

Introduction to Chronic Kidney Disease

Hello everyone, welcome to our series where we explore Chronic Kidney Disease or CKD and the high prevalence of cardiovascular diseases associated with it. Well, Let's start off this series with some basic knowledge about CKD, shall we?!

Chronic Kidney Disease is defined as any condition with prolonged kidney damage or estimated glomerular filtration rate (GFR) less than 60 ml/min per 1.73 square meters that lasts for 3 months or more.

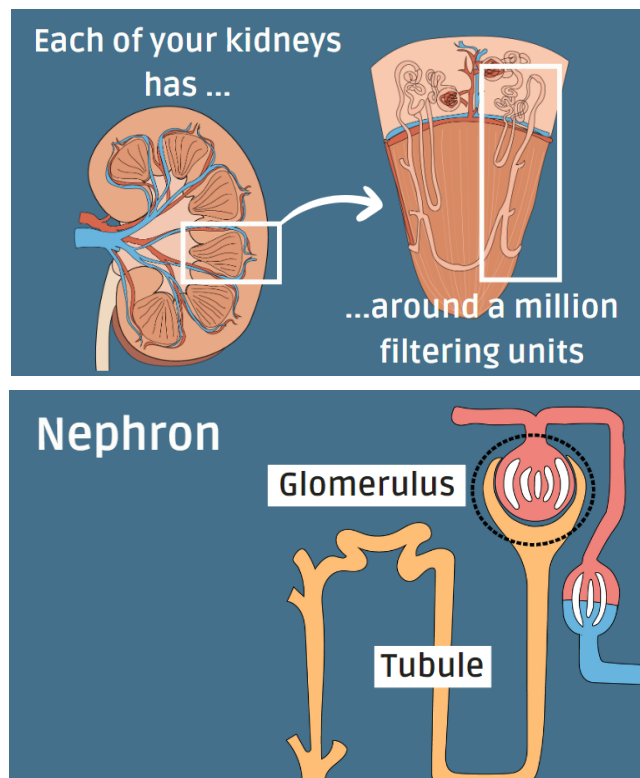
First, let's try to identify the roles of the kidneys!

Your kidneys remove wastes and extra fluid from your body. By doing so, they help maintain the balance of water, salts, and minerals in your blood.

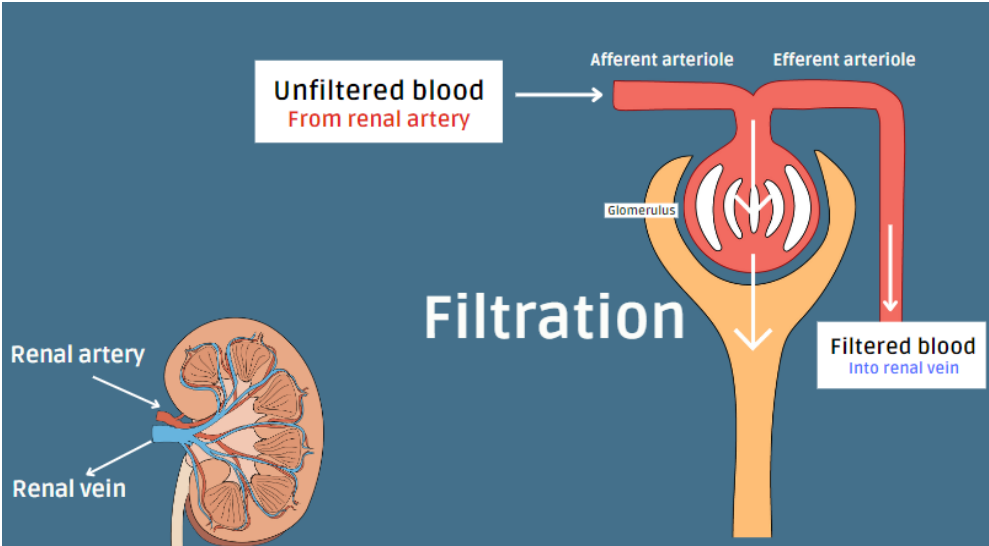
In addition, your kidneys make hormones. Three main hormones are:

- Renin* - helps control your blood pressure
- Erythropoietin* - stimulates the production of red blood cells
- Calcitriol* - keeps your bones strong and healthy.

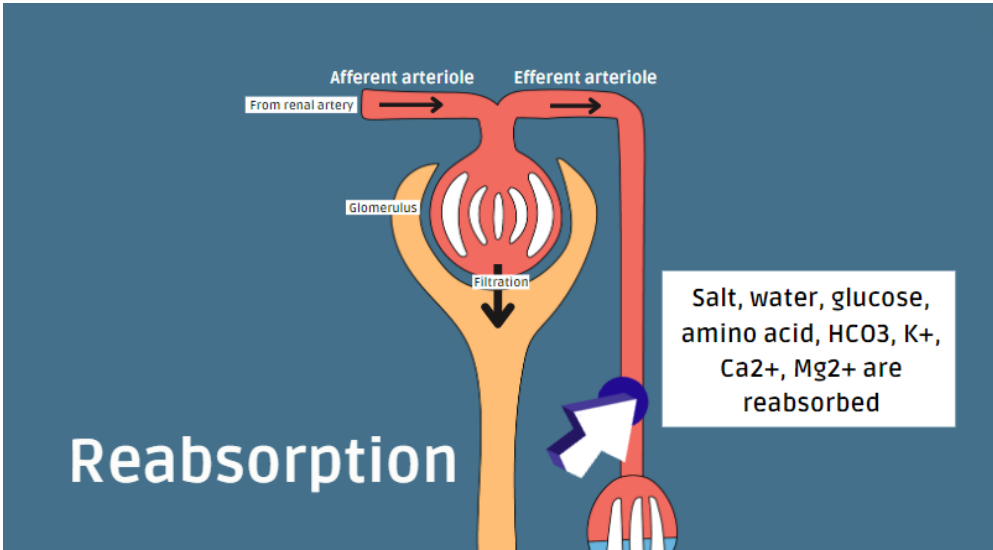
So each of your kidneys is made up of about a million filtering units. These units are called nephrons. Each nephron consists of a tubule and a collection of tiny vessels called glomeruli.



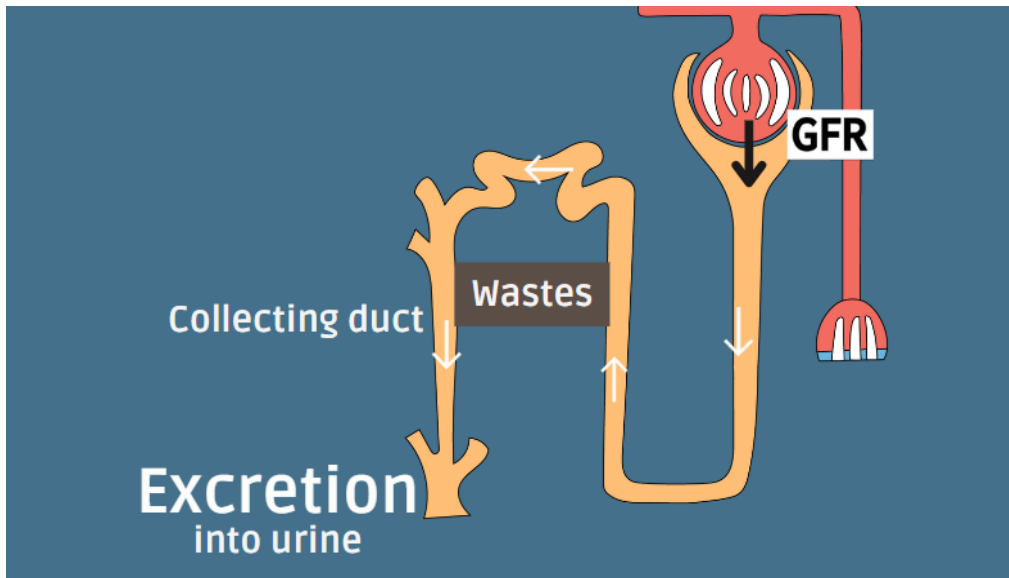
Blood flows from the renal artery into the glomerulus to get filtered.



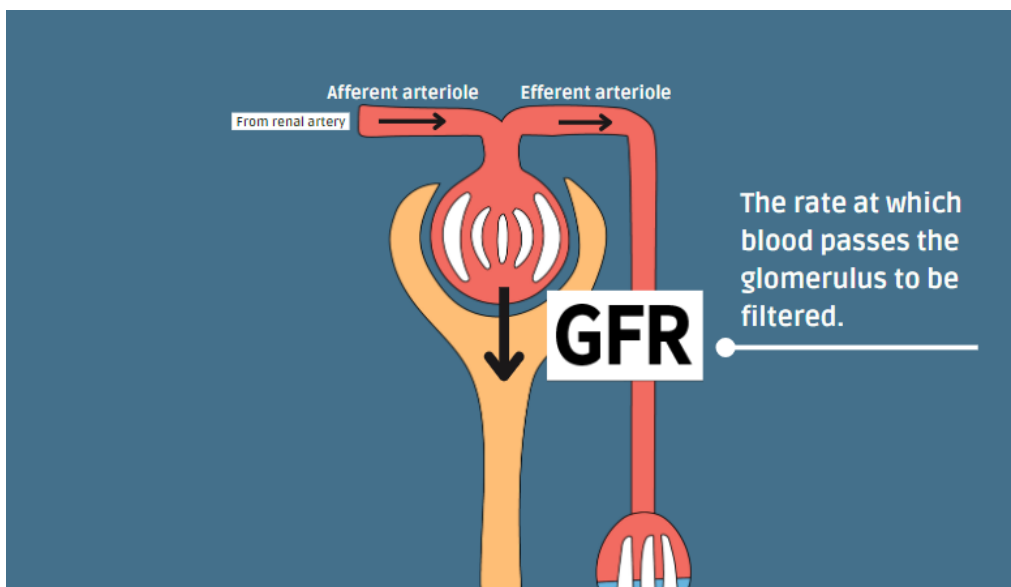
Essential substances, such as glucose, amino acids, salts, and water will be reabsorbed from the tubule back into the blood...



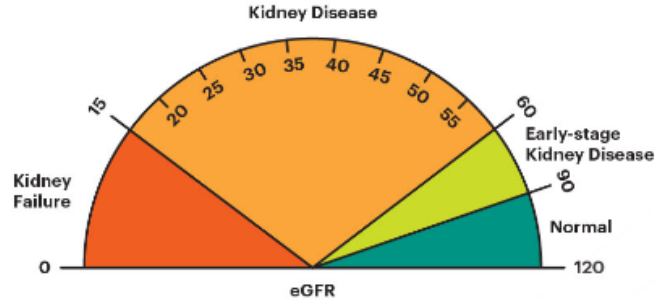
... While wastes will continue to move down to the collecting duct and get eliminated in the urine.



The rate at which renal blood passes the glomerulus is called glomerular filtration rate or GFR. We will explain GFR calculation in our next video.



The normal GFR range in a healthy person is between 100-120 ml/min per 1.73 square meters.



Source: *Estimated glomerular filtration rate (egfr)*. National Kidney Foundation. (2023, June 26). <https://www.kidney.org/atoz/content/gfr>

The GFR is important because it is what is used to determine CKD stages. There are 5 stages of CKD.

The 5 stages of CKD range from mild to severe kidney damage as described in this table. Feel free to pause to learn more about each stage and we will have another video to explain these stages in detail.

Stage of CKD	eGFR Result	What it means
Stage 1	90 or higher	- Mild kidney damage - Kidneys work as well as normal
Stage 2	60-89	- Mild kidney damage - Kidneys still work well
Stage 3a	45-59	- Mild to moderate kidney damage - Kidneys don't work as well as they should
Stage 3b	30-44	- Moderate to severe damage - Kidneys don't work as well as they should
Stage 4	15-29	- Severe kidney damage - Kidneys are close to not working at all
Stage 5	Less than 15	- Most severe kidney damage - Kidney are very close to not working or have stopped working (failed)

Source: *Stages of kidney disease*. American Kidney Fund. (2023, January 24). <https://www.kidneyfund.org/all-about-kidneys/stages-kidney-disease>

So you might be wondering, what causes CKD?

There are several factors but diabetes (type 1 and 2) and hypertension are the most common causes of chronic kidney disease.

- Diabetes* (type 1 and 2)
- Hypertension*
- Glomerulonephritis*
- Interstitial nephritis inflammation*
- Polycystic kidney disease* or other inherited kidney diseases
- Prolonged obstruction of the urinary tract from conditions such as enlarged prostate, kidney stones and some cancers
- Vesicoureteral reflux*
- Pyelonephritis*

So what are the consequences of CKD?

In a patient with CKD, fluid, electrolytes and wastes build up in the body . Because of this, it causes other health problems or complications. Some consequences of CKD are:

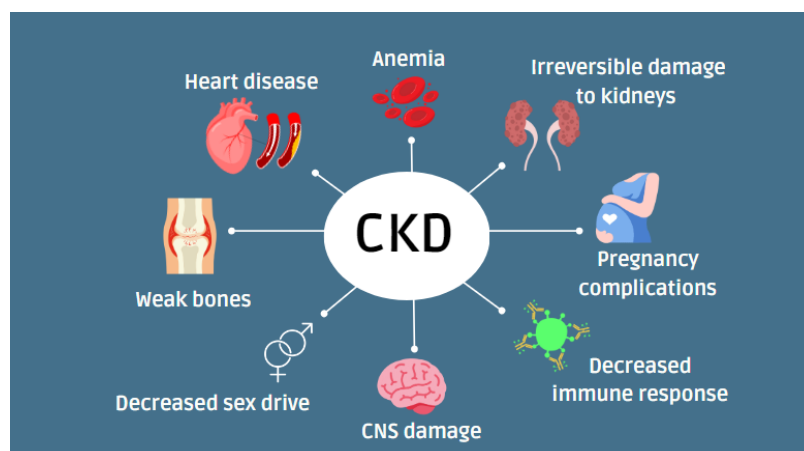
- Fluid retention, which could lead to swelling in your arms and legs, high blood pressure, or fluid in your lungs (pulmonary edema)

CKD can also lead to:

- A sudden rise in potassium levels in your blood or hyperkalemia, which could impair the heart's function and can be life-threatening

Other consequences include:

- Anemia
- Heart disease
- Weak bones and an increased risk of bone fractures
- Decreased sex drive, erectile dysfunction or reduced fertility
- Damage to your central nervous system, which can cause difficulty concentrating, personality changes or seizures
- Decreased immune response, which makes you more vulnerable to infection
- Pregnancy complications that carry risks for the mother and the developing fetus
- Irreversible damage to your kidneys such as end-stage kidney disease, which will eventually require either dialysis or a kidney transplant for survival



Well, time is up. That is it for today's video. Be sure to follow our series! Thank you for watching and see you soon.

The end.

*Notes: * Please check the vocabulary section (the next page) for word definition.*

Vocabulary:

- **Renin:** an enzyme secreted by and stored in the kidneys which promotes the production of the protein angiotensin that helps control blood pressure.
- **Erythropoietin:** a hormone secreted by the kidneys that increases the rate of production of red blood cells in response to falling levels of oxygen in the tissues.
- **Calcitriol:** a hormone normally made in the kidney, also known as 1,25-dihydroxycholecalciferol. It plays a role in maintaining healthy bones.
- **Diabetes:** a chronic disease that occurs either when the pancreas does not produce enough insulin, a hormone that regulates blood glucose level, or when the body cannot effectively use the insulin it produces. With diabetes, blood glucose level is affected.
- **Hypertension:** a condition in which there is a persistent increase in the amount of force that the blood flow pushes against the walls of the blood vessels as it moves through the body.
- **Glomerulonephritis:** an inflammation and damage to the filtering part of the kidneys (glomerulus).
- **Interstitial nephritis inflammation:** a kidney disorder in which the spaces between the kidney tubules become swollen.
- **Polycystic kidney disease:** a genetic disorder that causes many fluid-filled cysts to grow in your kidneys.
- **Vesicoureteral reflux:** a condition in which urine flows backward from the bladder to the ureters and sometimes to the kidneys.
- **Pyelonephritis:** a bacterial infection causing inflammation of the kidneys.

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