INDIAN SCHOOL AL WADI AL KABIR

DEPARTMENT OF SCIENCE (2023 –2024)

CLASS: XI	SUBJECT: BIOLOGY	DATE OF COMPLETION: 11/02/2024
WORKSHEET WITH ANSWERS	TOPIC: EXCRETORY PRODUCTS AND THEIR ELIMINATION	NOTE: A4 FILE FORMAT
CLASS & SEC:	NAME OF THE STUDENT:	ROLL NO.

1Mark Questions

1. **_____ is considered as the basic functional unit of the human kidney**
    1. Exon
    2. Nephron
    3. Cilia
    4. Neuron
2. **The Krebs-Henseleit cycle is a sequence of biochemical reactions that take place in _____**
    1. Brain
    2. Liver
    3. Urinary bladder
    4. Lungs
3. **Bowman capsule is located in _____**
    1. Cortex
    2. Henle’s loop

3. Bladder
4. None of the above

4. **The _____ is the point where two or three major renal calyces join together.**
    1. Renal pelvis
    2. Urethra
    3. Bowman's capsule
    4. None of the above
5. **_____ are tubes made up of smooth muscle fibres that transport urine to the bladder from the kidneys**
    1. Renal Papilla
    2. Urethra
    3. Ureters
    4. None of the above

II : Assertion and reasoning:

a) Assertion and Reason are true and Reason is the correct explanation of the Assertion.

b) Assertion and Reason are true but Reason is not a correct explanation of the Assertion.

c) Assertion is true but the Reason is false.

d) Assertion and Reason are false.

Q6. Assertion: Ammonia should be removed from the body as rapidly as it is formed.
Reason: In water, ammonia is insoluble.

Q7. Assertion: In birds and reptiles, main excretory product is the combined form of urine and feces.
Reason: Birds and reptiles consists of no separate chamber for excretion of urine and feces.

Q8. Assertion: Comparative to uric acid, urea is a more toxic excretory substance.
Reason: Birds and insects are uricotelic animals.

Q9. Assertion: The primary excretory organ in vertebrates is referred to as liver.

Reason: Liver helps kidneys urine secretion.

Q10. Assertion: In vertebrates, the liver is also referred as an accessory excretory organ.
Reason: Liver helps kidneys in the secretion of urine.

2Mark Questions

Q.11. Name the site where the selective reabsorption of filtrate from Glomerular occurs.

Q.12. Name the excretory product of reptiles from the kidneys.

Q.13. Write the composition of the sweat secreted by the sweat gland.

Q.14. Which gland in the prawns performs excretory functions?

Q.15. Which is the excretory structure in amoeba?

3Mark Questions

Q.16. Describe the role of Renin-Angiotensin in the management of Kidney function.

Q.17. Give reason why aquatic animals ate mostly ammonotelic in nature whereas terrestrial forms are not.

Q.18. Explain why the composition of glomerular filtrate is not the same as urine.

Q.19. What is the remedial measure advised for the correction of acute renal failure? Explain briefly.

4Mark Questions

Q.20. CASE STUDY QUESTION

Blood is filtered so finely through these membranes, that almost all the constituents of the plasma except the proteins pass onto the lumen of the Bowman's capsule. Therefore, it is considered as a process of ultra-filtration.

The amount of the filtrate formed by the kidneys per minute is called glomerular filtration rate (GFR). GFR in a healthy individual is approximately 125 ml/minute, i.e., 180 litres per day!

The kidneys have built-in mechanisms for the regulation of glomerular filtration rate. One such efficient mechanism is carried out by juxta glomerular 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.

A comparison of the volume of the filtrate formed per day (180 litres per day) with that of the urine released (1.5 litres), suggest that nearly 99 per cent of the filtrate has to be reabsorbed by the renal tubules. This process is called reabsorption. The tubular epithelial cells in different segments of nephron perform this either by active or passive mechanisms. For example, substances like glucose, amino acids, Na^+ , etc., in the filtrate are reabsorbed actively whereas the nitrogenous wastes are absorbed by passive transport. Reabsorption of water also occurs passively in the initial segments of the nephron. During urine formation, the tubular cells secrete substances like H^+, K^+ and ammonia into the filtrate. Tubular secretion is also an important step in urine formation as it helps in the maintenance of ionic and acid base balance of body fluids.

1.) Identify the correct statement

Statement 1 – Tubular epithelial cells perform reabsorption either by active or passive mechanisms.

Statement 2 – Amount of the filtrate formed by the kidneys per minute is glomerular filtration rate.

Statement 3 – The first step in urine formation is the filtration of blood.

Statement 4 – Renin can stimulate the glomerular blood flow.

a) Both 1 & 2

b) Only 2

c) Both 3 & 4

d) All of the above

2.) _____ stimulate the glomerular blood flow.

a) Tubular secretion

b) Renin

c) renal tubules

d) podocytes

3.) What is the main function of tubular epithelial cells?

4.) How filtration slits are formed?

5Mark Questions

Q.21. Explain the micturition and disorders of the excretory system.

Q.22. What is the role of tubular secretion in maintaining acid-base and ionic balance in the body fluids?

ANSWER KEY

1. 2
2. 2
3. 1
4. 1
5. 3
6. c
7. a
8. b
9. d
10. c

11. PCT – Proximal Convoluted Tubules and DCT – Distal Convoluted Tubules

12. They are uricotelic animals that excrete nitrogenous wastes in the form of uric acid as a paste with a minimum discharge of water.

13. It is a watery fluid having NaCl, with a little quantity of urea, lactic acid, etc.

14. Their excretory organs are called as green glands or antennary glands. They secrete ammonia and are opaque-white pea-sized structures, confined in the coxa of each second antenna.

15. Contractile vacuole.

16. The Juxta-Glomerular Apparatus (JGA) releases renin on activation by fall in the blood flow in the glomerular. In blood, renin transforms angiotensinogen into angiotensin I and hence into angiotensin II which is a vasoconstrictor that raises the blood pressure in the glomerular and hence the Glomerular Filtration Rate(GFR). Also, the angiotensin II stimulates the adrenal cortex to secrete aldosterone, which in turn causes the reabsorption of water and Na+ from the distal parts of the tubule which results in an increase in the GFR and blood pressure, this is termed as RAAS (Renin Angiotensin Aldosterone System).

17. Ammonia needs a large amount of water for its removal as its the most toxic. To conserve water, terrestrials adapted to produce less toxic nitrogenous wastes like uric acid and urea. In ureotelic animals, ammonia released as a result of metabolic activities is converted into urea in their liver and released into the blood that is filtered and excreted by the kidneys.

18. When the volume of the filtrate is compared with that of the urine that is formed per day, which is 180 litres and 1.5. Litres respectively, it can be extrapolated that 99% of the filtrate needs to be reabsorbed by the renal tubules, the phenomenon is referred to as reabsorption. Substances such as amino acids, Na+, glucose are actively reabsorbed in the filtrate hence are not found in urine.

A.19. The ultimate method for the correction of acute renal failure is Kidney transplantation. The kidney is transplanted from a donor having a functional kidney, a close relative preferably, so that chances of rejection by the host immune system are minimized.

20. 1.) d

2.) b

3.) The tubular epithelial cells in different segments of nephron perform reabsorption either by active or passive mechanisms.Substances like glucose, amino acids, Na+, etc., in the filtrate are reabsorbed actively whereas the nitrogenous wastes are absorbed by passive transport.

4.) The epithelial cells of Bowman's capsule are arranged in an intricate manner that they small minute space like pores, these pores are called filtration slits or slit pores.

21. In micturition, urine is formed by the nephrons that are transferred by the urinary bladder which stores in until a signal is generated by the CNS. The signal is triggered by the stretching of the urinary bladder due to the filling of urine, which is responded in the form of signals to the CNS by the stretch receptors present on the bladder walls. To trigger smooth contractions of the bladder muscles, the CNS transfers motor messages and parallelly relaxes the urethral sphincter thereby resulting in the release of urine. This phenomenon of releasing urine is called as micturition The following are the disorders:

- Kidney malfunction can cause urea accumulation in the blood, the condition is referred to as uremia that may lead to kidney failure. Urea in such patients is eliminated through hemodialysis and kidney transplantation ultimately.
- Renal Calculi is when insoluble or stones of crystallized salts are formed within the kidney.
- Inflammation of the glomeruli of the kidney – Glomerulonephritis

22. The tubular cells produce ammonia, H+, and K+ into the filtrate during the formation of urine. Tubular secretion assists in maintaining ionic and acid-base balance in the body fluids and is a necessary step in urine formation. The PCT

helps in doing so through selective secretion of ammonia, hydrogen ions, and potassium ions into the filtrate. The DCT is also able enough to selectively secrete ions of potassium and hydrogen and ammonia for the maintenance of the sodium-potassium balance pH in the blood. Another structure that plays a role in maintaining the pH and ionic balance of the blood by selectively secreting H+ and K+ ions is the collecting duct.

PREPARED BY **Ms ARUNIMA NAIR**	**CHECKED BY** **HoD SCIENCE**