

NAME:- IBE CHIAMAKA ALMA

MATRIC NO:- 18/mhs01/171

DEPARTMENT:- ANATOMY

COURSE:- ANA 204

#### ASSIGNMENT

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.

#### ANSWER

1. Desert mammals do not readily find water, hence they must excrete very less amount of water. They are able to produce highly concentrated urine. Desert animals such as Gerbils have several characteristics that have allowed them to adapt to dry environments. Gerbils have an excellent ability for thermoregulation, and they have a high level of heat tolerance. They have a unique water metabolism in that they require very little water to function. Gerbils can obtain sufficient water from their diet and their kidneys have a highly efficient urine-concentrating capacity to ensure adequate hydration.

Kangaroo rats depend on metabolic water as there is little or no water available in their diet of seeds. Kangaroo rats appear to be ill-adapted for life in a desert; like other rodents they neither sweat nor pant. Conservation of water by the kidney is of crucial importance for the kangaroo rat, which does not drink and can obtain water only from catabolism.

#### **ADAPTATION**

Birds or mammals can conduct heat from their bodies to the environment by decreasing the insulating value of feathers or fur. On a hot day, a curve-billed thrasher sleeks its feathers which creates a thinner insulating layer. Coyotes lose their thick winter coats in late spring; their early summer coats are relatively thin. A bighorn sheep also sheds its winter coat in the spring-but it sheds it in stages. During the heat of June, the belly and shaded parts of the legs are shed first, providing an area from which to lose body heat; the back, however, remains covered with thick woolly fur that insulates and shades the bighorn sheep from the hot overhead sun.

Some mammals create their own microclimates. A white-throated wood rat (or pack rat) builds a den made of desert litter-cholla joints, prickly pear pads, sticks, and stones-within a

clump of prickly pear cactus. It looks a little like a trash heap and may be three feet high and eight feet across. At the bottom of this pile is a series of tunnels leading to a nest of soft plant fibers. The pack rat spends its day in the soft nest, somewhat insulated from an exterior air temperature that may be 110°F (43°C), with a ground surface temperature of 160°F(71°C).

## **2. CLINICAL IMPORTANCE**

### **A. Proteinuria**

Urinary protein excretion in the normal adult humans is less than 150 mg/day. Persistent protein excretion greater than this merits further evaluation. Proteinuria is strongly associated with progression of kidney disease. Furthermore, proteinuria has proven to be an independent risk factor for all-cause and cardiovascular mortality. Proteinuria can be glomerular resulting from an impairment of the glomerular filtration apparatus, tubular from diminished tubular resorption of low-molecular-weight proteins, and overflow—where the resorptive capacity is overwhelmed by large loads of filtered proteins

### **B. Diabetic kidney Disease**

Diabetic kidney disease is a type of kidney disease caused by diabetes. Diabetic kidney disease is also called DKD, chronic kidney disease, CKD, kidney disease of diabetes, or diabetic nephropathy. When your kidneys are damaged, they can't filter blood like they should, which can cause wastes to build up in your body. Kidney damage can also cause other health problems. Prevention for diabetic kidney disease - Stop smoking, Work with a dietitian to develop a diabetes meal plan and limit salt and sodium, Make physical activity part of your routine, Get enough sleep.

### **C. Glomerulonephritis**

Glomerulonephritis is an inflammation of the glomeruli, which are structures in your kidneys that are made up of tiny blood vessels. These knots of vessels help filter your blood and remove excess fluids. If your glomeruli are damaged, your kidneys will stop working properly, and you can go into kidney failure. They can also be called nephritis. Glomerulonephritis can be caused depending on the type of glomerulonephritis disease you have, whether acute or chronic glomerulonephritis. Symptoms - puffiness in your face, urinating less often, blood in your urine which turns your urine a dark rust color, high blood pressure, swelling in your ankles and face, abdominal pain and frequent nosebleeds. Treatment – controlling blood pressure, using the method plasmapheresis to remove the fluid part of your blood, reduction in the amount of protein, salt and

potassium in foods and also use of corticosteroid if your immune system is attacking you.

D. IgA Nephropathy

IgA nephropathy is also known as Berger's disease. It is a kidney disease that occurs when an antibody called immunoglobulin A (IgA) builds up in your kidneys. This results in local inflammation that, over time, can hamper your kidneys' ability to filter waste from your blood. Symptoms - Cola- or tea-colored urine, Foamy urine from protein leaking into your urine (proteinuria), Pain in the one or both sides of your back below your ribs, Swelling (edema) in your hands and feet, High blood pressure.