Advance Lab Tech.

Specimen collection

All laboratory procedures for clinical service laboratory testing are performed on different types of specimens like sputum, pus, urine, blood; serum or plasma, tissues, CSF and different body fluids. The quality and quantity of a specimen is of paramount importance for getting accurate test results and for the interpretation of these results to be scientifically sound.

SPECIMEN RECEIVING:
All specimens received in the laboratory will maintain the chain of custody from the collection sites. This involves the proper identification of specimens with its lab requisition form (tracking sheet) and the proper review of all information.

1. Review the received specimens with its laboratory requisition form (For HIV Testing).
2. Patient ID
3. Specimen type or source
4. Age of patient and gender
5. Type and quantity of collection tubes or container,
6. Information on collection labels or container
7. Collection date & time
8. Technician Initials.

- Specimens consists:
  - Urine
  - Stool
  - Sputum
  - Wound drainage
  - Blood

Order of Draw	Tube Stopper Color	Additive	Dept.	Tests	Liquid Part post centrifugation
1	Yellow 	Sodium polyethanol sulfonate (SPS)	Microbiology	Blood Culture	Plasma
2	Light Blue 	Sodium Citrate	Coagulation	PT, PTT	Plasma
3	Red (plain) 	No additive	Tube Blood Bank	Type, RH, antibody screen, type & crossmatch	Serum
4	Red & Grey or Gold 	Clot Activator	Routine Chemistry	All STAT tests + Iron, folate	Serum
5	Green 	Heparin	STAT Chemistry	BMP, CMP, Glucose, K, Troponin, Bilirubin	Plasma
6	Lavender 	K2EDTA	Hematology	CBC, ESR	Plasma
7	Pink 	EDTA	Gel Blood Bank	Type, RH, antibody screen, type & crossmatch	Plasma
8	Gray 	Sodium Flouride (inhibits glycolysis)	Chemistry	Lactic Acid, Gluc (not run right away)	Plasma

Urine Specimen

In acute infection, a single pathogen is usually found , whereas two or more pathogens are often seen in chronic infection.

Classification and pathogenesis:

Type of infection:

1. First infection:
   This result from infected stones,chronic pyelonephritis or prostatitis .
2. Second infection:
   Occur when new infection with new pathogen occur successful treatment
3. Ascending infection**:**
   From the urethra is the most common route. Women are particularly at risk for urinary tract infection because the female urethra short.

- Tested for:
- Specific gravity
- pH
- Albumin
- Glucose
- Microscopic exam

Why a urine specimen for C&S?

- Urinary Tract Infection (UTI)
- Frequency
- Urgency
- Dysuria
- Hematuria
- Flank pain
- Fever
- Cloudy, malodorous urine

Characteristics of Urine:

- Color
- Clarity
- Odor

Measuring chemical properties of urine=Urinalysis:

- Glucose
- Ketones
- Protein
- Blood- hematuria
- pH
- Specific gravity
- Microscopic examination

Macroscopic urinalysis:

Is the direct visual observation of the urine, noting its volume, color, clarity or cloudiness, etc.

Normal urine is typically pale yellow and clear. Obvious abnormalities in the color, clarity, and cloudiness may suggest different diseases.

Normal urine

abnormal urine

Urine test	Normal Levels	Indicators
Leukocytes	Negative-trace 0-10 lev/vl	>Trace may indicate UTI
Nitrite	Negative - 0	Positive indicates significant infection
Uro-Bilirubin	0.2-1.0 mg/dl	>2.0 mg/dl may indicate liver issues
Protein	Negative - 0	>Trace may indicate kidney disfunction
pH	Optimal 7.0-7.5	(normal for **BLOOD** is 7.41)
Blood	0 - trace	>Trace may indicate any of several issues
Specific Gravity	1.016-1.022	Higher values may indicate dehydration
Extreme high/low values not related to fluid intake may indicate more serious condition		
Ketone	Negative - 0	>Trace ketones may indicate fat metabolisis or diabetes
Bilirubin	Negative - 0	* Trace or more indicates liver and/or gallbladder issues
Glucose	0-15 mg/dl	>15mg/dl may indicate kidney issues (or pregnancy) Glucose spike immediately after large meal is normal
* Drugs that may INCREASE bilirubin: Allopurinol, Barbiturates, Birth control pills, Chlorpromazine, Diuretics, Isoniazid, Phenazopyridine, Steroids, Sulfonamides Drugs that may DECREASE bilirubin: Indomethacin and ascorbic acid (Vitamin C)		

Dipstick chemical analysis:

Urine dipstick is a narrow plastic strip which has several squares of component of the test used to interpret urinalysis.

Colors generated by each pad are visually compared against a range of colors on brand-specific color chartsThe entire strip is dipped in the urine sample and color changes in each square are noted. Nitrite (suggestive of bacteria in urine)

Bilirubin (possible liver disease or red blood cell break down)
Urobilinogen (possible liver disease)

Microscopic examination used to view elements that are not visible without microscope. e.g cells.

Red Blood Cells:

Hematuria is the presence of abnormal numbers of red cells in urine due to:

a. Glomerular damage

b. Tumors

c. Urinary tract stones

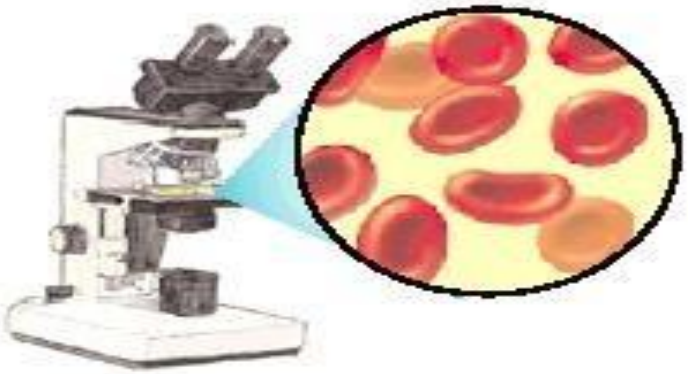
d. Upper and lower urinary tract infections

Hematuria:

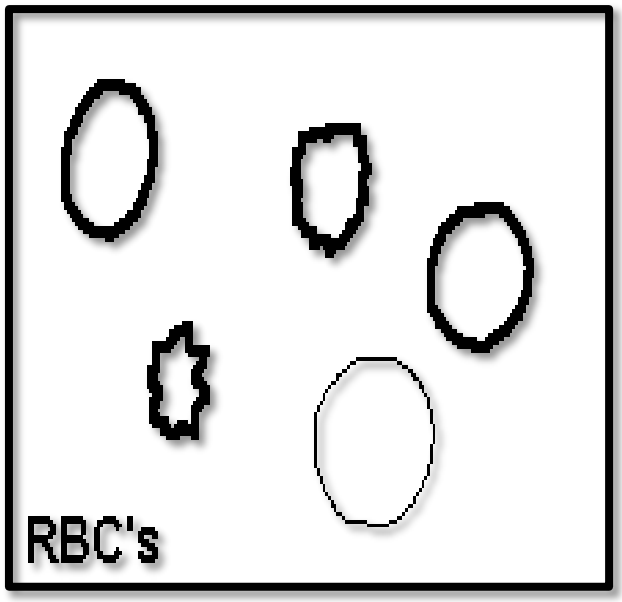
Two Types of Hematuria

1. Gross hematuria means that the blood can be seen by the naked eye. The urine may look pinkish, brownish, or bright red.
2. Microscopic hematuria means that the urine is clear, but blood cells can be seen under a microscope.

Gross hematuria means blood can be seen in the urine.

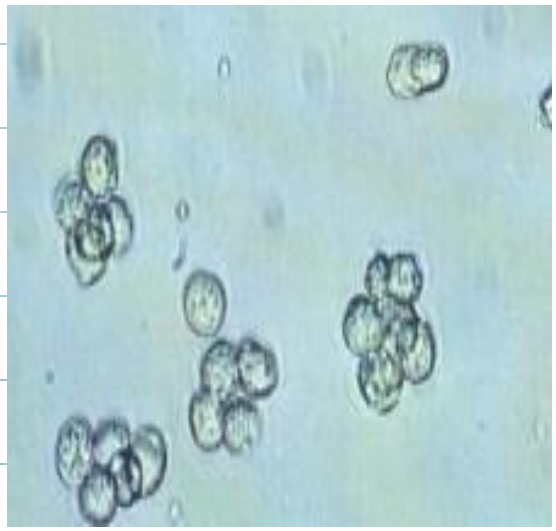


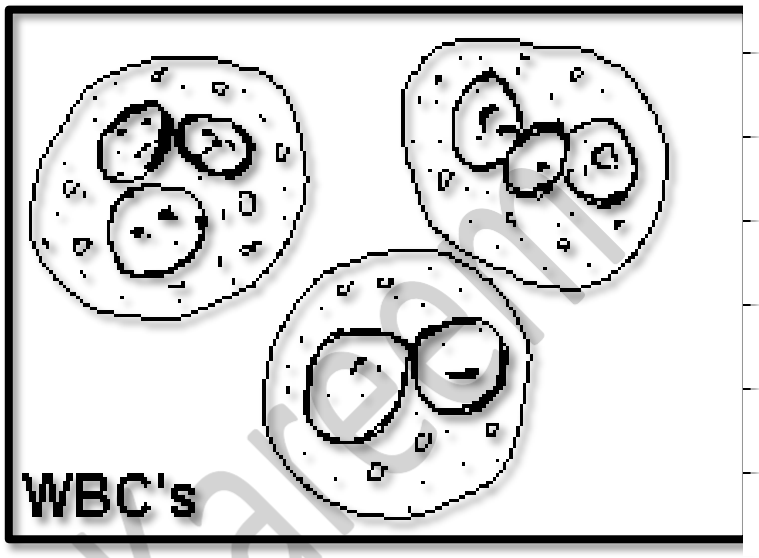
Microscopic hematuria means blood can be seen only with a microscope.



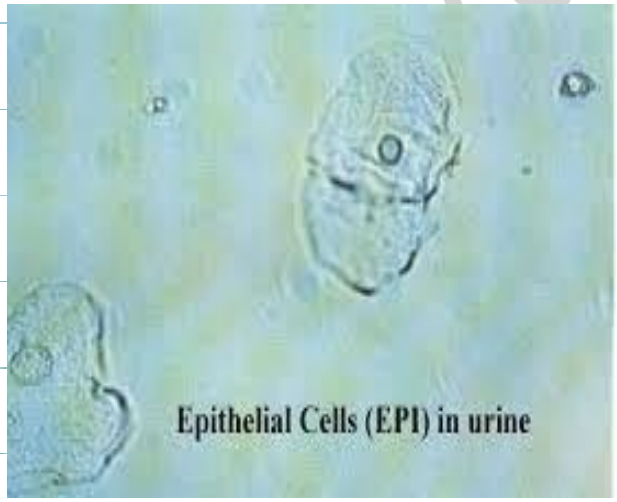
White Blood Cells:

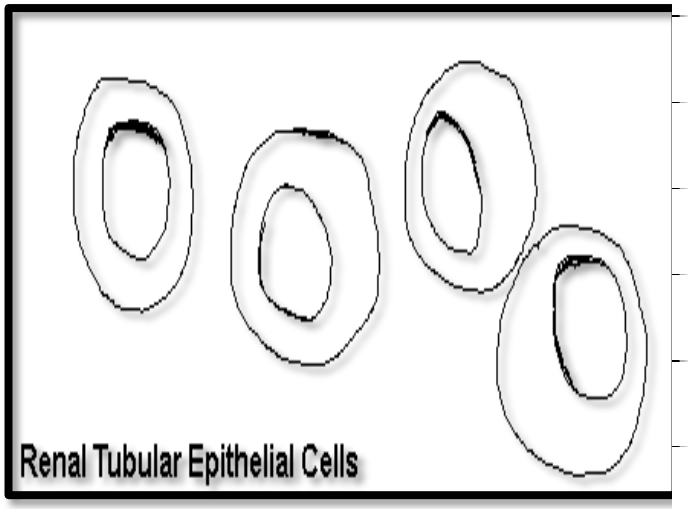
Pyuria refers to the presence of abnormal numbers of leukocytes that may appear with infection in either the upper or lower urinary tract or with acute





Renal tubular epithelial cells, contain a large round or oval nucleus and normally slough into the urine in small numbers. However, with nephrotic syndrome and in conditions leading to tubular degeneration.





Casts:

Urinary casts are cylindrical structures produced by the kidney and present in the urine in certain disease states.

They are formed in the distal convoluted tubule (DCT) and collecting ducts of nephrons, then dislodge and pass into the urine, where they can detected by microscopy.

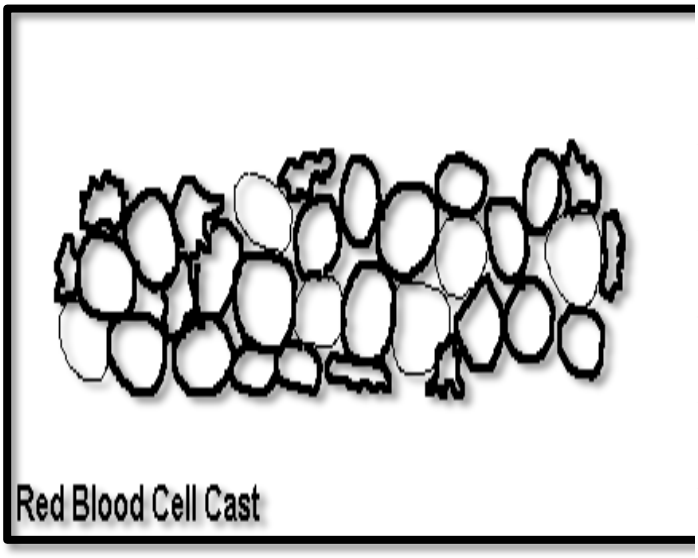
Urinary casts may be made up of cells (such as white blood cells, red blood cells, kidney cells, uric acid, sodium oxalate, calcium oxalate) or substances such as protein.

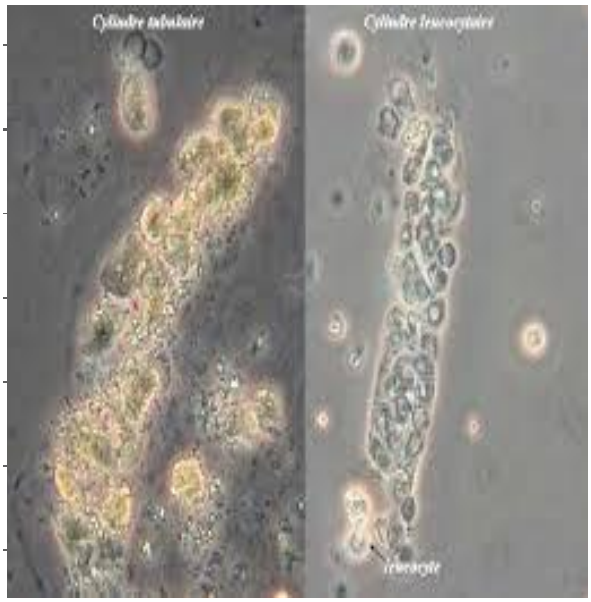
The factors which favor protein cast formation:

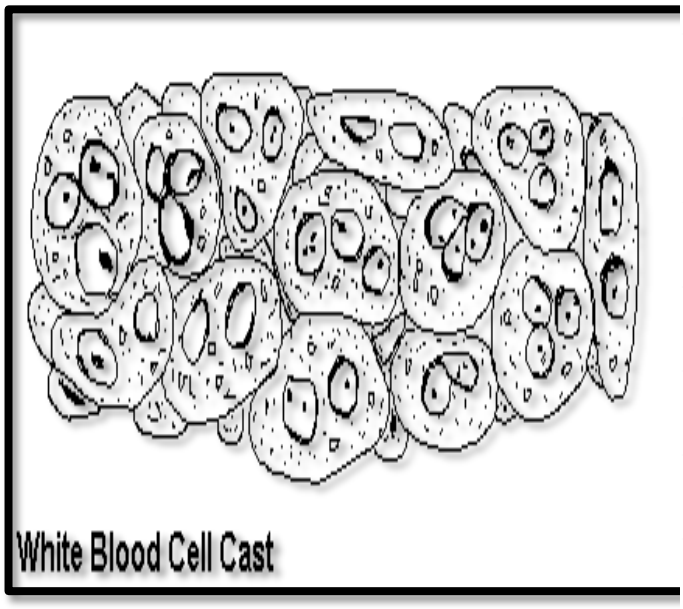
1. low flow rate of the filtrate
2. high salt concentration
3. low pH.

Red blood cells may stick together and form red blood cell casts. Such casts are indicative of **glomerulonephritis**, with leakage of RBC's from glomeruli.

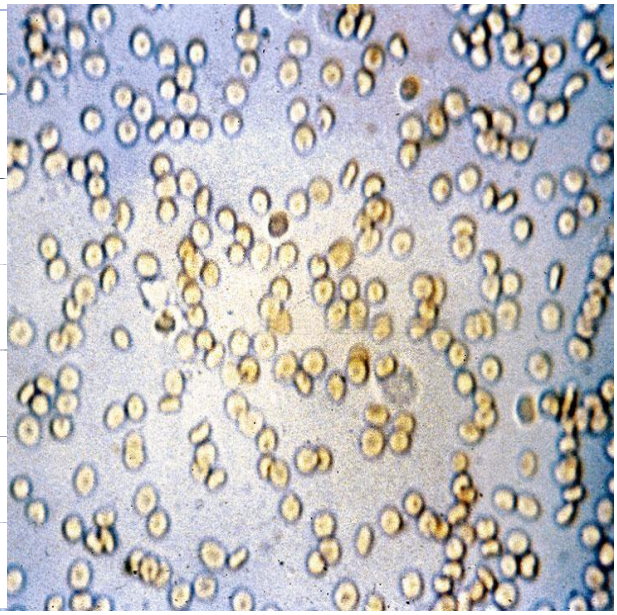
White blood cell casts may also be present with **glomerulonephritis**. Their presence indicates inflammation of the kidney, because such casts will not form



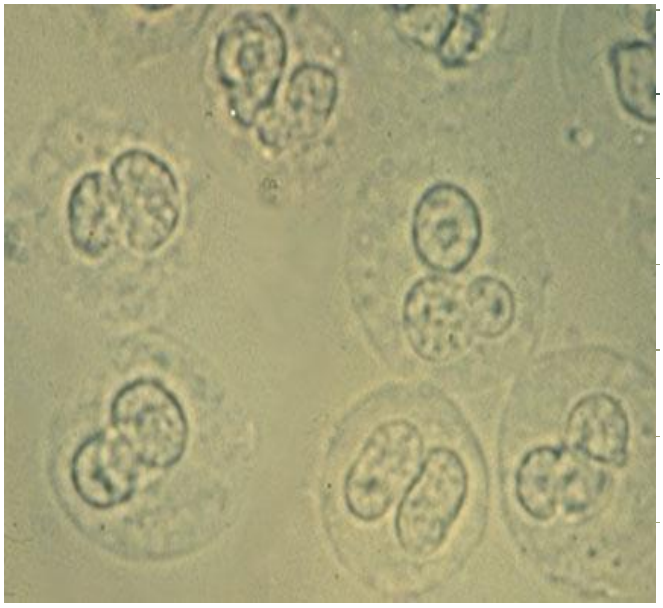

Cylindre tubulaire
Cylindre leucocytaire


White Blood Cell Cast

RBCs:



WBC:



Bence Jones proteins:

Bence Jones proteins are small proteins found in the urine. Testing for these proteins is done to diagnose and monitor *multiple myeloma* and other similar diseases.

Bence Jones proteins are considered the first tumor marker.

A tumor marker is a substance, made by the body, that is linked to a certain cancer, or malignancy. Bence Jones proteins are made by plasma cells, a type of white blood cell. The presence of these proteins in a person's urine is associated with a malignancy of plasma cells.