

# كلية المستقبل الجامعة

قسم هندسة تقنيات  
الأجهزة الطبية



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Estimation of serum creatinine	عنوان المحاضرة

# Renal function tests

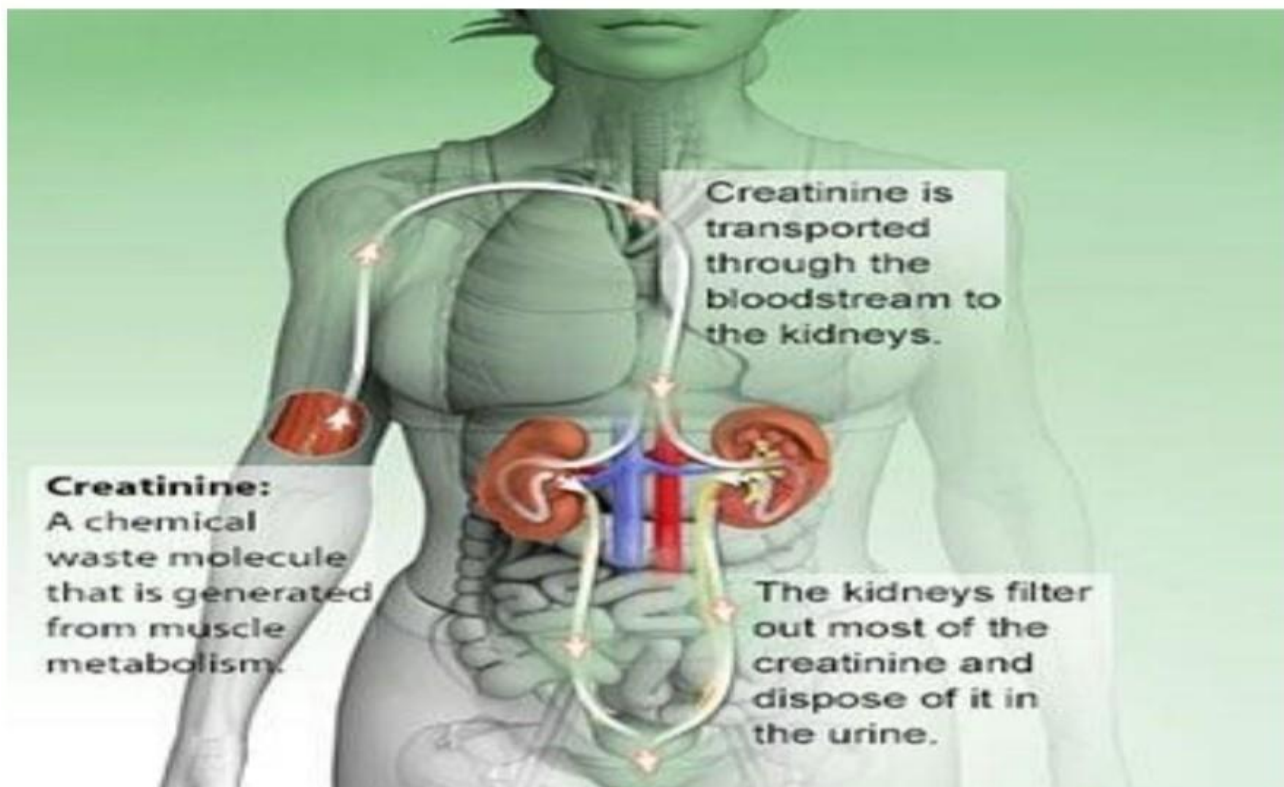
## Estimation of serum Creatinine:

### Objective:

- ❖ What is a creatinine test?
- ❖ Why is a creatinine blood test done?
- ❖ What is the risk factors?
- ❖ How do I prepare for a creatinine blood test?
- ❖ What do the results mean?
- ❖ What are the condition that affects kidney function?
- ❖ Are there any instances when creatinine alone can be used to determine kidney function?
- ❖ Procedure.

### What is a creatinine test?

This test measures creatinine levels in blood and/or urine. Creatinine is a waste product made by your muscles as part of regular, everyday activity. Normally, your kidneys filter creatinine from your blood and send it out of the body in your urine. If there is a problem with your kidneys, creatinine can build up in the blood and less will be released in urine. If blood and/or urine creatinine levels are not normal, it can be a sign of kidney disease.



## Why is a creatinine blood test done?

You may need this test if you have symptoms of kidney disease. These include:

- fatigue and trouble sleeping
- a loss of appetite
- swelling in the face, wrists, ankles, or abdomen
- lower back pain near the kidneys
- changes in urine output (Urine that is foamy or bloody)
- Frequent and painful urination
- nausea
- vomiting

## What is the risk factors?

You may also need this test if you have certain risk factors for kidney disease. You may be at higher risk for kidney disease if you have:

- Type 1 or type 2 diabetes
- High blood pressure
- A family history of kidney disease

## How do I prepare for a creatinine blood test?

A creatinine blood test doesn't require much preparation. Fasting isn't necessary. You can and should eat and drink the same as you do normally to get an accurate result.

## What do the results mean?

Creatinine is measured in milligrams per deciliter of blood (mg/dL). People who are more muscular tend to have higher creatinine levels. Results may also vary depending on age and gender.

In general, however, [normal creatinine levels](#) range from 0.9 to 1.3 mg/dL in Men and 0.6 to 1.1 mg/dL in Women who are 18 to 60 years old. Normal levels are roughly the same for people over 60.

High serum creatinine levels in the blood indicate that the kidneys aren't functioning properly.

## What are the condition that affects kidney function?

In general, high levels of creatinine in blood and low levels in urine indicate kidney disease or another condition that affects kidney function. These include:

- a [blocked urinary tract](#)
- dehydration
- kidney problems, such as kidney damage or [infection](#)
- reduced blood flow to the kidneys due to [shock](#), congestive heart failure, or [complications of diabetes](#)
- [Heart failure](#)

But abnormal results don't always mean kidney disease. The following conditions can temporarily raise creatinine levels:

- [Pregnancy](#)
- Intense exercise
- A diet high in red meat (a high-protein)
- Certain medicines. Some medicines have side effects that raise creatinine levels.

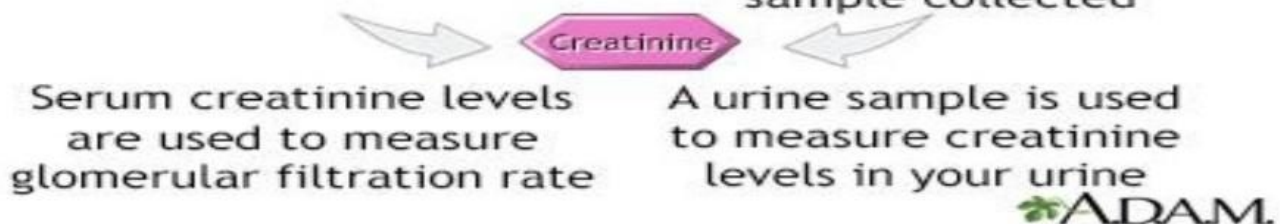
## Are there any instances when creatinine alone can be used to determine kidney function?



Blood sample taken



24-hour urine sample collected



There is a difference between looking at creatinine in your bloodstream (called “serum creatinine”) and looking at creatinine in your urine (called “creatinine clearance”). These are two different lab tests. Serum creatinine is part of a routine lab report; creatinine clearance is not.

Creatinine clearance requires a timed urine sample. All the urine you have passed within a specific time period – usually 24-hours – is saved (collected) in a container and tested. The result shows how much creatinine has passed through your kidneys into your urine. It helps show how well your kidneys are removing the waste products from your blood.

## Procedure:

### REFERENCE VALUES

Serum - plasma	Men	0.9 - 1.3 mg/dl (80 -115 µmol/l)
	Women	0.6 - 1.1 mg/dl (53 - 97 µmol/l)
Urine		0.80 -1.80 g/24h

## Wave length 550 nm

	Blank	STD	Sample
Reagent R1	270 µL	270 µL	270 µL
D.W	8 µL	--	--
STD	--	8 µL	--
Sample	--	--	8 µL
<b>Mix ,incubate at 37°C for 5 minutes, and then add:</b>			
Reagent R2	90 µL	90 µL	90 µL
<b>Mix and measure the Absorbance of sample 1 and STD 1 against the Blank. After 5 minutes, reading Absorbance of sample 2 and STD2 against the Blank</b>			

## CALCULATION:

$$\text{Creatinine [mg/dl]} = \frac{(A .\text{sample 2} - A.\text{sample 1})}{(A.\text{STD 2} - A.\text{STD 1})} \times \text{Conc. STD}$$

$$\text{Conc. STD} = 2 \text{ mg/dl}$$