

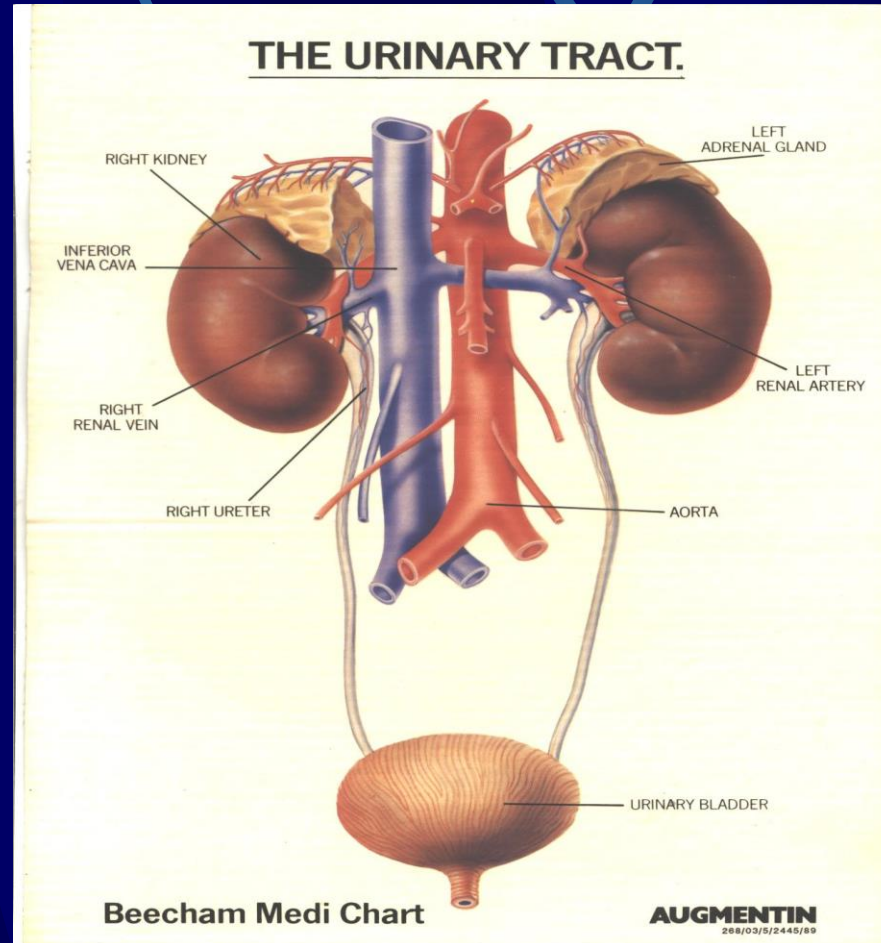
**Universitas Indonusa Esa Unggul**  
**FAKULTAS KESEHATAN MASYARAKAT**  
**Jurusan**  
**Perekam Medis dan Informasi Kesehatan**

# **ANATOMI-FISIOLOGI**

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# SISTEM PERKEMIHAN



# ORGAN PERKEMIHAN

Sistem traktus urinarius terdiri dari :

- Ginjal ( kidney )
- Ureter
- Kandung kencing
- Uretra

**Ginjal** :terdiri dari dua ginjal, yang pada orang dewasa mempunyai berat antara 150-200 gram. Posisi ginjal kanan terletak lebih rendah dari ginjal kiri oleh karena diatas ginjal kanan terdapat organ hati.

Ginjal mempunyai dua lapisan yaitu a) korteks yang berfungsi dalam faktor eritropoetin dan b) medula yang terdiri dari bagian-bagian ber

bentuk kerucut yang disebut renal piramid dan puncak kerucut ini menghadap ke kalises ginjal yang mengandung papila renalis

Struktur diatas mengandung nefron yang merupakan struktur halus ginjal dan terdiri atas banyak nefron yang merupakan satuan-satuan fungsional ginjal, diperkirakan ada sejuta nefron dalam setiap ginjal. Setiap nefron mulai sebagai berkas kapiler ( badan Malpighi atau glomerulus ), dari sini terbentuk struktur tubulus yang berjalan berkelok-kelok dan dikenal sebagai tubulus proksimalis dan sesudah itu terdapat sebuah simpai yang disebut simpai Henle, tubulus ini akan berkelok-kelok lagi dan disebut kelokan kedua yang disebut tubulus distal



Tubulus distal ini akan bersambung dengan tubulus penampung dan berakhir dipuncak dipuncak salah satu piramidis. Diglomerulus terjadi proses filtrasi dan ditubulus distal terjadi proses reabsorpsi.

**Ureter** : mempunyai panjang lebih kurang 25 sentimeter dan juga mempunyai daya / gelombang peristaltik yang menyembrotkan urin ke kandung kencing

**Kandung kencing** : merupakan organ otot berongga serta mempunyai spink ter serta struktur trigono.

**Uretra** : pada pria mempunyai panjang antara 12 hingga 20 sentimeter, pada wanita mempunyai panjang sekitar 3 sentimeter.

Pada pria, uretra terdiri atas tiga bagian, yaitu : prostatika, membranosa dan spongiosa.

Seperti yang telah diuraikan diatas, glomerulus mempunyai fungsi filter dan dari filter tersebut menghasilkan senyawa ultra filtrat, suatu cairan yang menyerupai plasma, bebas protein yang akan mengalir kedalam tubulus ginjal. Untuk melaksanakan fungsi sebagai filter, glomerulus harus mempunyai tekanan serendah-rendahnya 65 mm Hg.

Aliran darah keginjal ( kidney blood flow ) cukup besar yaitu berkisar antara 1.2 liter sampai 1.3 liter permenit atau setara lebih kurang 25 % dari cardiac output dan membutuhkan oksigen sebanyak 18 mililiter permenit.

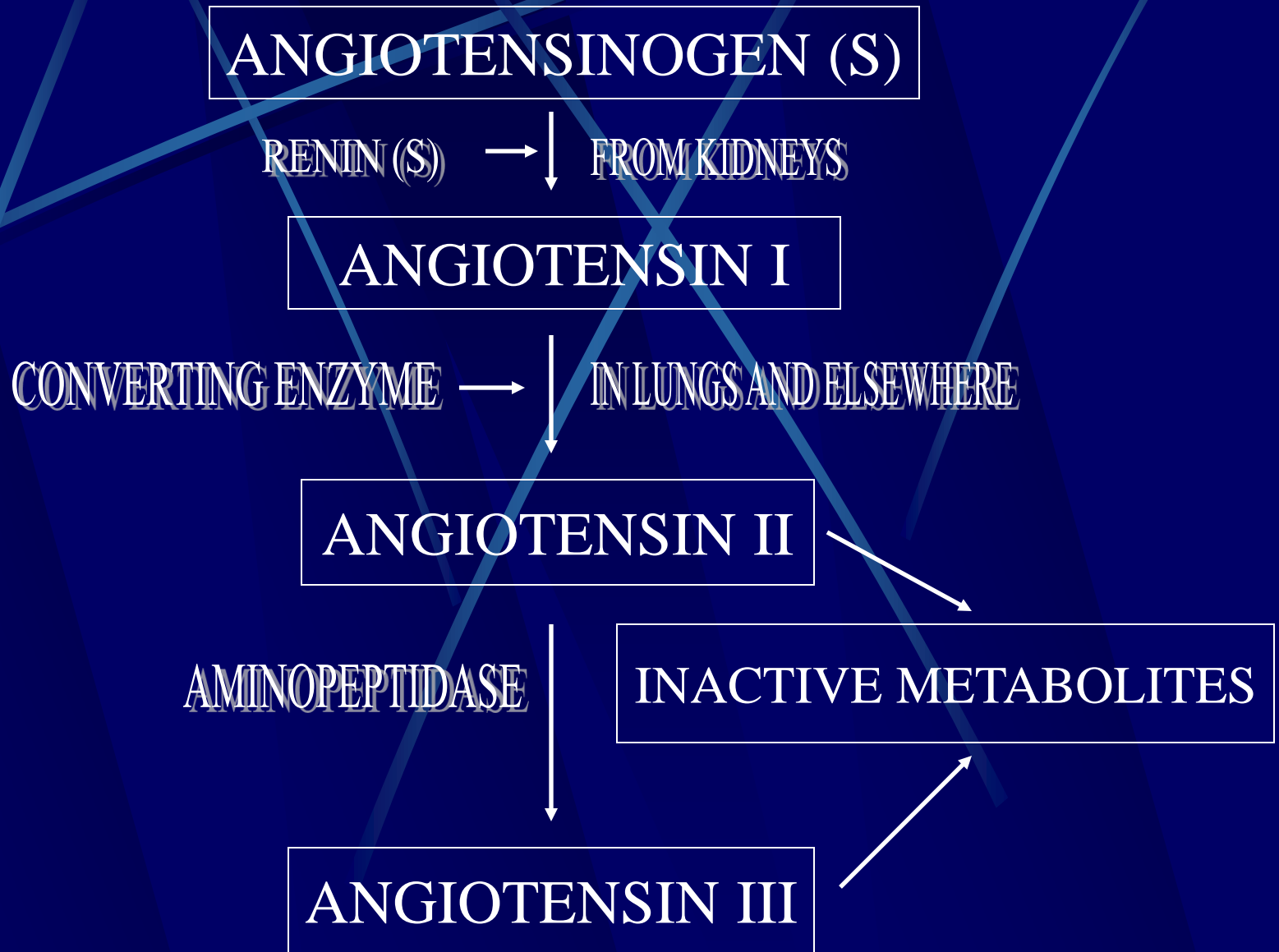
Glomerulus filtration rate ( GFR ) secara normal berkisar 125 mililiter permenit yang berarti 7.5 liter perjam atau 180 liter perhari. Nilai GFR sebesar itu menunjukkan setara dengan 4 kali total body water perhari atau 15 kali dari jumlah cairan ekstraseluler perhari atau setara dengan 60 kali volume plasma perhari.

Secara normal urin diproduksi antara 0.5 – 1.0 sentimeter kubik perkilo berat badan perjamnya.

Tubulus proksimal ginjal akan mereabsorpsi glukosa, asam amino, karbonat natrium, klorida, fosfat, asam sulfat, asam urat, keton bodies dan kreatinin, sedangkan tubulus distal ginjal akan mereabsorpsi air, natrium, klorida, fosfat dan asam sulfat. Reabsorpsi pada tubulus ginjal dipengaruhi oleh sekresi kelenjar hipofisis posterior yaitu hormon anti diuretik ( ADH )

Ginjal secara khusus mempunyai fungsi sebagai kelenjar endokrin yaitu men sekresi renin.

Fungsi eritopoetin ginjal dibentuk oleh kerja faktor ginjal yang disebut Kidney Eritropoetin Faktor ( KEF )





## Fungsi ginjal :

- Pengeluaran zat toksik
- Mempertahankan keseimbangan cairan
- Mempertahankan keseimbangan elektrolit
- Mempertahankan asam basa
- Mensekresikan hormon renin
- Mensekresikan bahan buangan, antara lain ureum, kreatinin dan amoniak



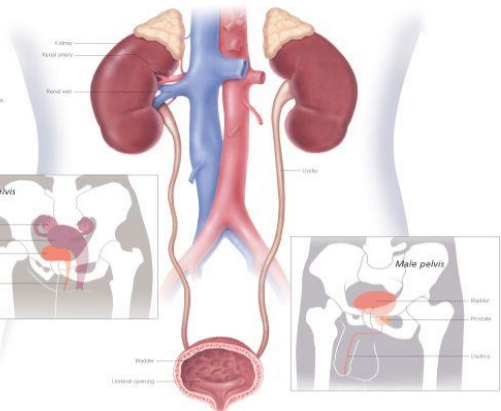


# The Urinary System

The urinary system is responsible for three major functions in the body: **removing wastes, maintaining normal water volume, and controlling and regulating ions** in the bloodstream. The individual components of the urinary system (kidneys, bladder, ureters and urethra) each play an important role in these processes.

These functions happen within your **backbone** area of the body called **retroperitoneum**. A capsule that wraps around the kidneys, **retroperitoneum**, and **uroteronephros** receive metabolic wastes, which are transported through the blood and excreted by the kidneys. The kidneys also regulate the body's water balance and electrolyte balance such as sodium and potassium. The kidneys also regulate the body's blood pressure through the production of **renin**.

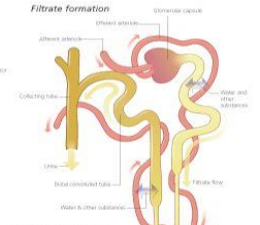
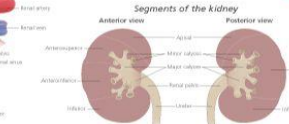
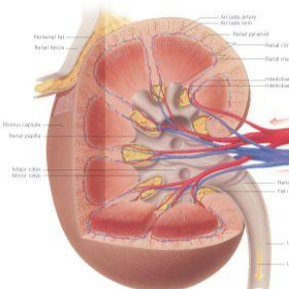
How does the kidney regulate the body's water balance? The kidneys regulate the body's water balance by controlling the amount of water that is excreted in urine. The kidneys also regulate the body's blood pressure through the production of **renin**.



## Structure of the kidneys

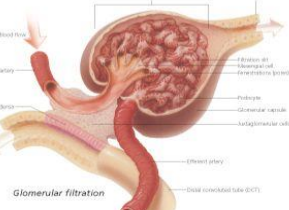
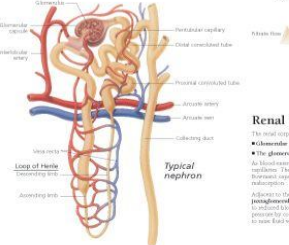
The kidneys are located on each side of the spine in the back of the abdominal cavity. Each kidney is approximately 11 cm long and 5 cm wide. The kidney is a bean-shaped organ that filters blood and excretes the waste products in the form of urine. The kidney is composed of an outer layer called the **capsule**, an inner layer called the **cortex**, and a central region called the **medulla**. The medulla is divided into several **pyramids** (the renal pyramids) that meet at the **renal pelvis**, which leads to the **ureter**. The ureter carries urine to the bladder.

**Functions of the kidneys**  
The primary function of the kidneys is to filter and excrete waste from the blood. The kidneys also regulate the body's water balance and electrolyte balance. The kidneys also regulate the body's blood pressure through the production of **renin**.



## The nephron

Each kidney contains about 1 million nephrons. The nephron is the basic functional unit of the kidney. It is responsible for filtering blood and excreting the waste products in the form of urine. The nephron is composed of a **glomerulus** (a cluster of capillaries) and a **tubule** that carries urine away from the glomerulus.



## How urine is produced

The kidneys process an average of 200 quarts of blood daily, eventually excreting only about 2 quarts of extra water and waste products as urine. Urine production begins when blood enters the nephrons. After a complex process of reabsorption and secretion along the renal tubule, concentrated urine containing water and wastes such as sodium and urea is produced. This concentrated urine is then carried in the collecting ducts to the bladder.

- Key stages of urine formation**
- Filtration:** filtering of wastes, waste products, sodium, glucose and other chemicals
  - Reabsorption:** movement of usable substances back to the bloodstream
  - Secretion:** transport of waste materials from capillaries around the renal tubule back into the distal tubule for removal with the urine

## Renal corpuscle

The renal corpuscle consists of two parts:

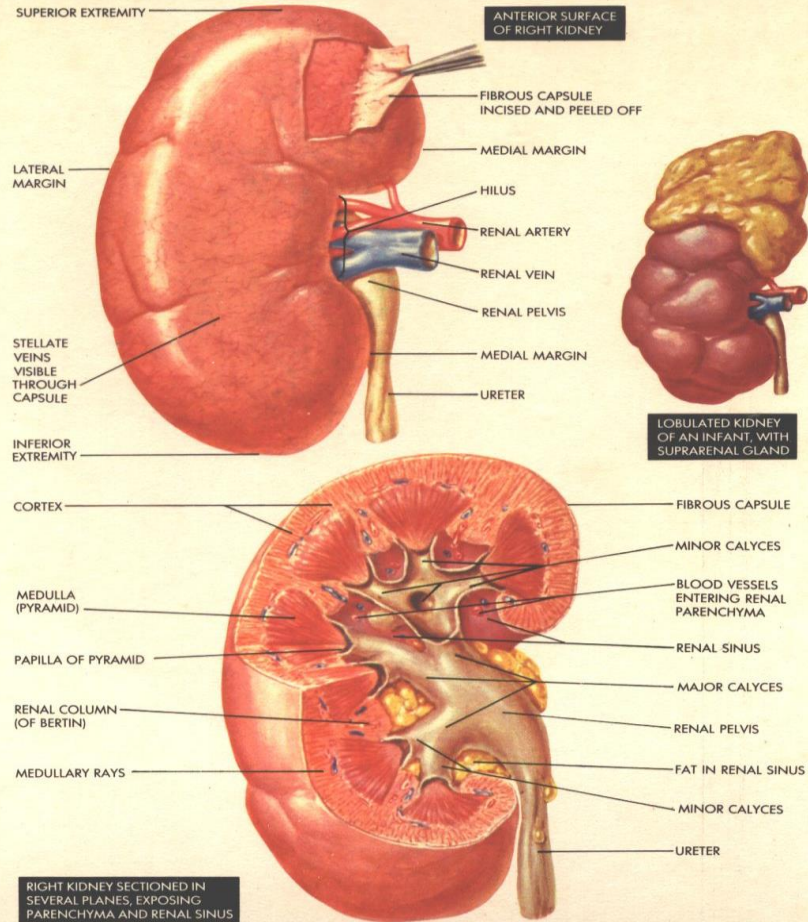
- Bowman's capsule:** a hollow, cup-shaped body that surrounds the renal tubule.
- Glomerulus:** a network of capillaries where blood cells and large molecules are filtered. Blood enters the glomerulus at a high pressure. Blood is filtered through tiny pores in the glomerular capillaries. The remaining fluid containing ions, water, glucose and other substances enters Bowman's capsule, which passes the fluid to the upper part of the renal tubule (DCT) to begin tubular reabsorption.

Adjacent to the renal corpuscle and distal convoluted tubule are specialized cells called the **peritubular capillaries**. These cells receive blood pressure in a system that filters and reabsorbs blood. Blood is reabsorbed by the peritubular capillaries, so it can be used in the body. Blood pressure is regulated by the peritubular capillaries.



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# THE KIDNEY AND NEPHRON UNIT.

