

Function of Urinary Bladder System and its Structure

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DESCRIPTION

In humans and other vertebrates, the bladder is a hollow organ that stores urine from the kidneys before passing it through urination. Humans have a distensible organ on the pelvic floor called the bladder. The ureters carry urine into the bladder, and the urethra carries it out. The typical adult human bladder can hold far more than the 300–500 ml (10.14–16.91 fl oz) range before the need to urinate arises.

Structure

At the base of the pelvis in humans, the bladder is a hollow muscular structure. The bladder can be broken down into a large fundus, a body, an apex, and a neck in terms of gross anatomy. The median umbilical ligament travels along the back of the anterior abdominal wall to the umbilicus from the apex, also known as the vertex, which is pointed forward towards the higher portion of the pubic symphysis. It carries the peritoneum to form the middle umbilical fold from the apex to the abdominal wall. The region at the base of the trigone that encloses the internal urethral opening leading to the urethra is known as the neck of the bladder. The neck of the urine bladder in males. There are three holes in the bladder. The urethra enters the bladder at the trigone, while the two ureters enter the bladder through ureteric orifices. Mucosal flaps in front of these ureteric holes serve as valves to stop vesicoureteral reflux, or the backflow of urine into the ureters. The interureteric crest is an elevated region of tissue located between the two ureteric apertures. This creates the trigone's upper boundary. The bladder floor above the urethra is made up of a region of smooth muscle called the trigone. In contrast to the irregular surface created by the rugae, it is a region of smooth tissue that allows for the simple passage of urine into and out of this part of the bladder.

Function

Because of drainage from two ureters, urine that is expelled by the kidneys gathers in the bladder before being urinated (micturition). The urethra, a solitary muscular tube that terminates in the urinary meatus where urine leaves the body, allows urine to pass from the bladder.

Urination requires synchronised muscle changes, a reflex with a spine-based origin, and higher cerebral inputs. The external urinary sphincter and the muscles of the perineum relax during urination, allowing urine to pass through the urethra and leave the body. The detrusor muscle contracts during urination.

Stretch receptors that become active when the bladder is holding 300–400 mL of urine are what cause the need to urinate. The rugae flatten and the bladder wall thins as it expands as urine builds up, allowing the bladder to hold more urine without experiencing a major increase in internal pressure. The pontine micturition centre in the brainstem regulates urination.

When the bladder is swollen, stretch receptors signal the parasympathetic nervous system to trigger the muscarinic receptors in the detrusor, causing the muscle to contract. This encourages urine to be released from the bladder through the urethra although Muscarinic (M2) receptors are also engaged and outweigh Muscarinic (M3) receptors in terms of number, they are less sensitive. The predominant receptor activated is the M3 receptor.

The adenylyl cyclase Cyclic Adenosine Monophosphate (Camp) route, which is triggered by the 3 adrenergic receptors, is the primary relaxant mechanism. Even though there are more 2 adrenergic receptors than 3 receptors in the detrusor, their role in relaxing the detrusor smooth muscle is not as significant.

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