



AL-Mustaqbal University College

**Medical laboratory Techniques
Department**

Clinical Biochemistry

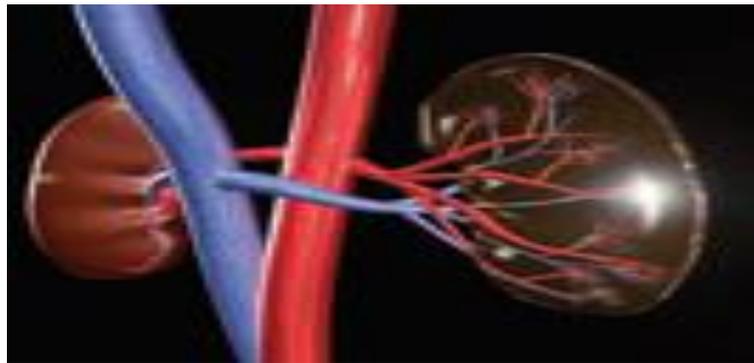
**Lecture (4)
(kidney functions)**



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What are the kidneys and how do they help to maintain good health?

kidneys are two bean-shaped organs, each about the size of fist. They are located near the middle of your back, just below the rib cage. kidneys are a filtering system. Each kidney is made up of about one million tiny units called nephrons. The kidneys filter about 200 quarts of blood each day. They remove about two quarts of waste products and excess fluid in the form of urine. The urine flows through two tubes, called ureters, to the bladder. The urine is stored there until you go to the bathroom. The wastes come from the breakdown of food you eat and normal muscle activity.



kidneys perform these important jobs:-

1. To removing wastes and fluid from body.
2. They regulate body water and other chemicals in the blood such as sodium, potassium, phosphorus and calcium.
3. They remove drugs and toxins introduced into body.
4. They release hormones into the blood to help body. These hormones:
 - a) regulate blood pressure
 - b) make red blood cells
 - c) promote strong bones.

What is chronic kidney disease

Chronic kidney disease means the kidneys have been damaged by diabetes, high blood pressure and other disorders. These problems may happen slowly over a long period of time. Damaged kidneys are not able to keep you healthy . If kidney disease gets worse, it may lead to kidney failure, which requires dialysis or a kidney transplant to maintain life.

What causes chronic kidney disease

The two main causes of chronic kidney disease are :-

1-Diabetes happens when blood sugar is too high, causing damage to many organs and muscles in the body, including the kidneys and heart, as well as blood vessels, nerves and eyes.

2-High blood pressure, or hypertension, occurs when the pressure of the blood against the walls of the blood vessels increases.

Other conditions that affect the kidneys are:

- ❖ Glomerulonephritis, a group of diseases that cause inflammation and damage to the kidney's filtering units. These disorders are the third most common type of kidney disease.
- ❖ Inherited diseases, such as polycystic kidney disease. These cysts damage the tissue around them.
- ❖ Malformations that occur as a baby develops in its mother's womb. For example, a narrowing may occur that prevents normal outflow of urine.

- ❖ Lupus and other diseases that affect the body's immune system.
- ❖ Obstructions caused by problems like kidney stones and tumors.
- ❖ Repeated urinary infections.

What are the symptoms of chronic kidney disease

- ✓ Feel more tired and have less energy.
- ✓ Have trouble concentrating.
- ✓ Have a poor appetite.
- ✓ Have trouble sleeping.
- ✓ Have cramping at night.
- ✓ Have swollen feet and ankles.
- ✓ Have puffiness around of the eyes, especially in the morning
- ✓ Have dry skin.
- ✓ Need to urinate more often, especially at night.

Are any other tests done to help detect chronic kidney disease?

- Urinalysis** can detect many abnormalities in the urine, such as blood, protein, pus, sugar and bacteria
- Microalbuminuria** is a sensitive test to detect a small amount of protein in the urine
- Urine creatinine** estimates the concentration of your urine and helps to give an accurate protein result.

d) **Protein-to-creatinine ratio** estimates the amount of protein you excrete in your urine in a day. This can replace the 24-hour urine sample.

What is your stage of kidney disease?

Stages of Kidney Disease		
Stage	Description	Glomerular Filtration Rate (GFR)*
1	Kidney damage (e.g., protein in the urine) with normal GFR	90 or above
2	Kidney damage with mild decrease in GFR	60 to 89
3	Moderate decrease in GFR	30 to 59
4	Severe reduction in GFR	15 to 29
5	Kidney failure	Less than 15

What is the GFR?

- GFR number tells how much kidney function you have. As chronic kidney disease progresses, GFR number decreases.
- The GFR is equal to the sum of the filtration rates in all of the functioning nephrons.
- GFR is not routinely measured in clinical settings.
- An estimation of GFR (eGFR), using serum creatinine level, gives a rough measure of the number of functioning nephrons.

How Do The Kidneys Get Extra Help in Stage 5?

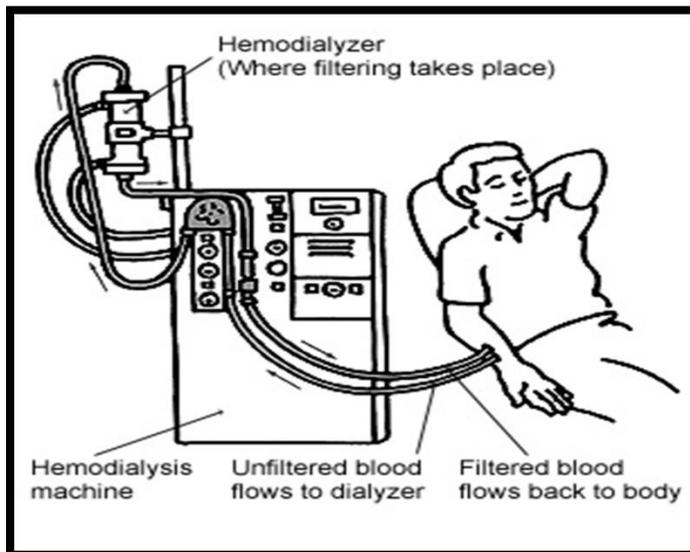
- Two ways to help the kidneys
 1. A kidney machine: Dialysis
 2. A new kidney: Transplant

What Kinds of Dialysis Are There?

There are 2 kinds of dialysis for chronic kidney failure:

- Hemodialysis – blood leaves your body, gets filtered by a machine and returns
- Peritoneal dialysis – fluid goes in your belly and leaves with toxins, acid, etc

Hemodialysis



Peritoneal Dialysis



A Transplant

- A transplant is the most common way to help people sick with Stage 5 Kidney Disease.
- A transplant is where you get a new kidney from someone else

Stages in Progression of Chronic Kidney Disease and Therapeutic Strategies?

