Answers

2.14 Male Reproductive System

530. a – b – c + d – e –

The primordial germ c ells are first found in the wall of the yolk sac close to the allantosi. From there they migrate to the area of the genital ridges and become incorporated in the sex cords.

531. a + b + c + d – e +

532. a – b + c + d + e +

The inersitial tissue of the testis is quite well vascularized and abundant fenestrated capillaries are found there. In addition there is a fairly extensive network of lymphatic vessels. The interstitial cells or Leydig cells, unlike most endocrine cells, do not develop from epithelium, but from mesenchymal cells of the stroma between the developing seminiferous tubules. Leydig cells secrete the male hormone, testosterone. The cells have abundant, smooth endoplasmic reticulum typical of steroid-secreting inclusions (crystalloids of Reinke). Leydig cells are stimulated to secrete testosterone by LH (= ICSH, Interstitial Cell Stimulating Hormone) from the adenohypophysis.

533. a – b – c + d – e +

The process of spermatogenensis cannot occur at normal body temperature. Undescended testes are unable to accomplish spermatogenesis as the body temperature is too high for the process and in cases of cryptorchidism the spermatic epithelium degenerates. The process of spermatogenesis is dependent on Sertoli cells and also on correct levels of testosterone. Spermatogenesis continues to a certain degree throughout the adult life of males, even in old age.

534. a – b + c + d – e +

535. a + b – c + d + e +

Sertolic cells are found in the seminiferous tubules and are the supportive cells for developing spermatozoa. They are large irregular cells, which can be considered phagocytic in that they engulf and digest cytoplasmic fragments of developing spermatids. Sertoli c ells are derived from the embryonic sex cords. Unlike the spermatogenic line, they are fairly resistant to high temperature, malnutrition or X-rays. Sertoli cells respond to FSH and are responsible for the formation of androgen-binding protein (ABP).

536. a – b + c – d + e +

Myoid cells are found as a single layer of flattered cells in the loose connective tissue surrounding seminiferous tubules. They contain actin mico-seminiferous tubules. They contain actin micro-filaments. In rodents these myoid cells are contractile, but in humans or other primates such contractility has not been seen, and in fact the myoid cells in these cases are less similar to smooth muscle fibers than was once thought.

537. a + b – c – d + e -
Following the operation of vasectomy, in which the vas deferens is cut or tied, there is a loss of fertility as there is no means of egress for spermatozoa. There is a subsequent loss of spermatozoal production. Spermatozoa, however may still be found in ejaculates for up to 90 days after vasectomy. Neither penile erection nor normal sexual relations are impaired as a result of vasectomy.

538. a – b + c – d + e +
Spermiogenesis is the process of transformation of spermatids into mature spermatozoa and unlike spermatogenesis does not involves cell division, though there are major morphological changes involved. Spermiogenesis is only possible if Sertoli cells are intact.

539. a + b – c – d + e -

540. a – b + c + d – e -
Spermatozoa develop in the seminiferous tubules of the testis and are stored in the epididymis, where they undergo maturation. Movement through the spermatic ducts is passive. In freshly-ejaculated semen the spermatozoa are not very motile and full motility takes up to 30 minutes. Because of this, qualitative and quantitative examinations of semen are not made immediately on fresh ejaculates.

541. a – b – c + d – e +
The acrosome, found at the anterior part of spermatozoa in front of the nucleus, is a membrane-limited structure that is PAS-positive and contains a considerable amount of carbohydrate. The acrosome is the site of hydrolytic enzymes that play an important role in the fertilization process. These enzymes include acid phosphatase, aryly sulfatase and hyaluronidase (which should not be confused with hyaluronic acid).

542. a + b – c + d – e +

543. a – b + c – d – e +
The epididymal duct is lined with pseudostratified columnar epithelium. The columnar cells have stereocilia and very well-developed Golgi bodies. Smaller basal cells are also found. The epithelium lining the efferent ductules of the epididymis differs from that of epididymal duct in that it is a simple epithelium composed of alternating groups of cuboidal cells and columnar ciliated cells. This epithelium lacks stereocilia, such as are found in the epididymal duct. Surrounding the efferent ductules are smooth muscle fibers. The epididymis is the site where spermatozoa mature and acquire most of their fertilizing capacity.

544. a + b + c – d + e +

545. a + b – c + d – e +
The seminal vesicles are paired structures which are evaginations of the ductus deferens and have a somewhat similar structure to the ductus deferens. The seminal vesicles are typically lined with pseudostratified epithelium and smooth muscle is found in their walls. External to this is a connective tissue layer rich in elastic fibers. The seminal vesicles produce a viscid, yellowish secretion, which is rich in sugars especially fructose, which provide an energy source for the spermatozoa. Spermatozoa under normal circumstances are not found in the seminal vesicles.

546. a – b + c – d + e +

547. a + b + c – d – e -

548. a + b + c – d + e +
The prostate gland surrounds the urethra as it leaves the bladder. The prostate has a thin capsule containing both connective tissue and smooth muscle fibers. The prostate contains a large number of tubuloalveolar glands, which secrete into the urethra a thin fluid, which is released during ejaculation. The epithelial lining of the glands in normal, healthy, sexually-mature males is simple columnar epithelium. The prostate gland is a target organ for testosterone and only really develops at sexually maturity. Acid phosphatase is secreted in prostatic fluid. In cases of prostatic hypertrophy or malignancy this acid phosphatase rises considerably in blood serum. Castration causes prostatic involution. In old age there develop a number of concretions within the lumina of the prostatic glands. These concretions are ovoid or spherical bodies of glycoprotein composition, which may become calcified. A well-developed, musclar contractile stroma is found between the glands in the prostate and so there is no need for myoepithelial cells.

549. a + b + c + d + e +

550. a + b + c – d + e +
The erectile tissue of the penis consists of two corpora cavernosa and a single corpus spongiosum (corpus cavernosum urethrae) through which the urethra passes. The erectile tissue is surrounded by dense, collagenous, connective tissue of the tunica albuginea. In the erectile tissue are found vascular spaces and trabeculae with helicine arteries that straighten during erection. Erection begins with the loss of tonus in the muscle fibers of the penile arterial walls. The vascular spaces fill with blood. The corpus spongiosum becomes less rigid than the paired erectile bodies so as not to block the passage of seminal fluid through the penile urethra. The lacunae (cavernous sinuses) of the erectile bodies are a specialized sort of blood vessel in so far as they are highly extensible and allow the accumulation of blood. The veins draining the blood from the corpora cavernosarun parallel to the tunica albuginea.

551. a + b + c + d + e +
The bulbourethral glands (Cowper's glands) are paired structures that secrete via ducts that open on the membranous portion of the urethra. They are compound tubuloalveolar glands that produce a mucoid secretion that contributes in part to the production of seminal fluid. The bulbourethral glands are believed to release their mucus-like secretion prior to ejaculation as a lubricant of the urethra.

552. a – b – c – d + e +
The male urethra is a single tube of mucous membrane that originates in the urinary bladder and immediately passes through the prostate gland, continues as a short 'membranous' portion, where it passes through the fasciae of the urogenital diaphragm, before extending through the bulb of the penis and the length of the penis in the corpus cavernosum urethrae (corpus spongiosum). Only the very first part of the urethra close to the bladder and the first of the prostate gland is lined with transitional epithelium. Students should be careful not to confuse the urethra with the ureters.

553. a + b – c + d – e +
The glands of Littré are mucus-secreting glands that help lubricate the male urethra. They may secrete directly into recesses or outpockets of the mucous membranes called lacunae of Morgani.