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1. Critically examine the renal function of desert dwellers and the anatomical basis of their unique adaption.

**ANSWER**

Renal function also known as kidney function is an indication of the kidneys condition and its role in renal physiology. Glomerular filtration rate is the volume of fluid filtered from the renal glomerular capillaries into the Bowman’s capsule per unit time.

Kidneys of desert dwellers have a longer loop of Henle to make the urine of the animal to be concentrated as possible and limits the amount of water and salt the animal looses. This helps the desert dwellers to live for long periods of time on small amounts of water.

The Henle’s loop of juxtamedullary (adjacent to the medulla of kidney) nephron goes deep down into the medulla. The Henle’s loop of juxtamedullary nephron of desert dwellers like the camel goes deep down into the medulla this is why medulla of camel’s kidney is thicker than that of other mammals but is the most developed in another desert mammals. The Henle’s loop of

juxtamedullary nephrons along with counter flowing blood vessels called VASA RECTA help in conservation of water. Solutes can leave the filtrate and enter the blood along this stretch. When the blood flows along descending limb, water is then reabsorbed from filtrate but not the solutes. The longer the Loop of Henle, the more amount of solute will be reabsorbed and hence more amount of water could be removed from filtrate.

1. Write extensively on the clinical importance of the glomerular filtration barrier.

**ANSWER**

The glomerular filtration barrier is a highly specialized blood filtration interface that displays a high conductance to small and midsized solutes in plasma but retains relative impermeability to macromolecules. It has three layered components; the fenestrated capillary endothelium, the glomerular basement membrane and filtration slits. The major component of the filter is formed by fusion of the basal laminae of a podocyte and a capillary endothelial cell. The glomerular basement membrane is the most substantial part of the filtration barrier separating the blood in the capillaries from the capsular space. It is formed by the fusion of capillary and podocyte and is also maintained by the podocyte.

The glomerular filtration barrier is maintained by physicochemical and signaling interplay among its three layered components. The barrier determines the composition of the plasma ultra filtrate. It restricts the filtration of molecules primarily on the basis of size. A reduction in glomerular filtration rate in disease states like diabetes mellitus is most often due to decrease in the ultrafiltration coefficient because of the loss of filtration surface area.s