

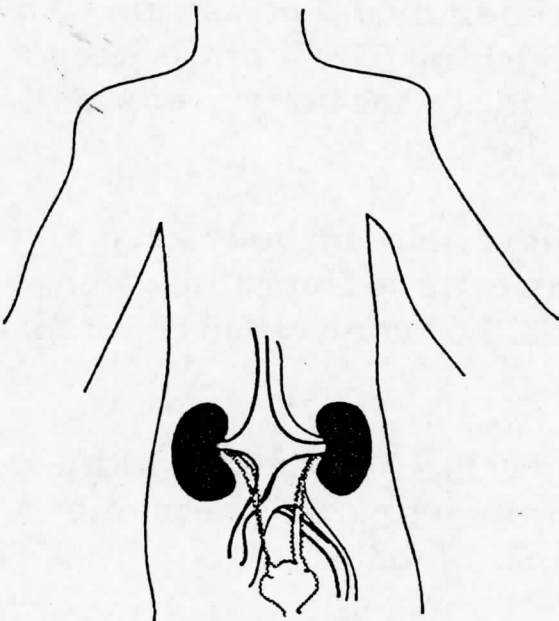
THE KIDNEYS

The kidneys are two organs that are located in the lower back, one on each side of the spine. Their main function is to get rid of extra water and waste products. The waste products are from normal body functions. Everyone has waste products which result from the digestion of food. The kidneys filter these products and get rid of harmful waste through the urine. The useful products are left in the body.

The kidneys help regulate the body's water balance. They also release hormones which help make red blood cells and control blood pressure. Another important balance that is affected by the kidneys is calcium, phosphate, and vitamin D, which work together to play a key role in bone formation.

Functions of the Kidneys:

1. Remove extra water.
2. Remove waste products.
3. Restore needed chemicals.
4. Regulate blood pressure.
5. Help red blood cell production.
6. Help with calcium and vitamin balance.



Functions of the Kidneys (continued)

1. Remove extra water - The kidneys filter the extra water the body does not need in the form of urine. This water comes from the liquids you drink and the foods you eat. As the kidneys form urine, it is sent to the bladder through tubes called the ureters. The urethra is the tube that drains the urine from the bladder to the outside of the body.
2. Remove waste products - Urea and creatinine are examples of waste products. These two waste products are found in everyone. Urea and creatinine form as the body breaks down food into energy and performs its routine bodily functions. Waste products are harmful if not removed by the kidneys or dialysis.
3. Restore needed chemicals - The kidneys work to keep the chemicals (electrolytes and minerals) in balance in the body. Two examples of electrolytes are sodium and potassium. An example of a mineral would be calcium. The kidneys keep a proper balance by saving the chemicals the body needs and passing the extra chemicals into the urine.
4. Regulate blood pressure - The kidneys help the body keep a normal blood pressure by passing extra sodium and water. The kidneys also produce a special hormone called renin that helps control blood pressure.
5. Help in the production of red blood cells - The healthy kidney produces a hormone called erythropoietin. This hormone helps the bone marrow produce red blood cells.
6. Help with calcium and vitamin balance - The kidneys balance calcium, phosphorous, and vitamin D. These three chemicals play a key role in bone formation.

Kidney Failure

As kidney failure begins, the kidneys are not able to clean the blood of waste products. Waste products and excess water collect in the body. A build up of waste products in the blood is called uremia. Symptoms of kidney failure may include:

- extreme tiredness
- nausea and vomiting
- itching skin
- difficulty sleeping
- puffiness and swelling of the feet, legs, hands, and face
- shortness of breath
- poor appetite
- a urine odor
- high blood pressure.

Chronic renal failure means that the loss of kidney function is permanent. Kidney function may stop quickly or slowly fail over a period of years. End Stage Renal Disease or ESRD occurs when the kidneys have reached the point where they can no longer work well enough to maintain the balances needed for life. This is usually when dialysis must be started.

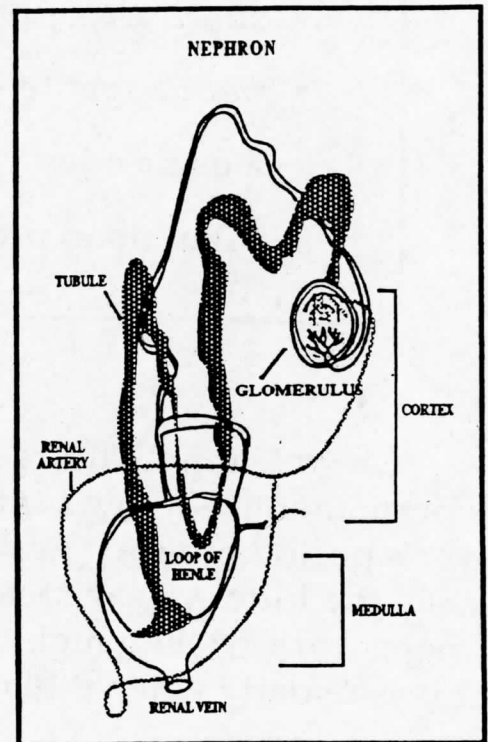
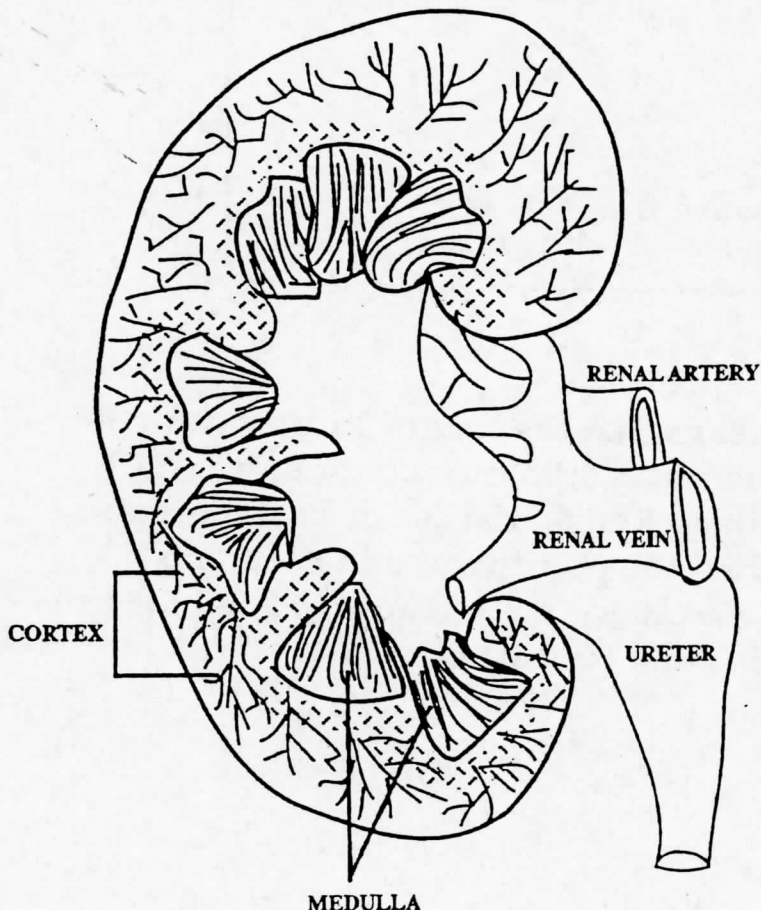
Common Causes of Kidney Failure

There are many causes of kidney failure and a few of the most common reasons are listed here:

Diabetes—Diabetes causes blood vessel changes in the kidneys (and the whole body). This process occurs over many years. The kidney failure is caused by a thickening and hardening of renal arteries, glomeruli, and tubules.

Glomerulonephritis—This is the single most common cause of chronic kidney failure. In this disease, there is inflammation and destruction of the glomerulus. The glomerulus is the part of the kidney that filters the blood of waste products. When enough glomeruli are damaged, dialysis must be started.

CROSS SECTION OF THE KIDNEY



Lupus Erythematosus—Lupus is a chronic inflammatory disease of the body's connective tissue, especially capillaries and small blood vessels. After this chronic inflammation the blood vessels are scarred. The scarring leads to kidney failure.

Hypertension—This is high blood pressure. The vessels become thick and narrow from constant high pressure to the blood vessels of the kidneys. Eventually, the kidneys fail because the flow of blood to the kidneys is decreased.

Obstruction—This usually occurs with kidney stones. If urine is not able to drain well and backs up into the kidneys, there will be infections which will damage the kidneys.

Polycystic Kidney Disease—In this condition, the kidneys are full of cysts. A cyst is a fluid filled sac. As these cysts slowly enlarge, they press against the working parts of the kidney, causing permanent damage. This is an inherited condition.

Pyelonephritis—This is an infection of the kidneys. Repeated infections of the kidneys may damage the nephrons, causing kidney failure. The nephron is the part of the kidney that contains the glomerulus and tubules.

Structural Disorders—This is from a defect in the urinary tract. This condition is usually present at birth. If the urine is not able to drain well and backs up into the kidneys, infections will damage the kidneys.