Renal System Cheat Sheet

by noush via cheatography.com/213565/cs/46486/

Definition

The organ system in charge of regulating fluid balance, removing waste from the circulation, and excreting urine is the renal system which is also sometimes referred to as the urinary system.

Main Functions

Filters waster from the blood (urea/toxins)
Regulated blood pressure
Hormone production (erythropoietin, renin)
Excreted drugs and toxins
Control blood pH
Maintains electrolyte levels
Keeps bones healthy
Eliminates metabolic byproducts
Supports blood osmolarity
Glucongenesis

Nephron Physiology

Filtration	Occurs in the glomerulus where fluid (filtrate) is forced in the Bowman's capsule by blood pressure. Blood cells and plasma proteins are too large to get filtered, but water, glucose, urea, amino acids, and small molecules all pass through.
Reabso-rption	It is in the proximal convoluted tubule (PCT) where substances such as water, glucose, Na+, K+, Cl-, and amino acids are all reabsorbed back into the blood. The descending loop includes water only and the ascending loop has Na+ and Cl-.

Nephron Physiology (cont)

Secretion	Occurs mostly in the distal convoluted tubule (DCT), and it removed substances including H+, K+, NH4+, and some drugs from the blood into filtrate to be excreted.
Excretion	In this step, the tribe follows a track from the collecting ducts -> renal papilla -> minor calyx -> major calyx -> renal pelvis -> ureter -> and finally to the bladder.

Anatomy of the Renal System

Main Organs	Internal (Kidney)
Kidneys	Cortex
Ureters	Medulla
Urethra	Renal Pelvis
Urinary Bladder	Renal Artery
	Renal Papilla
	Calyces
	Renal Vein

Hormones

Hormone	Function	Source
ADH	Water reabso-rption	Posterior Pituitary
Aldost-erone	Na+ reabso-rption	Adrenal Cortex
Erythr-opoietin	RBC production	Kidney
Renin	Blood pressure regulation	Juxtaglom-erular Cells
Calcutriol	Vitamin D activation	Kidney

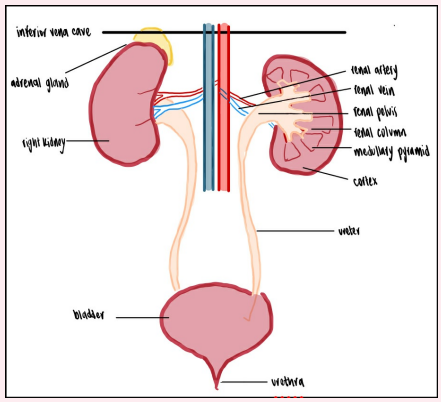
Common Diseases

Chronic Kidney Disease	Kidney Cancer	Diabetes
Unrinary Tract Infection	Glomerulonep-hritis	Interstitial Cystitis
Hypertension	Uremia	Urinalysis
Acidosis	Kidney Stones	Pyelon-ephritis
Ecoptic Kidney	Polycystic Kidney Disease	Kidney Failure

Cortical vs Juxtamedullary Nephrons

Core Element	Cortical	Juxtamedu-llary
Location	Renal Cortex	Glomerulus
Function	Absorption and filtration	Concen-trates urine
Percentage	85%	15%
Blood Supply	Peritubular Cappilaries	Vasa Recta
Association	Homeostasis	Water conser-vation

Diagram



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Neuroanatomy

Sympathetic Nervous System	Parasympathetic Nervous System	Baroreceptor Reflex	Hypothalamus & Posterior Pituitary
It is a result of low blood pressure/ loss and stress. The mains effects are the vasoconstriction of afferent arterioles which leads to ↓ GFR, stimulates JG cells leading to ↑ renin, and the activation of RAAS which ↑ blood pressure and keeps blood levels constant.	It is in the vagus nerve where there in not a lot of renal input. The main effects are it overlooks the detrusor muscle, keeps the internal urethral sphincter calm, and controls the sphincter.	It is found in the arotid sinus and the atria. The main functions is it helps regulate blood pressure by detecting any changes in the levels which also leads to the SNS activation allowing for the release of renin and a higher level of Na+ and water.	Osmoreceptors detect ↑ plasma osmolality Its main functions is to stimulate the release of ADH which leads to ↑ water reabsorption and ↓ plasma osmolality.

Psychological Factors

Reduced GFR and renal vasoconstriction are the results of acute stress activating the SNS and HPA axis. In order to boost blood pressure and preserve fluid, it promotes renin release, which activates RAAS. Prolonged cortisol rise brought on by chronic stress contributes to glomerular damage and hypertension. Water retention may result from elevated ADH levels brought on by stress. In terms of behavior, stress can deteriorate kidney function by causing excessive salt intake, dehydration, and bad habits like excessive caffeine or alcohol consumption..

Fun Facts

Did you know that your kidneys filter your whole blood volume around 60 times every day? That is around 1.2 to 1.5 liters of blood every minute.

If all of the filtering tubules (nephrons) of one kidney were stretched out, they would be approximately 5 miles long. While most individuals are born with two kidneys, it is possible to live a healthy life with only one. The surviving kidney frequently responds by getting bigger and working harder.

The human bladder is capable of holding a remarkable amount of pee. Approximately 300-500 milliliters (1.5 to 2 cups) before you feel a strong want to go.

The name "renal" is derived from the Latin word "renes," which means kidney.