

Excretory Product & Their Elimination

Excretion:-

- Due to metabolism or excess ingestion of certain substance some nitrogenous waste like NH_3 , urea, uric acid and some ions like Na^+ , K^+ , Cl^- and phosphate and sulphate can be accumulated in excess which needs to be constantly removed and the process is called excretion.
- The main nitrogenous waste are :- NH_3 (most toxic and needs more amount of water for its elimination) Urea, uric acid (least toxic and requires minimum amount of water for its elimination)

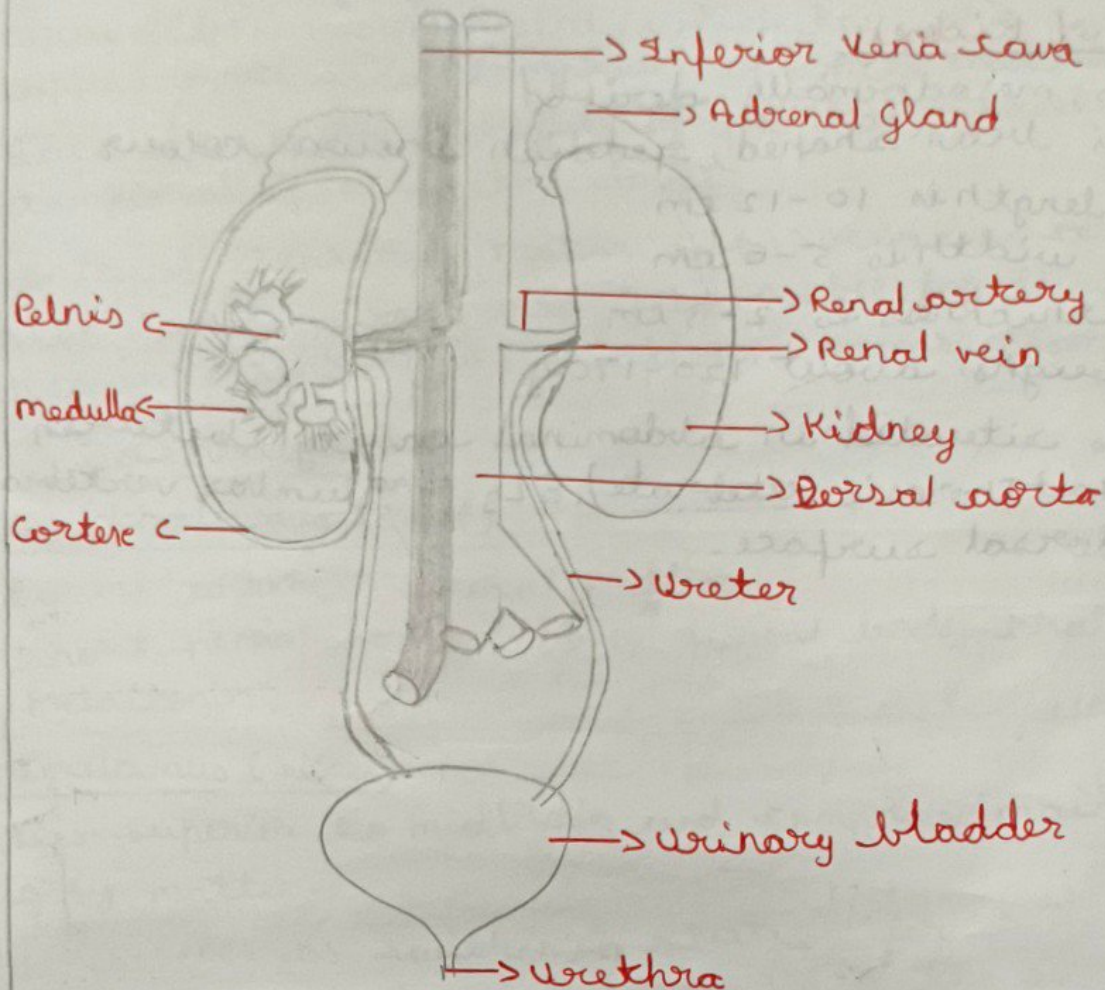
On the basis of excretory products animals can be categorised into 3 types:-

<u>Ammotelic</u>	<u>Ureotelic</u>	<u>Uricotelic</u>
• Excretory product → NH_3	• Excretory product → urea	• Excretory product → uric acid
• The removal of NH_3 takes place through body surface / gill surface by the diffusion	• The urea is formed in the liver (NH_3 is converted into urea)	• The uric acid is formed as pellets or paste to minimise the loss of water and eliminated
Eg Aquatic amphibians, aquatic insect, Bony fishes	Eg:- Terrestrial amphibians, mammals	Eg:- Terrestrial insects, land snails, birds, Reptiles

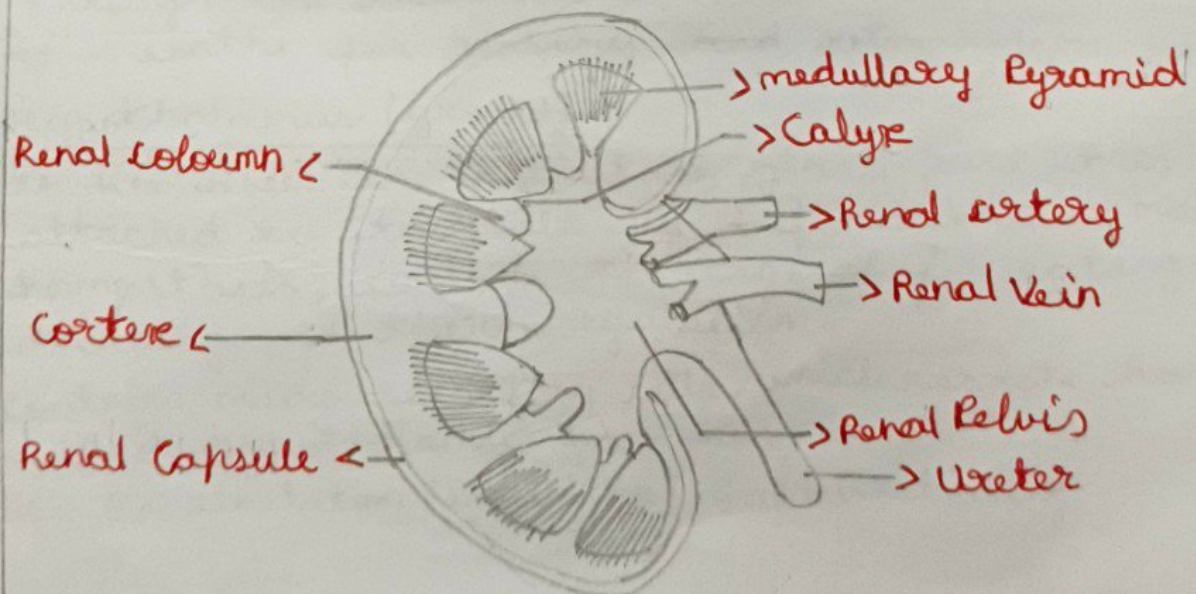
Excretory Structures :-

- Protonephridia (flame cells, solenocytes)
Eg Platyhelminthes, protochordates, (cephelochordates) ~~and~~ siphon (zooplankton) and some annelids
- Nephridia
Eg Earthworm
- Antennary gland / green gland :- Crustaceans (crabs)
- Malpighian tubule :- Insect (cockroach)
- Kidney :- some of the fishes, amphibians, mammals

- vi Coel gland = spider & scorpion
 vii Kelen gland/organ of bryozoa :- mollusca
 viii water vascular system :- Echinodermata
 ix Proboscis gland in Hemichordata



Human Urinary System



Longitudinal Section of Kidney

Human Excretory system

- It consists of a :
 - i pair of kidneys
 - ii pair of ureters
 - iii urinary bladder
 - iv urethra

Pair of Kidney

- It is mesodermally derived
- It is bean shaped, reddish brown colour
- Its length is 10-12 cm
- Its width is 5-6 cm
- Its thickness is 2-3 cm
- It weighs about 120-170 g
- It is situated in abdominal cavity between T_{12} (12th Thoracic vertebrae) & L_3 (3rd lumbar vertebrae) in dorsal surface.

Human Urinary system

kidney

ureter

urinary bladder

urethra

kidney

ureter

Longitudinal section of kidney

Neural Control and Coordination Continue

- Cerebral cortex forms outermost portion of cerebrum and makes the grey matter.
- The surface of cortex is highly folded forming gyri (upward folds) alternating with sulci (downward droops).
- Beneath the grey matter millions of myelinated nerve fibres are present, which keep up the white appearance and comprises of white matter.
- Each hemisphere consists of frontal, parietal, temporal & occipital lobes.
- Contains sensory, motor & association areas.
- Association areas are responsible for functions like intersensory associations, memory, communication.

Diencephalon

Epithalamus (roof)

- Forms anterior choroid plexus.
- Short pineal stalk, have, pineal body that secretes melatonin.

Thalamus (sides)

- Lies superior to midbrain and comprised mainly of grey matter.
- It serves as switching station for sensory input excluding smell and balance. With the exceptions of smell, each sensory channel its sensory nerve fibres pass through the thalamus.
- It is centre for sensory and motor region.

Hypothalamus (ground)

- It lies above the pituitary gland and it is attached to its stalk by infundibulum. Maintains homeostasis, controls the urge for eating & drinking and thermoregulation.
- Contains neuro secretory cells, which secrete hormones called hypothalamic hormones.

Eg:- Somatostatin (inhibiting) GnRH (releasing)

Limbic lobe

- The inner part of cerebral limbic sphere and group of associated deep structure forms the limbic lobe or limbic system.

- Along with the signal, it is involved in the regulation of sexual behavior, expression of emotional behavior, excitement, pleasure, fear, rage and motivation.

Midbrain

- Located between thalamus, hypothalamus & pons.
- A canal called cerebral aqueduct passes through the midbrain.
- Dorsal portion has 4 round lobes :-
 - Corpora quadrigemina
 - Cerebra Cerebri
- Corpora quadrigemina has 2 parts :- superior region (sense of sight) and inferior region (sense of hearing)
- Cerebra Cerebri :- relay impulses back and forth

Hindbrain :-

- Consists of pons, cerebellum & medulla
- Pons consists of fibre tracts that interconnect different regions of the brain.
- Cerebellum
 - Very convoluted surface in order to provide additional space for many more neurons.
- Medulla
 - Centre for respiration, cardio-vascular reflexes and gastric secretion.

Brain stem

- Midbrain, medulla and Pons forms the connect between brain and spinal chord.