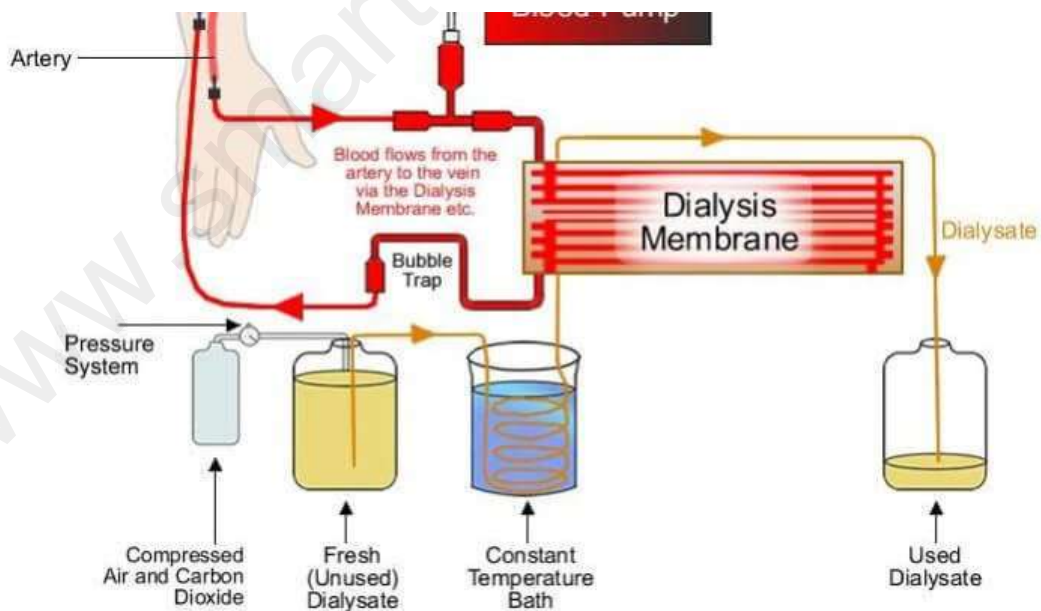
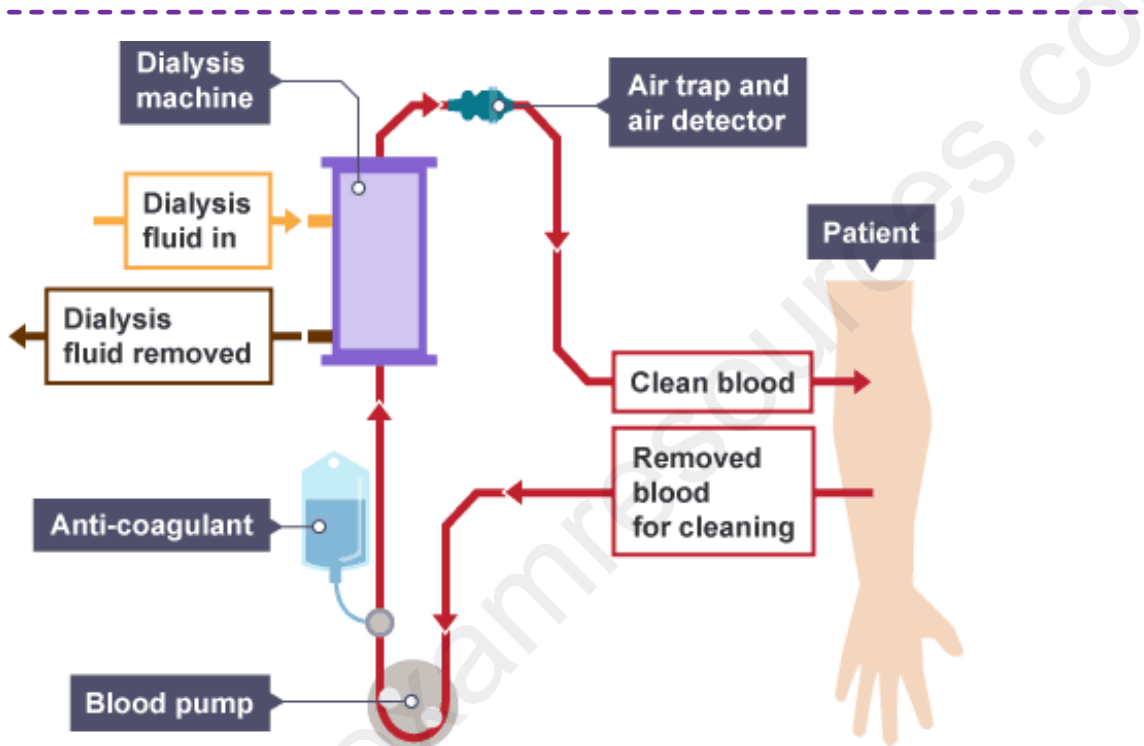
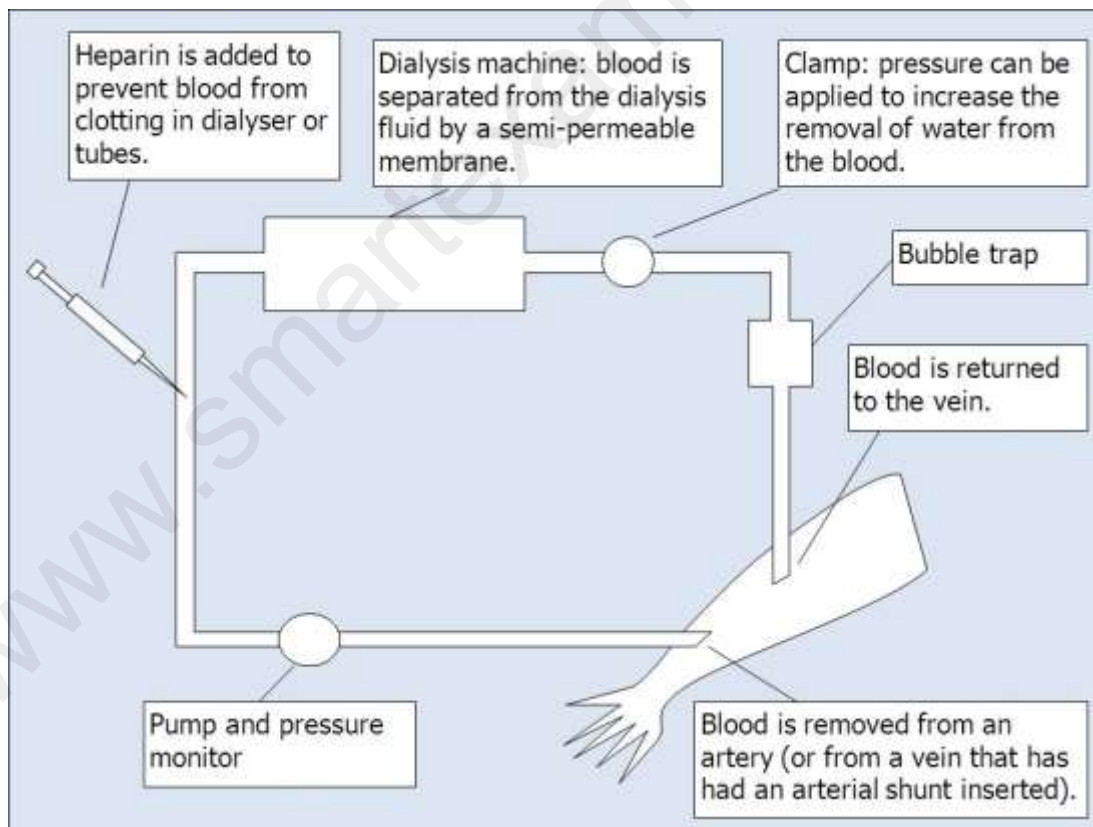
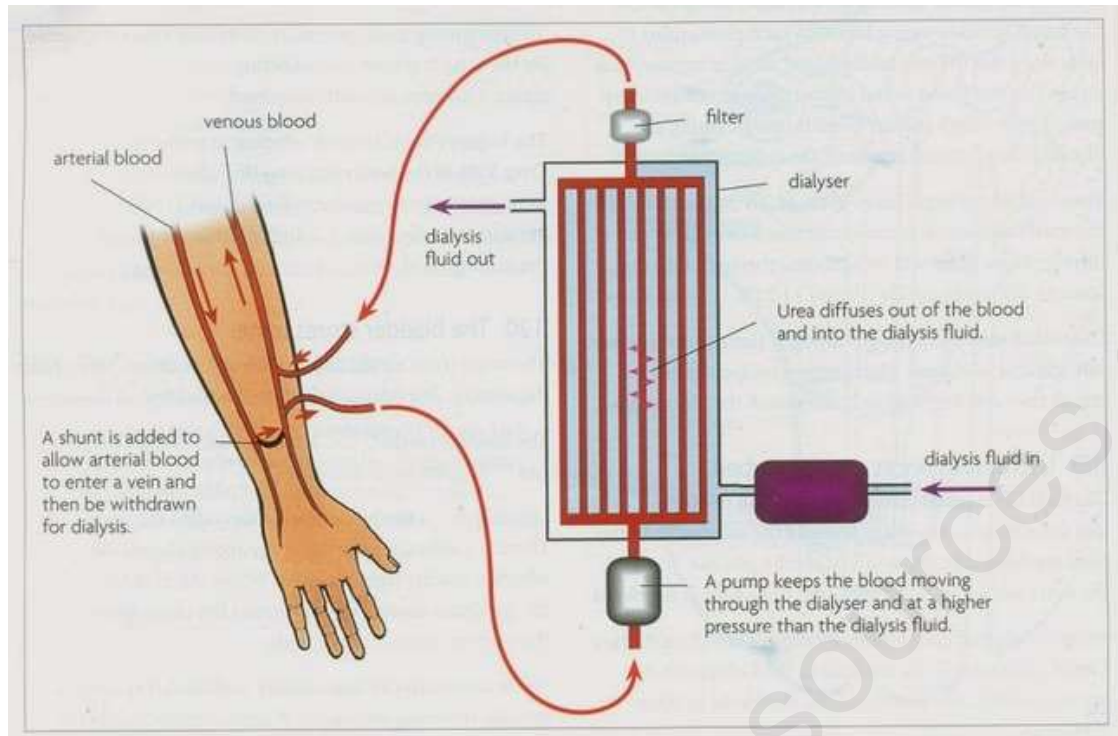


EXCRETION

Dialysis





Before a patient begins dialysis treatments, a minor surgical procedure called arteriovenous (AV) fistula might be recommended. In a fistula , an artery and a vein are directly connected.

In dialysis, all of a patient's blood is withdrawn from an artery or vein, filtered and returned to a vein. Creating an AV fistula allows arterial pressure to enlarge the vein, over time, enabling it to receive a larger volume of blood returning back into the body.

So a vein in dialysis will usually mean a vein with an arterial shunt.

Process of dialysis:

- The patient's blood is continuously pumped from an artery, a large vein, or a surgically modified vein to allow high blood flow rates.
- Blood passes over the dialysis membrane usually made up of cellulose. This membrane separates the patient's blood from the dialysis fluid.
- The dialysis fluid (also called as the dialysate) consists of salts and sugars in the correct proportion but does not contain any urea.
- Movement of substances across the membrane happens via diffusion down a concentration gradient.
- Urea leaves the blood and enters the dialysis fluid.
- Dialysis fluid is refreshed after certain intervals of time.
- Excess salts and water leave the blood and enter the dialysis fluid.
- Usually the salts and sugars are kept at the same concentration as in the blood to avoid loss of essential salts.
- Certain ions such as sodium ions may be present in dialysis fluid, so that the concentration of these ions in the blood and the dialysis fluid is the same and thus there is no osmosis and hence no loss or gain of ions.
- There is no net loss of glucose during the dialysis.
- The following components are not present in the dialysis fluid:
 - ⊗ Red blood cells
 - ⊗ White blood cells
 - ⊗ Plasma proteins
 - ⊗ Urea (Uric acid)
 - ⊗ Amino acids
 - ⊗ Acids/Glycerol/Bacteria/Virus

- **Anticoagulant:** Heparin is the usual anticoagulant that is added to the patient's blood as it enters the dialysis machine (in order to prevent the blood from clotting as it passes through the machine). Preventing the blood from clotting should, in turn, prevent any blood clots from blocking the filtration surface of the system. However, heparin is not added during the final hour of dialysis in order to enable the patient's blood clotting activity to return to normal before he or she leaves.

- **Bubble trap and the dialysis machine blood pump :**

A blood pump simply pumps the blood from the body into the machine through specially made tubes. The tubes have bubble traps attached to ensure air does not get into the bloodstream.

- A pressure gradient is maintained across the membrane to ensure the proper flow of compounds out of and into the blood.

- **The substances removed from the kidneys during dialysis are: Urea/Ammonia/Uric acid/Sodium, Mg, cal ions in excess of requirements/water and hormones**

Application based questions:

Theory:

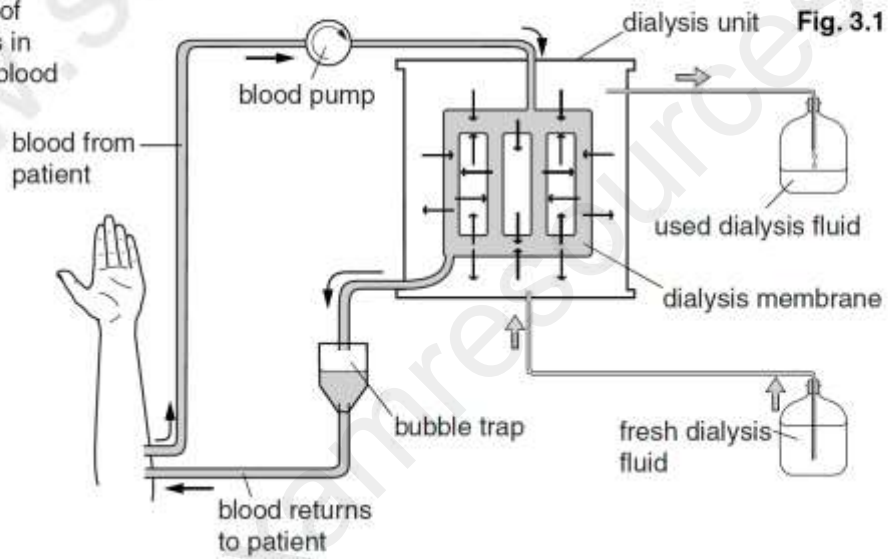
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(c) Dialysis can be used to treat people whose kidneys do not function properly.

Fig. 3.1 shows dialysis treatment.

Key

- movement of blood
- ⇒ movement of dialysis fluid
- ↔ movement of substances in and out of blood



Use Fig. 3.1 to describe the process of dialysis **and** explain changes that occur in a person's blood.

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