

## Lecture (2)

# Renal Function: Estimation of Blood Urea

Submitted by:

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## Urea Clearance

This test have other names (Urine urea nitrogen clearance, 24-hour urine). This test measures the amount of *urea nitrogen* in your urine.

Urea nitrogen is a waste product made when your liver breaks down protein. It's carried in your blood, filtered out by your kidneys, and removed from your body in your urine. If your liver isn't healthy, it may not break down proteins the way it should, and if your kidneys aren't healthy, they may not properly filter urea. Either of these problems can lead to changes in the amount of urea nitrogen in your body.

If you are dehydrated – you don't have enough fluid in your body – you may have extra urea in your blood because you aren't passing much urine.

### ⚡ **The purpose of this test:**

- You may have this test to find out how healthy your kidneys are or wants to see whether your medical treatment is working.
- You may also have this test to look at your protein balance.

It may also order blood tests, usually within (48) hours of this test. These tests may include:

- Blood Creatinine.
- Blood protein-to-creatinine.
- Blood albumin-to-creatinine ratio.

### ⚡ **Test results mean:**

Many things may affect your lab test results. These include the method each lab uses to do the test. Even if your test results are different from the normal value, you may not have a problem. To learn what the results mean for you, talk with your health care provider.

- Results are given in grams per 24 hours. A normal range is 12 to 20 grams/24 hours.
- Lower levels may mean that you don't have enough protein in your diet or that you have kidney problems.
- Higher levels may mean that you are getting too much protein in your diet or your body is breaking down too much protein.

### ⚡ **How is this test done:**

This test requires a 24-hour urine sample. For this sample, you must collect all the urine you make for 24 hours. Empty your bladder completely first thing in the morning without collecting it and note the time. Then collect your urine every time you go to the bathroom for the next 24 hours.

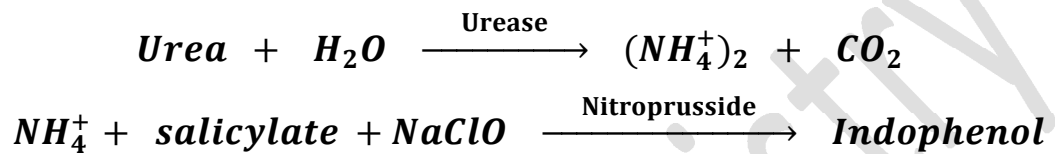
### **Test Requirements:**

You don't need to prepare for this test. But be sure your doctor knows about all medicines, herbs, vitamins, and supplements you are taking. This includes medicines that don't need a prescription and any illicit drugs you may use.

### *Estimation of blood urea*

#### ⌘ Principle of the method:

Urea in the sample is hydrolyzed enzymatically into ammonia (NH<sub>4</sub><sup>+</sup>) and carbon dioxide (CO<sub>2</sub>). Ammonia ions formed reacts with salicylate and hypochlorite (NaClO), in presence of the catalyst nitroprusside, to form a green indophenols:



The intensity of the color formed is proportional to the urea concentration in the sample.

#### ⌘ Normal value:

- Serum: 15 – 45 mg / dl.
- Urine: 20 – 35 g / 24 hrs.
- Urea nitrogen: 12 - 20 g / 24 hrs.

These reference values are for orientation purpose, each laboratory should establish its own reference range.

#### ⌘ Reagents:

Reagent	Composition
<b>R<sub>1</sub></b> <b>(Buffer)</b>	Phosphate (PH=6.7) 50 m mol/L
	EDTA 2 m mol/L
	Sodium salicylate 400 m mol/L
	Sodium nitroprusside 10 m mol/L
<b>R<sub>2</sub></b> <b>(NaClO)</b>	Sodium hypochlorite 140 m mol/L
	Sodium hydroxide 150 m mol/L
<b>Urea Cal</b>	Urea aqueous primary standard 50 mg / dl

⚗ **Procedure:**

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	<b>Standard</b>	<b>sample</b>	<b>Blank</b>
<b>W. reagent (R<sub>1</sub>)</b>	<b>1000 μL</b>	<b>1000 μL</b>	<b>1000 μL</b>
<b>Standard</b>	<b>10 μL</b>		
<b>Serum</b>		<b>10 μL</b>	
<b>Mix and incubate (5) min at 37 °C or (10) min at room temperature (15 - 25) °C</b>			
<b>Reagent (R<sub>2</sub>)</b>	<b>1000 μL</b>	<b>1000 μL</b>	<b>1000 μL</b>
<b>Mix and incubate (5) min at 37 °C or (10) min at room temperature (15 - 25) °C</b>			

- Read the absorbance of standard and sample against reagent blank at wave length (580 n.m.).
- Urea standard concentration = 50 mg / dl
- Calculating the concentration of sample by the following equation:

$$\text{Urea Concentration} = \frac{\text{Absorbance of Sample}}{\text{Absorbance of Standard}} \times 50$$