

General Urine Examination (GUE) OR Urinalysis



DR. RUNDK HWIAZ

Outline



- **By the end of this lab you should be able to:**
 - Explain what is urine?
 - What is GUE? why it should be done?
 - Explain methods of urine collection and why?

What is urine?



- is a liquid by-product of the body secreted by the kidneys through a process called urination and excreted through the urethra.
- Volume 800-2000 ml/day.
- Normal fluid in day 2 liter a day.

General Urine Examination (GUE) Or Urinalysis



- Is the test (physical, chemical and microscopic examination) that evaluates a sample of urine, is used to detect disorders such as urinary tract infection, kidney diseases and diabetes.
- Urinalysis involves a number of tests can measure many compounds that pass through the urine.
- Clue of many diseases.

Sample collection



- We have two common methods of collecting urine are:
 1. 24-hours urine collection
 2. Clean catch urine specimen
- 24-hours urine collection:
- It is measure the amount of urine produced in a day. The amount of creatinine, protein, and other chemicals that released during this period.
- Normal range volume is 800 to 2000 ml per day



- In some conditions can **increased** urine volume such as diabetes, high fluid intake, take diuretic medications, and some forms of kidney disease.



- **Clean catch urine sample**
 - It is a lab test to check for bacteria, urinary tract infection in adults and children.

- When the sample sent to a lab the following will be examined:

1. *Physical color and appearance*

what does it look like?

is it cloudy?

is it pale, dark or reddish yellow color?

- Clear to dark yellow – normal.
- Yellowish-brown – dehydration.
- Orange – dehydration, intake of rifampicin, consumption of orange food dye.
- Brown – severe dehydration, liver disease.
- Pink to reddish – consumption of beets, rhubarb or blueberries, tumors, kidney diseases, prostate problems, UTI.
- Blue or green – consumption of asparagus, genetic disorders, excess calcium, heartburn medications, multivitamins.

Dipstick





URINE TEST STRIP

BLOOD hemolyzed								
		ca. 10	ca. 50	ca. 250				
Non-hemolyzed								
UROBILINOGEN	neg.	ca. 5-10	ca. 50	ca. 250				
BILIRUBIN	norm.	2	4	8	12			
PROTEIN	neg.	+	++	+++				
NITRITE	neg.	30	100	500				
		Every pink color						
KETONES	neg.	pos.						
ASCORBIC ACID	neg.	+	++	+++				
GLUCOSE	neg.							
	norm.	50	150	500	≥ 1000			
PH		5	6	7	8	9		
SPECIFIC GRAVITY		1,000	1,005	1,010	1,015	1,020	1,025	1,030
LEUKOCYTES	neg.	ca. 25	ca. 75	ca. 500 Leuko/μl				



Aspect

pH

Specific gravity

Glucose

Ketones

Nitrate

Leukocyte

Bilirubin

Urobilirubin

Protein

Blood



3. Microscopic appearance

- Sample is examined under a microscope to look at cells, mucus, urine crystals and other substances also to identify bacteria and germs it may be present.

AM I HYDRATED?

Urine Color Chart

1		If your urine matches these colors, you are drinking enough fluids
2		Drink more water to get the ideal color in Shade 1 and 2.
3		Dehydrated
<hr/>		
4		You may suffer from cramps and heat-related problems
5		Health risk! Drink more water.
6		Health risk! Drink more water.
7		Health risk! Drink more water.
8		Health risk! Drink more water.

Microscopic Urinalysis



- It should be done when there are abnormal findings on the physical or chemical examination.
- Looking at the urine under the microscope.
- It can see cells from your urinary tract, blood cells, crystals, bacteria, parasites, and cells from tumors.

It can help to diagnose:



- Kidney disease
- Urinary tract infection
- Cancer
- Liver disease
- Yeast infection
- Parasitic infection

Methodology



- A sample of well-mixed urine (usually 10-15 ml) is centrifuged in a test tube at relatively low speed (about 2-3,000 rpm) for 5-10 minutes until a moderately cohesive button is produced at the bottom of the tube.
- The supernate is decanted and a volume of 0.2 to 0.5 ml is left inside the tube. The sediment is resuspended in the remaining supernate by flicking the bottom of the tube several times.
- A drop of resuspended sediment is poured onto a glass slide and coverslipped.

Sample collections



- urine that has been centrifuged to concentrate the substances in it at the bottom of a tube. The fluid at the top of the tube is then discarded and the drops of fluid remaining are examined under a microscope.
- high power field (HPF) that area of a slide that is visible by light microscopy at high power (approximately 500X).
- Cells, crystals, and other substances are counted and reported either as the number observed "per low power field" (LPF) or "per high power field" (HPF). In addition, some entities, if present, are estimated as "few," "moderate," or "many," such as epithelial cells, bacteria, and crystals.

How to Scan the Slide



- Place the slide under the scope and begin the examination under low power. Be sure to use a low light source.
- Too much light makes the cellular and crystalline elements harder to see. Scan the slide under low power to locate areas of interest. Look for casts just inside the perimeter of the cover slip.
- Then switch to high dry magnification and examine ten random fields in the central part of the coverslip . Count the numbers of red cells and white cells in each and report the range of findings.

A microscopic examination of urine sediment detects the presence and amounts of:



- White blood cells
- Red blood cells
- Epithelial cells
- Casts
- Crystals
- Bacteria and yeast