Urinary bladder

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The **urinary bladder** is a hollow muscular organ that collects urine from the kidneys before disposal by urination. A hollow[1] muscular, and distensible (or elastic) organ, the bladder sits on the pelvic floor. Urine enters the bladder via the ureters and exits via the urethra. The typical human bladder capacity is between 300 and 500 mL (10.14 and 16.91 fl oz).[2][3]

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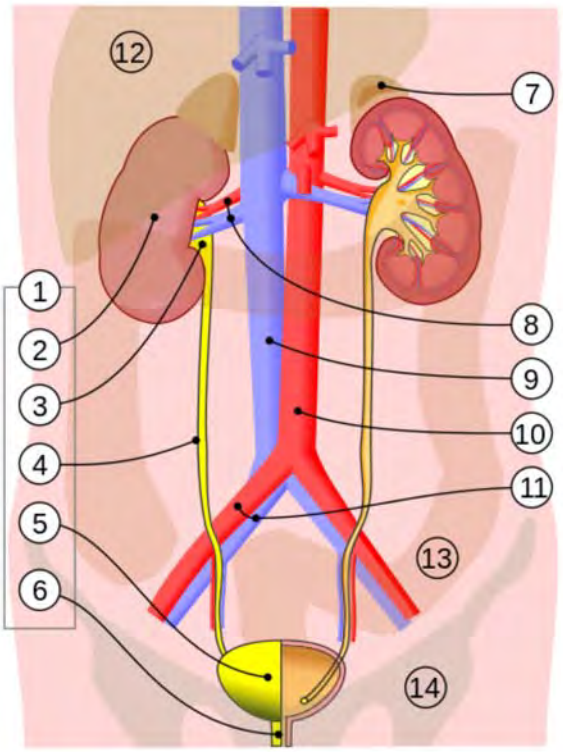
Structure

The bladder is a hollow muscular organ situated at the base of the pelvis. Urine collects in the bladder from the two ureters, which open into the bladder at its back and connect to the kidneys. Urine leaves the bladder via the urethra, a single muscular tube which ends in the urethral orifice. Anatomically, the bladder is divided into a fundus at the top, two ureteric orifices, and an opening for the urethra which surrounds the trigone of the bladder. In men, the prostate gland lies outside the opening for the urethra.

The bladder is situated below the peritoneal cavity near the pelvic floor. In men, it lies in front of the rectum, separated by a space. In women, it lies in front of the uterus.

Urinary bladder



1. *Human urinary system:* 2. Kidney, 3. Renal pelvis, 4. Ureter, **5. Urinary bladder**, 6. Urethra. (Left side with frontal section)
7. Adrenal gland
Vessels: 8. Renal artery and vein, 9. Inferior vena cava, 10. Abdominal aorta, 11. Common iliac artery and vein
With transparency: 12. Liver, 13. Large intestine, 14. Pelvis

Details

Precursor	urogenital sinus
System	Urinary system
Artery	Superior vesical artery Inferior vesical artery Umbilical artery Vaginal artery
Vein	Vesical venous plexus
Nerve	Vesical nervous plexus

Identifiers

Histology

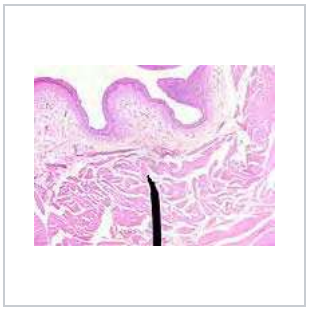
The urinary bladder is lined with transitional epithelium. It does not produce mucus.[4] The internal lining of the bladder wall is termed the urothelium and lamina propria, and this layer is thought to regulate some aspects of the overall bladder physiology in response to stimuli such as stretch during filling.[5]

Latin	*vesica urinaria*
MeSH	*A05.810.161 (https://www.nlm.nih.gov/cgi/mesh/2011/MB_cgi?mode=&term=Bladder)*
TA	A08.3.01.001 (http://www.unifr.ch/ifaa/Public/EntryPage/TA98%20Tree/Entity%20TA98%20EN/08.3.01.001%20Entity%20TA98%20EN.htm)
FMA	15900 (http://xiphoid.biostr.washington.edu/fma/fmabrowser-hierarchy.html?fmaid=15900)

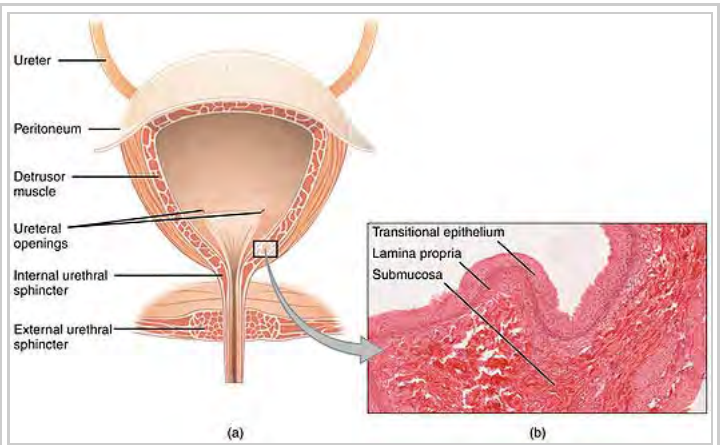
Anatomical terminology

[edit on Wikidata]

Vertical section of bladder wall.



Layers of the urinary bladder wall and cross section of the detrusor muscle.



Anatomy of the female bladder, showing transitional epithelium as well as part of the wall in a histological cut-out.

Detrusor muscle

The detrusor muscle is a layer of the urinary bladder wall made of smooth muscle fibers arranged in spiral, longitudinal, and circular bundles. When the bladder is stretched, this signals the parasympathetic nervous system to contract the detrusor muscle. This encourages the bladder to expel urine through the urethra. A meta-analysis on the effect of voiding position on urodynamics in males found that sitting down allows for improved contraction of the detrusor muscle.[6]

Lymphatic supply

The fundus of the bladder is lymphatically drained by the external iliac lymph nodes.

Nerve supply

The bladder receives motor innervation from both sympathetic fibers, most of which arise from the hypogastric plexuses and nerves, and parasympathetic fibers, which come from the pelvic splanchnic nerves and the inferior hypogastric plexus.[7]

Sensation from the bladder is transmitted to the central nervous system (CNS) via general visceral afferent fibers (GVA). GVA fibers on the superior surface follow the course of the sympathetic efferent nerves back to the CNS, while GVA fibers on the inferior portion of the bladder follow the course of the parasympathetic

efferents.[7]

For the urine to exit the bladder, both the autonomically controlled internal sphincter and the voluntarily controlled external sphincter must be opened. Problems with these muscles can lead to incontinence.[8]

Development

The human urinary bladder is derived from the urogenital sinus, and it is initially continuous with the allantois. In males, the base of the bladder lies between the rectum and the pubic symphysis. It is superior to the prostate, and separated from the rectum by the rectovesical excavation. In females, the bladder sits inferior to the uterus and anterior to the vagina; thus, its maximum capacity is lower than in males. It is separated from the uterus by the vesicouterine excavation. In infants and young children, the urinary bladder is in the abdomen even when empty.[9]

Function

Urine, excreted by the kidneys, collects in the bladder before disposal by urination. The urinary bladder usually holds 300-350 ml of urine. As urine accumulates, the rugae flatten and the wall of the bladder thins as it stretches, allowing the bladder to store larger amounts of urine without a significant rise in internal pressure.[10]

Clinical significance

Frequent urination can be due to excessive urine production, small bladder capacity, irritability or incomplete emptying. Males with an enlarged prostate urinate more frequently. One definition of overactive bladder is when a person urinates more than eight times per day,[11] though there can be other causes of urination frequency. Though both urinary frequency and volumes have been shown to have a circadian rhythm, meaning day and night cycles,[12] it is not entirely clear how these are disturbed in the overactive bladder.

Disorders of or related to the bladder include:

- Bladder cancer
- Bladder exstrophy
- Bladder infection
- Bladder spasm
- Bladder sphincter dyssynergia, a condition in which the sufferer cannot coordinate relaxation of the urethra sphincter with the contraction of the bladder muscles
- Bladder stones
- Cystitis
- Hematuria, or presence of blood in the urine, is a reason to seek medical attention without delay, as it is a symptom of bladder cancer as well as bladder and kidney stones
- Interstitial Cystitis

Urinary bladder (black butterfly-like shape) and hyperplastic prostate (BPH) visualized by Medical ultrasonography technique.

- Overactive bladder, a condition that affects a large number of people
- Paruresis
- Urinary incontinence
- Urinary retention

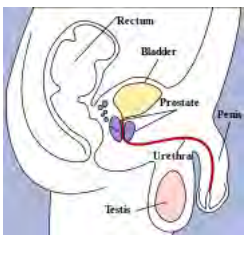
A diverticulum of the bladder

Other animals

Bladders occur throughout much of the animal kingdom, but are very diverse in form, such as the swim bladder in fish, and in some cases are not homologous with the urinary bladder in humans.[13] The urinary bladder of chelonians is very thin and cystoscopy permits visualisation of internal organs.[14] The pig bladder is very similar to the human bladder.

Additional images

Vertical section of bladder, penis, and urethra.



The bladder can be seen highlighted in yellow in the illustration.

See also

- Artificial urinary bladder
- Bladder augmentation
- Neurogenic bladder
- Ureterocele
- Urodynamics
- Uvula of urinary bladder
- Vesicouretic reflux

References

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External links

- Histology at KUMC *epithel-epith09 (https://www.kumc.edu/instruction/medicine/anatomy/histoweb/epithel/epith09.htm)* "Urinary Bladder"
- Anatomy photo: Urinary/mammal/bladder/bladder1 (https://web.archive.org/web/20081020010317/http://trc.ucdavis.edu/mjguinan/apc100/modules/Urinary/mammal/bladder/bladder1.html) - Comparative Organology at University of California, Davis — "Mammal, bladder (LM, Medium)"
- Virtual Slidebox at Univ. Iowa *Slide 445 (http://www.path.uiowa.edu/cgi-bin-pub/vs/fpx_gen.cgi?slide=445&viewer=java&view=0&lay=nlm)*
- Anatomy photo:43:07-0100 (http://ect.downstate.edu/courseware/haonline/labs/l43/070100.htm) at the SUNY Downstate Medical Center — "The Female Pelvis: The Urinary bladder"
- Anatomy photo:44:04-0103 (http://ect.downstate.edu/courseware/haonline/labs/l44/040103.htm) at the SUNY Downstate Medical Center — "The Male Pelvis: The Urinary bladder"
- Bladder (http://www.bladderj.org) (ISSN 2327-2120 (https://www.worldcat.org/search?fq=x0:jrnl&q=n2:2327-2120)) — An open-access journal on bladder biology and diseases.

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