

**Tikrit University**

**College of Nursing**

**Basic Nursing Sciences**



**Second Year - 2023-2024**

**Bio Chemistry**

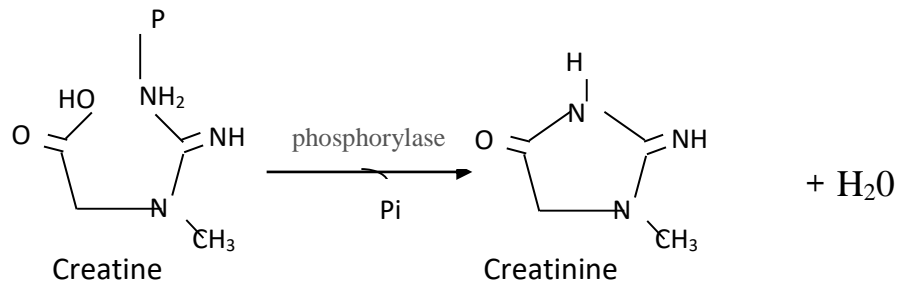
**Creatinine**

**By: assistant lecturer**

**Haitham Mejbel Hasan**

## Creatinine

Creatinine is the by-product of creatine phosphate in muscle, and it is produced at a constant rate by the body. in the following equation



### Estimation of Creatinine in serum

Creatinine is the waste product of creatine, which the muscles use to make energy. Typically, creatinine travels in the blood to the kidneys where it leaves the body in the urine. High levels in the blood might indicate that the kidneys are not working correctly. The creatinine blood test helps doctors diagnose kidney disease. A poorly functioning kidney cannot filter creatinine as well as it usually does, which causes levels in the blood to rise.

\* The result of this blood test is useful, as it is an important marker of how well the kidneys are working.

The production of creatinine depends on muscle mass and the amount of creatinine increases in muscle size and also depends on the extent of glomerular filtration in the kidney.

## **Causes For High Levels**

Some of the causes of high creatinine levels are:

### **1. Chronic kidney disease**

When kidneys are damaged, they have trouble removing creatinine from the blood and levels rise. Doctors use the result of the creatinine blood test to calculate GFR, which is a more specific measure that can indicate chronic kidney disease.

### **2. Kidney obstruction**

A blockage in the flow of urine, such as an enlarged prostate or kidney stone, could cause kidney obstruction which might raise the level of creatinine. The medical term for this condition is hydronephrosis.

### **3. Dehydration**

Severe dehydration is a risk factor for kidney injury, which will affect creatinine levels.

### **4. Increased consumption of protein**

What a person eats can have a significant impact on creatinine levels. For example, proteins and cooked meat contain creatinine, so eating more than the recommended amount of meat or other proteins for your activity levels, or adding extra protein to the diet through supplements can cause high creatinine levels.

### **5. Intense exercise**

Creatine is present in the muscles and helps them produce energy. Rigorous exercise can increase creatinine levels by increasing muscle breakdown.

### **6. Certain medications**

Antibiotics, such as trimethoprim, and H<sub>2</sub> blockers, such as cimetidine, can cause a temporary increase in measured serum creatinine levels.

## **Causes For Low Levels**

### **1. Low muscle mass**

Because the breakdown of muscle produces creatinine, low muscle mass can result in low levels of creatinine. Older people are more at risk as muscle mass declines with age. Malnutrition can also cause low muscle mass and low creatinine levels.

### **2. Pregnancy**

Pregnancy causes an increase in blood flow to the kidney leading to increased urine production and faster elimination of creatinine, leading to lower levels.

### **3. Extreme weight loss**

Weight loss can result in the reduction of muscle mass, leading to low levels of creatinine.

Normal level:

Men: The proportion of natural creatine have higher than in women, because they have a larger muscle mass and stronger, so the proportion of creatinine have a natural range of 0.6-1.2 mg/dl, in adult males.

For women: In adult women it ranges from 0.5-1.1 mg/dl Vegetarians: They have a low creatinine ratio compared to people who eat meat.

Men with muscle: the ratio is generally higher.

Older people: The percentage is generally lower. Infants: Their normal ratio starts at 0.2 mg/dl and starts to increase as their muscles develop.

People with one kidney: the normal ratio is 1.8 or 1.9 mg/dl

## Creatinine level in serum

### PRINCIPLE

Colorimetric reaction (Jaffe reaction) of creatinine with alkaline picrate measured kinetically at 490 nm (490-510), without any pre-treatment step. This reaction has been improved (specificity, speed and adaptability) by the development of an initial-rate method.

### PROCEDURE

#### Manual method

Let stand reagent and specimens at room temperature.

Working Reagent (R1+R2)	1000 µL
Specimen (Note 3)	100 µL
Mix well. Perform kinetic tests at 37°C (verify constant temperature). After 30 seconds read absorbance A1 and exactly 120 sec after read absorbance A2 at 490 nm (490-510) against distilled water. Test tube by tube with water, calibrator, controls and then assays as specimen	

- 1- Performances with manual procedure should be validated by user.
- 2- Kenza applications and other applications proposal are available on request.
- 3- Specimen: serum, plasma, urines diluted (1-19) in demineralised water and water (zero poi

### CALCULATION

Serum or plasma

$$\text{Result} = \frac{(A2 - A1) \text{ Assay} - (A2-A1) \text{ Blank}}{(A2 - A1) \text{ Standard} - (A2-A1) \text{ Blank}} \times \text{Standard Concentration}$$