CORPUS LUTEUM^{H3}
UTERINE TUBE^{H4}
VAGINA^K

BLOOD VESSELS
 FIMBRIA
 CAPILLARY
 SECTION THROUGH OVARY
 H
 H'
 H''
 H'''
 H¹
 H²
 H³
 H⁴
 K

