

Urinary and genital systems

Urinary system

function	removing waste products from blood in form of urine
organs	1/ kidney 2/ major and minor calyces 3/ renal pelvis 4/ ureter 5/ urinary bladder 6/ urethra
Kidney	paired organ, bean-shaped, primary retroperitoneal organ, located at level of Th12 - L3 vertebrae, renal hilum at level of L1 vertebra right kidney is caudally to the left one (because of liver)
coverings	fibrous capsule fatty capsule (adipose capsule - perirenal fat) renal fascia – prerenal layer (anterior), retrorenal layer (posterior) pararenal fat body
external features	anterior and posterior surfaces superior (upper) and inferior (lower) poles lateral margin medial margin – renal hilum and renal sinus
internal structures	renal cortex: renal columns (with interlobar aa.) renal medulla: renal pyramids – base of pyramid (with arcuate aa.) renal papilla with papillary foramina (cribriform area) minor renal calyces surround renal papilla, in renal sinus major renal calyces – fusion of minor renal calyces, in renal sinus
vessels	<i>renal aa., renal vv.</i>
lymphatics	<i>lumbar lnn.</i>
innervation	<i>autonomic – renal plexus: sympathetic and parasympathetic innervation,</i> <i>sensory – spinal nn. Th10 - Th12 for innervation of fibrous capsule</i>
Renal pelvis	paired organ; from fusion of major renal calyces, located in renal sinus and in renal hilum; behind renal v. and renal a. (VAP vein, artery, pelvis anteroposteriorly), primary retroperitoneal organ
Ureter	paired organ, from renal pelvis to urinary bladder
parts	1/ abdominal portion (is situated retroperitoneally) 2/ pelvic portion (is situated subperitoneally) 3/ intramural portion (in wall of urinary bladder)
curves and constrictions	1/ after leaving renal pelvis 2/ when crossing of external iliac vessels on the right site and common iliac vessels on the left site 3/ when crossing uterine a. 4/ when entering to urinary bladder

<i>vessels</i>	<i>ureteric brr. of renal a., ovarian / testicular a., uterine a. / a. of deferens duct, superior and inferior vesical aa.; same named veins</i>
<i>lymphatics</i>	<i>lumbar lnn., internal iliac lnn.</i>
<i>innervation</i>	<i>autonomic – renal plexus, ovarian / testicular plexus, uterovaginal / deferential plexus, vesical plexus, ureteric plexus; sensory – from spinal nn. Th10 – L1</i>
Urinary bladder	empty bladder is located subperitoneally, full bladder preperitoneally 1/ apex of bladder 2/ body of bladder 3/ fundus of bladder – trigone of bladder: right and left ureteric orifices internal urethral orifice – uvula of bladder interureteric fold (crest) – retrotrigonal fossa 4/ cervix of bladder
<i>vessels</i>	<i>superior and inferior vesical aa.; vesical venous plexus → vesical vv.</i>
<i>lymphatics</i>	<i>paravesical lnn., prevesical lnn., retrovesical lnn., lateral vesical lnn. → internal and external iliac lnn.</i>
<i>innervation</i>	<i>autonomic – vesical plexus; sensory – spinal nn. Th10 – L1</i>
Female urethra	origin: internal urethral orifice, the end: external urethral orifice shorter than male urethra
parts	1/ intramural part – in wall of urinary bladder 2/ pelvic part – between bladder and urogenital diaphragm 3/ perineal part – ends in external urethral orifice
<i>vessels</i>	<i>inferior vesical a., vaginal a., a. of the vestibular bulb; venous blood into vesical, pudendal, uterovaginal venous plexus</i>
<i>lymphatics</i>	<i>paravesical lnn. → visceral lnn. → iliac lnn. and deep inguinal lnn.</i>
<i>innervation</i>	<i>autonomic – vesical plexus; motor – for sphincter urethrae m. and sensory from pudendal n.</i>
Male urethra	origin: internal urethral orifice the end: external urethral orifice
parts	1/ intramural part - in wall of urinary bladder 2/ prostatic part - in prostate; contains structures: seminal colliculus urethral crest prostatic utricle prostatic sinus 3/ membranous part – in urogenital diaphragm 4/ spongy part – in spongy body (corpus spongiosum) of penis, structures: navicular fossa of urethra – valve of navicular fossa
curvatures	subpubic curvature prepubic curvature
<i>vessels</i>	<i>inferior vesical a., middle rectal a., urethral a.; prostatic venous plexus and internal pudendal vv.</i>
<i>lymphatics</i>	<i>visceral lnn. → pelvic lnn.; inguinal lnn.</i>
<i>innervation</i>	<i>autonomic rectal plexus and prostatic plexus; sensory – pudendal n.</i>

Female genital system

function	reproduction
organs	1/ internal genital organs: ovary uterine (fallopian) tube uterus vagina accessory sex glands: greater (major) vestibular glands lesser (minor) vestibular glands erectile tissues clitoris bulb of vestibule
	2/ external genital organs: labia majora pudendi labia minora pudendi

Ovary	paired organ, intraperitoneal position – mesovary in ovarian fossa (in nullipara) or in Claudio fossa (in multipara)
external features	medial and lateral surfaces tubal extremity → suspensory lig. of ovary uterine extremity → proper lig. of ovary free margin (border), mesovarian margin (border) - hilum of ovary
inner structures	tunica albuginea of ovary ovarian cortex ovarian medulla

Uterine tube	fallopian tube, paired organ, intraperitoneal position – mesosalpinx
parts	1/ uterine part – uterine opening 2/ isthmus of uterine tube 3/ ampulla of uterine tube 4/ infundibulum of uterine tube – abdominal opening of uterine tube tubal fimbriae, ovarian fimbria
<i>ovary and uterine tube:</i>	
vessels	<i>ovarian a., ovarian br. of uterine a.; ovarian vv., uterovaginal venous plexus</i>
lymphatics	<i>lumbar Inn.</i>
innervation	<i>autonomic – ovarian plexus</i>

Uterus	intraperitoneal position – mesometry; in anteversion and in anteflexion
external features	1/ body of uterus – fundus of uterus, right and left horns of uterus, right and left margins of uterus, intestinal and vesical surfaces cavity of uterus
	2/ isthmus of uterus
	3/ cervix of uterus – inside: canal of cervix with palmate folds supravaginal part – internal uterine orifice vaginal part – external uterine orifice: anterior/posterior lip

wall	1/ endometrium 2/ myometrium 3/ perimetrium – broad lig. of uterus = mesometrium + mesosalpinx + mesovarium rectouterine and vesicouterine pouches
parametrium	cardinal lig., sacrouterine (rectouterine) ligg., vesicouterine ligg. round lig. of uterus – from uterine horns – passes through inguinal canal
vessels	<i>uterine a.; uterovaginal venous plexus</i>
lymphatics	<i>lumbar lnn., internal iliac lnn., parauterine lnn., sacral lnn., superficial inguinal lnn.</i>
innervation	<i>autonomic – uterovaginal plexus</i>
Vagina	anterior wall – vaginal rugae anterior vaginal column – urethral carina of vagina posterior wall – vaginal rugae, posterior vaginal column fornix of vagina – anterior, posterior et lateral recesses vaginal orifice – hymen / hymenal caruncles
vessels	<i>vaginal a., vaginal br. of uterine a.; uterovaginal venous plexus</i>
lymphatics	<i>internal iliac lnn., superficial inguinal lnn.</i>
innervation	<i>autonomic – uterovaginal plexus; somatic – pudendal n.</i>
Mons pubis	mass of fatty tissue, covered by skin and pubic hair
Labia majora pudendi	composed of fatty tissue and venous plexus with pubic hair interconnected by anterior and posterior commissures of labia majora between them is rima pudendi
Labia minora pudendi	medially to labia majora pudendi; are formed by loose connective tissue anteriorly: interconnection by prepuce of clitoris and frenulum of clitoris posteriorly: interconnection by frenulum of labia minora between them is vaginal vestibule external urethral orifice and vaginal orifice
Clitoris	right and left crura of clitoris, body of clitoris → ends in glans of clitoris
Bulb of vestibule	erectile tissue underneath labia majora originates close to inferior side of body of clitoris
Greater vestibular gland	Bartholin's gland, behind bulb of vestibule opens to vaginal vestibule
Lesser vestibular glands	Skene's glands, paraurethral gll. open to vaginal vestibule, external urethral orifice
<i>external genital organs, erectile tissues and accessory sex glands:</i>	
vessels	<i>anterior labial brr. of external pudendal aa., a. of bulb of vestibule, perineal a., dorsal a. of clitoris, posterior labial brr. of internal pudendal a., external and internal pudendal vv.</i>
lymphatics	<i>superficial inguinal lnn.</i>
innervation	<i>autonomic – inferior hypogastric plexus; somatic – posterior labial brr. from pudendal n., anterior labial brr. from ilioinguinal n.</i>

Male genital system

function	reproduction transport of sperms: seminiferous convoluted tubules → straight tubules → efferent ductules → ductules of epididymis → ductus deferens
organs	internal genital organs: testes epididymis ductus deferens accessory sex glands: seminal vesicles prostate bulbourethral gland
	external genital organs: scrotum penis
	rudimentary structures – appendix of testis, appendix of epididymis
Testis	paired organ during intrauterine development has retroperitoneal position → descent of testes → into scrotum
external features	superior and inferior poles (extremity) medial and lateral surfaces anterior margin, posterior margin – mediastinum testis
inner structures	from tunica albuginea → septas of testis, which demarcate lobules of testis, mediastinum testis in posterior part of tunica albuginea – rete testis
coverings	1/ tunica albuginea 2/ visceral layer of tunica vaginalis testis (epiorchium) → serous cavity of scrotum (cavum vaginale) 3/ parietal layer of tunica vaginalis testis (periorchium)
Epididymis	paired organ on posterior margin of testis
parts	1/ head of epididymis 2/ body of epididymis 3/ tail of epididymis
inner structures	efferent ductules (in head of epididymis), duct of epididymis (in body and tail of epididymis)
coverings	1/ visceral layer of tunica vaginalis testis – from testis to epididymis, forms sinus of epididymis – superior and inferior ligg. of epididymis 2/ parietal layer of tunica vaginalis testis
<i>testes and epididymis:</i>	
vessels	<i>testicular aa.; pampiniform plexus</i>
lymphatics	<i>lumbar lnn.</i>
innervation	<i>autonomic – testicular plexus</i> <i>somatic – genital br. of genitofemoral n.</i>

Ductus deferens	paired organ connects epididymis with prostatic part of urethra
parts	1/ scrotal part 2/ funicular part 3/ inguinal part 4/ pelvic part
<i>vessels</i> <i>lymphatics</i> <i>innervation</i>	<i>a. of ductus deferens; vesical venous plexus</i> <i>external and internal iliac lnn.</i> <i>autonomic – deferential plexus</i>
Seminal vesicles	seminal glands, paired exocrine glands behind fundus of urinary bladder, laterally to ampulla of ductus deferens excretory duct from seminal gl. joins ampulla of ductus deferens to ejaculatory duct → seminal colliculus in prostatic part of urethra
<i>vessels</i> <i>lymphatics</i> <i>innervation</i>	<i>inferior vesical a.; vesical and prostatic venous plexus</i> <i>internal iliac lnn.</i> <i>autonomic – inferior hypogastric plexus</i>
Prostate	unpaired gland, chestnut-shaped
external features	base of prostate, apex of prostate, isthmus of prostate anterior, posterior, and inferolateral surface
inner structures	lobes: right, left and middle lobes zones: anterior fibromuscular, central, peripheral, and transitional zones
coverings	capsule of prostate prostatic venous plexus periprostatic capsule
<i>vessels</i> <i>lymphatic</i> <i>innervation</i>	<i>inferior vesical a.; venous prostatic plexus</i> <i>external and internal iliac lnn., sacral lnn.</i> <i>autonomic – prostatic plexus</i>
Bulbourethral gland	paired gland posteriorly to bulb of penis
Spermatic cord	paired, originates from tail of epididymis, passes through inguinal canal to pelvic cavity
content	posteriorly: ductus deferens, a. of ductus deferens, deferential plexus anteriorly: testicular a., pampiniform plexus, lymphatic vessels, testicular plexus
coverings	1/ internal spermatic fascia (derived from transversalis fascia) 2/ cremasteric m. (derived from internal oblique abdominal m.) + cremasteric fascia 3/ external spermatic fascia (derived from deep abdominal fascia) 4/ tunica dartos = dartos m. (continuation of Camper's fascia) + Colle's fascia (continuation of Scarpa's fascia)

Scrotum	fibromuscular cutaneous sac septum of scrotum, scrotal raphe
content	testes epididymis part of spermatic cord
layers	1/ tunica vaginalis testis (visceral and parietal layers) – coverings of testis 2/ internal spermatic fascia 3/ cremasteric m. + cremasteric fascia 4/ external spermatic fascia 5/ tunica dartos = dartos m. + Colle's fascia 6/ skin
vessels	<i>anterior scrotal brr. from external pudendal aa., posterior scrotal brr. from internal pudendal aa.; anterior and posterior scrotal vv.</i>
lymphatics	<i>superficial inguinal lnn.</i>
innervation:	<i>somatic – anterior scrotal nn. from ilioninguinal n. posterior scrotal nn. from pudendal n.</i>
Penis	copulatory organ fixed by fundiform lig. of penis suspensory lig. of penis
parts	root of penis – right and left crura → right and left cavernous bodies bulb of penis → spongy body (corpus spongiosum) body of penis – right and left cavernous bodies (corpus cavernosum) spongy body
external features	dorsum penis urethral surface with raphe of penis (continuation of raphe of scrotum) glans of penis – corona of glans neck of glans external urethral orifice
internal features	1/ paired cavernous body contains deep a. of penis septum of penis – between 2 cavernous bodies 2/ spongy body → ends as glans of penis contains spongy part of male urethra
coverings	tunica albuginea of spongy body and cavernous bodies deep fascia of penis (Buck's fascia) superficial fascia of penis (Dartos fascia) skin → creates prepuce of skin, frenulum of prepuce
vessels	<i>internal pudendal a. and its branches: a. of bulb of penis, urethral a., deep a. of penis, dorsal a. of penis;</i> <i>superficial dorsal v. of penis and deep dorsal v. of penis</i>
lymphatics	<i>superficial inguinal lnn.</i>
Innervation	<i>autonomic – inferior hypogastric plexus somatic – dorsal n. of penis</i>