

## Lecture (3)

# Renal Function: Estimation of Blood Creatinine

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## Creatinine

*Creatinine* is a chemical waste molecule that is generated from muscle metabolism. Creatinine is produced from creatine (a molecule of major importance for energy production in muscles). Approximately 2% of the body's creatine is converted to creatinine every day. Creatinine is transported through the bloodstream to the kidneys. The kidneys filter out most of the creatinine and dispose of it in the urine.

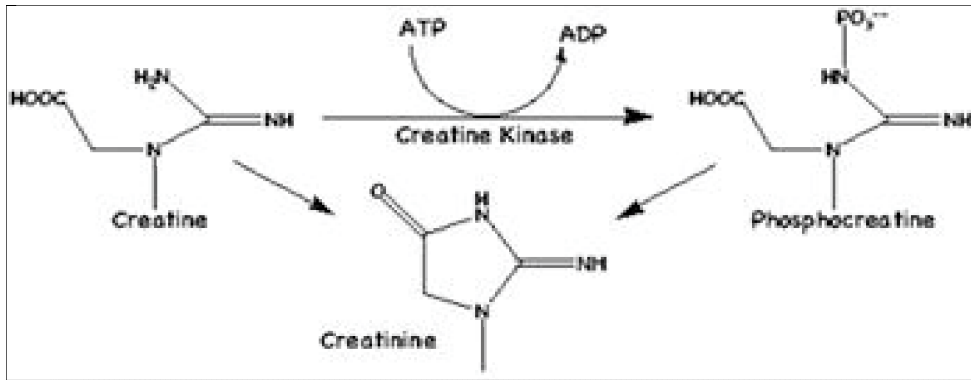
### ● Aim of check blood creatinine levels:

The kidneys maintain the blood creatinine in a normal range. Creatinine has been found to be a fairly reliable indicator of kidney function. Elevated creatinine level signifies impaired kidney function or kidney disease.

As the kidneys become impaired for any reason, the creatinine level in the blood will rise due to poor clearance of creatinine by the kidneys. Abnormally high levels of creatinine thus warn of possible malfunction or failure of the kidneys. It is for this reason that standard blood tests routinely check the amount of creatinine in the blood.

### ● Creatinine Test Types:

- 1- **serum Creatinine estimation:** is more specific and sensitive indicator of kidney function.
- 2- **Urine Creatinine estimation:** Urea is also a metabolic byproduct which can build up if kidney function is impaired.
- 3- **Blood urea nitrogen (BUN) level:** is another indicator of kidney function. The BUN-to-creatinine ratio generally provides more precise information about kidney function and its possible underlying cause compared with creatinine level alone.



*Mechanism of Creatinine formation*

● **Principle of Method:**

Creatinine react with picric acid to produce a colored compound, creatinine alkaline picrate. The change in absorbance is directional proportional to the Creatinine concentration.

● **Normal Values:**

- Serum "men" : (0.7 – 1.4) mg / dl.
- Serum "women" : (0.6 – 1.2) mg / dl.
- Urine : (0.80 – 1.80) gm / 24 hour.

● **Procedure:**

➤ Mix (1) volume of reagent 1 (**R<sub>1</sub>**) with (1) volume of reagent 2 (**R<sub>2</sub>**).

➤

	Blank	Standard	Sample
W. Reagent	1000 µl	1000 µl	1000 µl
Standard		100 µl	
Sample			100 µl

➤ Mix and read the absorbance (**A<sub>1</sub>**), then exactly after 60 second reading take the second reading (**A<sub>2</sub>**) at the wave length ( n.m.).

➤ Calculation: **Creatinine Concentration** =  $\frac{(A_2 - A_1) \text{ Sample}}{(A_2 - A_1) \text{ Standard}} \times 2$