What is the Renal System?

Worksheet

The renal system is the kidneys and urinary tract that filter blood, remove waste as urine, and regulate fluid, electrolyte, and blood pressure balance in the body.

Questions

1. What is the functional filtering unit of the kidney?

A) Alveolus
B) Nephron
C) Neuron
D) Villus

2. Which process moves needed substances like glucose back into the blood?

A) Filtration
B) Secretion
C) Reabsorption
D) Excretion

3. A lower-than-normal GFR most directly suggests:

A) Better kidney function
B) Reduced kidney function
C) Higher blood pressure only
D) No change in kidney health

4. Which hormone system do the kidneys help regulate blood pressure with?

A) Insulin-glucagon
B) Renin-angiotensin-aldosterone
C) Thyroid hormone axis
D) Growth hormone axis

5. A 45-year-old man weighs 70 kg with a serum creatinine of 1.0 mg/dL. Estimate his creatinine clearance.

6. A 65-year-old woman weighs 60 kg with a serum creatinine of 1.2 mg/dL. Estimate her creatinine clearance.

7. How does the nephron handle glucose under normal conditions?

8. Define: What is the functional unit of the kidney?

9. Define: What is GFR?

10. Define: What are the three main processes in urine formation?

Answer Key

1. B) Nephron - Each kidney contains about a million nephrons, the units that filter blood and form urine.

2. C) Reabsorption - Reabsorption, mainly in the proximal tubule, reclaims glucose, water, and ions.

3. B) Reduced kidney function - A drop in GFR means the kidneys are filtering less blood per minute, a sign of reduced function.

4. B) Renin-angiotensin-aldosterone - The kidneys release renin, triggering the renin-angiotensin-aldosterone system to regulate blood pressure and fluid balance.

5. CrCl = [(140 45) 70 1.0] / (72 1.0) CrCl = (95 70) / 72 CrCl = 6650 / 72 92.4 mL/min This is within the normal range (~90-120 mL/min)

6. CrCl = [(140 65) 60 0.85] / (72 1.2) CrCl = (75 60 0.85) / 86.4 CrCl = 3825 / 86.4 44.3 mL/min This suggests moderately reduced kidney function, worth further evaluation

7. Glucose is freely filtered at the glomerulus into Bowman's capsule The proximal tubule reabsorbs essentially all of the filtered glucose back into the blood As a result, healthy urine normally contains no glucose In diabetes, when blood glucose exceeds the tubule's reabsorption capacity, glucose appears in urine

8. The nephron - about a million per kidney.

9. Glomerular filtration rate: the volume of fluid filtered from the blood by the kidneys per minute.

10. Filtration, reabsorption, and secretion.