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NCERT Solutions for 11th Class Biology: Chapter 19-Excretory Products and their Elimination



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NCERT Solutions for 11th Class Biology: Chapter 19-Excretory Products and their Elimination

Class 11: Biology Chapter 19 solutions. Complete Class 11 Biology Chapter 19 Notes.

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Exercises

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1. Define Glomerular Filtration Rate (GFR)**Answer**

The amount of the filtrate formed by the kidneys per minute is called glomerular filtration rate (GFR).

2. Explain the autoregulatory mechanism of GFR.**Answer**

The kidneys have built-in mechanisms for the regulation of glomerular filtration rate. One such efficient mechanism is carried out by juxtaglomerular apparatus (JGA). JGA is a special sensitive region formed by cellular modifications in the distal convoluted tubule and the afferent arteriole at the location of their contact. A fall in GFR can activate the JG cells to release renin which can stimulate the glomerular blood flow and thereby the GFR back to normal.

3. Indicate whether the following statements are true or false:

(a) Micturition is carried out by a reflex.

► True

(b) ADH helps in water elimination, making the urine hypotonic.

► False

(c) Protein-free fluid is filtered from blood plasma into the Bowman's capsule.

► True

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(d) Henle's loop plays an important role in concentrating the urine.

► True

(e) Glucose is actively reabsorbed in the proximal convoluted tubule.

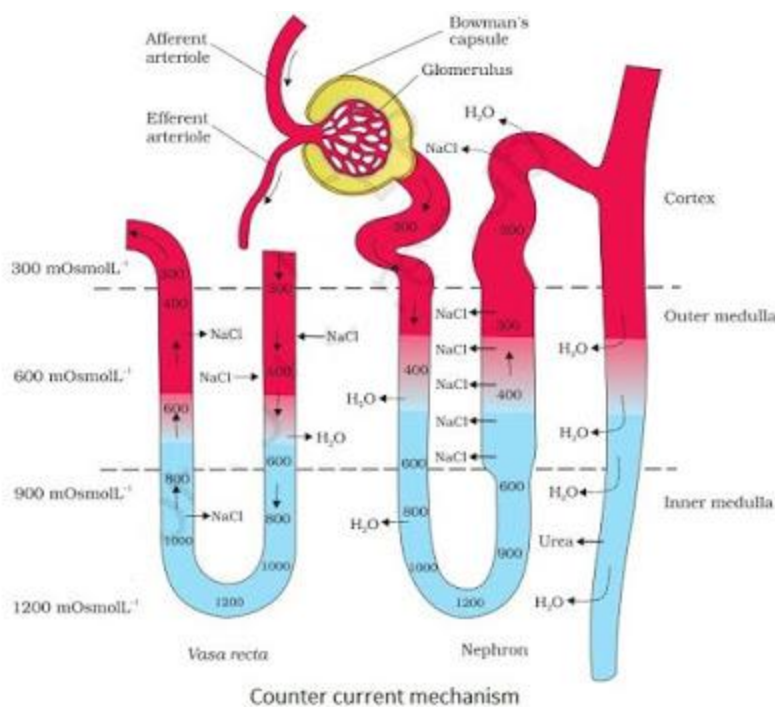
► True

4. Give a brief account of the counter current mechanism.

Answer

The counter current mechanism operating inside the kidney is the main adaptation for the conservation of water. The Henle's loop and vasa recta are two counter current mechanisms inside the kidneys. The flow of filtrate in the two limbs of Henle's loop is in opposite directions and thus forms a counter current. As a result, blood entering the renal medulla in the descending limb comes in close contact with the outgoing blood in the ascending limb. The osmolarity increases from 300 mOsmolL^{-1} in the cortex to $1200 \text{ mOsmolL}^{-1}$ in the inner medulla by counter current mechanism. It helps in maintaining the concentration gradient, which in turn helps in easy movement of water from collecting tubules. The gradient is a result of the movement of NaCl and urea.

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5. Describe the role of liver, lungs and skin in excretion.

Answer

- **Role of Lungs:** This remove large amounts of CO_2 and also significant quantities of water every day.
- **Role of Liver:** This is the largest gland in our body, secretes bile-containing substances like bilirubin, biliverdin, cholesterol, degraded steroid hormones, vitamins and drugs. Most of these substances ultimately pass out alongwith digestive wastes.
- **Role of Skin:** Skin has sweat and sebaceous glands that can eliminate certain substances through their secretions. Sweat glands are highly vascular and tubular glands that separate the waste products from the blood and excrete them in the form of sweat. Sweat excretes excess salt and water from the body. Sebaceous glands eliminate certain substances like sterols, hydrocarbons and waxes through sebum.

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6. Explain micturition.

Answer

The process of release of urine is called micturition. Urine formed by the nephrons is ultimately carried to the urinary bladder where it is stored till a voluntary signal is given by the central nervous system (CNS). This signal is initiated by the stretching of the urinary bladder as it gets filled with urine. In response, the stretch receptors on the walls of the bladder send signals to the CNS. The CNS passes on motor messages to initiate the contraction of smooth muscles of the bladder and simultaneous relaxation of the urethral sphincter causing the release of urine. An adult human excretes, on an average, 1 to 1.5 litres of urine per day.

7. Match the items of column I with those of column II:

Column I	Column II
(a) Ammonotelism	(i) Birds
(b) Bowman's capsule	(ii) Water reabsorption
(c) Micturition	(iii) Bony fish)
(d) Uricotelism	(iv) Urinary bladder)
(d) ADH	(v) Renal tubule

Answer

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Column I	Column II
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- | | | | |
|-----|------------------|-------|--------------------|
| (a) | Ammonotelism | (i) | Bony fish |
| (b) | Bowman's capsule | (ii) | Renal tubule |
| (c) | Micturition | (iii) | Urinary bladder |
| (d) | Uricotelism | (iv) | Birds |
| (d) | ADH | (v) | Water reabsorption |

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8. What is meant by the term osmoregulation?

Answer

Osmoregulation is the regulation of blood volume, body fluid volume and ionic concentration.

9. Terrestrial animals are generally either ureotelic or uricotelic, not ammonotelic, why?

Answer

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Terrestrial animals are generally either ureotelic or uricotelic, not ammonotelic because:

→ Ammonia is the most toxic form and requires large amount of water for its elimination, whereas uric acid, being the least toxic, can be removed with a minimum loss of water. Therefore, it needs to be converted into a less toxic form such as urea or uric acid.

→ As ammonia is readily soluble, is generally excreted by diffusion across body surfaces or through gill surfaces (in fish) as ammonium ions. Hence, it is converted into urea or uric acid. These forms are less toxic and also insoluble in water. This helps terrestrial animals conserve water.

10. What is the significance of juxta glomerular apparatus (JGA) in kidney function?

Answer

The JGA plays a complex regulatory role. A fall in glomerular blood flow/glomerular blood pressure/GFR can activate the JG cells to release renin which converts angiotensinogen in blood to angiotensin I and further to angiotensin II. Angiotensin II, being a powerful vasoconstrictor, increases the glomerular blood pressure and thereby GFR. Angiotensin II also activates the adrenal cortex to release Aldosterone. Aldosterone causes reabsorption of Na^+ and water from the distal parts of the tubule. This also leads to an increase in blood pressure and GFR. This complex mechanism is generally known as the Renin-Angiotensin mechanism.

11. Name the following:

(a) A chordate animal having flame cells as excretory structures

► Flatworms

(b) Cortical portions projecting between the medullary pyramids in the human kidney

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► Columns of Bertini

(c) A loop of capillary running parallel to the Henle's loop.

► Vasa Recta

12. Fill in the gaps:

(a) Ascending limb of Henle's loop is _____ to water whereas the descending limb is _____ to it.

► impermeable, permeable

(b) Reabsorption of water from distal parts of the tubules is facilitated by hormone _____.

► vassopressin

(c) Dialysis fluid contains all the constituents as in plasma except _____.

► nitrogenous waste

(d) A healthy adult human excretes (on an average) _____ gm of urea/day.

► 25 to 30

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- Chapter 1: The Living World
- Chapter 2: Biological Classification
- Chapter 3: Plant Kingdom
- Chapter 4: Animal Kingdom
- Chapter 5: Morphology of Flowering Plants
- Chapter 6: Anatomy of Flowering Plants
- Chapter 7: Structural Organisation in Animals
- Chapter 8: Cell-The Unit of Life
- Chapter 9: Biomolecules
- Chapter 10: Cell Cycle and Cell Division
- Chapter 11: Transport in Plants
- Chapter 12: Mineral Nutrition
- Chapter 13: Photosynthesis in Higher Plants
- Chapter 14: Respiration in Plants
- Chapter 15: Plant - Growth and Development
- Chapter 16: Digestion and Absorption
- Chapter 17: Breathing and Exchange of Gases
- Chapter 18: Body Fluids and Circulation
- Chapter 19: Excretory Products and Their Elimination
- Chapter 20: Locomotion and Movement
- Chapter 21: Neural Control and Coordination
- Chapter 22: Chemical Coordination and Integration

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