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DEPARTMENT: ANATOMY

COURSE CODE: ANA 204

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

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

**Clinical importance of the glomerular filtration barrier.**

Damage to the glomerulus by disease can allow passage through the glomerular filtration barrier of red blood cells, white blood cells, platelets, and blood proteins such as albumin and globulin. Underlying causes for glomerular injury can be inflammatory, toxic or metabolic.These can be seen in the urine (urinalysis) on microscopic and chemical (dipstick) examination. Examples are diabetic kidney disease, glomerulonephritis, and IgA nephropathy.

Due to the connection between the glomerulus and the GFR, the GFR is of clinical significance when suspecting a kidney disease, or when following up a case with known kidney disease, or when risking a development of renal damage such as beginning medications with known nephrotoxicity.

**Renal function of desert dwellers and the anatomical basis of their unique adaptation**

The desert dweller is able to survive without access to any drinking water at all because it does not sweat and produces extremely concentrated urine.

They have a unique water metabolism in that they require very little water to function.Desert dwellers can obtain sufficient water from their diet and their kidneys have a highly efficient urine-concentrating capacity to ensure adequate hydration.The ratio of long-loop nephrons to short-loop nephrons in desert dwellers is high. Ninety-six percent of their nephrons are long loop which allows them to efficiently concentrate their urine. The digestive system is also very efficient at absorbing and retaining water, and water can be stored in fat cell layers. desert dwellers produce and excrete a small amount of concentrated urine and dry feces per day therefore they require less frequent cage changing than other laboratory rodents.

Many desert animals are able to use available water opportunistically by drinking large quantities in short time. This ability is proverbial in the camel that can take up to 30% of its body weight in a few minutes. Camels and other desert mammals have resistant blood cells that can withstand osmotic imbalance.