NAME: CHIKE-OSEGBUE GABRIELLA IFEANYI.
MATRIC NO: 19/MHS03/014.
DEPARTMENT: ANATOMY 200L
COURSE CODE: ANA 204.

ASSIGNMENT.

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

ANS:

The nephron loop and surrounding tissue are involved in making urine hypertonic which is the excretion of excess solutes and conserving water. Desert mammals do not readily find water, hence they must excrete less amount of urine, this results in production of hypertonic urine which is a highly concentrated urine. The loop of henle of juxtamedullary nephrons along with counter flowing blood vessels, called VASA RECTA help in water conservation to prevent water loss. They adapt to their environment to help balance water income and water use. The adaptations of desert dwellers may also be in form of differences in coloration, in water balance, in thermo regulation, or in the manner of burrowing. The nephrons in the desert mammal like camel are equipped with well developed Henle loop and number of juxtamedullary nephrons in kidneys is very high, about 35% while in man, it is about 15%.
Blood first flows along ascending limb of Henle, which is impermeable to water. Solutes can leave the filtrate and enter the blood along this stretch. When this blood flows along descending limb, water is reabsorbed from filtrate but not the solutes. Longer the Henle loop, more amount of solutes will be reabsorbed and hence more amount of water could be removed from filtrate.

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

ANS:

The glomerular filtration barrier functions as a highly organized, semipermeable membrane preventing the passage of the majority of proteins into the urine. The barrier is composed of the glomerular basement, the podocyte, and the slit diaphragm between the podocytes. As blood flows into the nephron, it enters a cluster of tiny blood vessels which is the Glomerulus. The thin walls of the glomerulus allow smaller molecules, wastes, and fluid mostly water to pass into the tubule. Larger molecules such as proteins and blood cells, stay in the blood vessel. The slit diaphragm is the major barrier in the passage of plasma proteins into the filtrate.

Proteinura is a disease where there is a high amount of protein in the urine, it occurs when there is a leakage of protein into the filtrate and can be due to damage of the slit diaphragm filtration barrier. So if there is some form of damage to the slit diaphragm filtration barrier, this would allow more protein to pass our plasma proteins to pass into the filtrate so in this case and in the case of proteinuria, there is more protein in the filtrate than can be reabsorbed because if there is some proteins which can pass through for example, albumin can be reabsorbed later on in the proximal convoluted tubule but in the case of proteinuria, there is more protein in the filtrate that can be reabsorbed which leads to a higher amount of protein in the urine.