

C-Microscopic examination of urine

*** Requirements:**

1-Centrifuge tube or test tube

2-Glass slide

3-Coverslips

4-Pasteur pipettes

5-Centrifuge

6-Microscope

7-Sample

***Principle:**

The microscopic elements present in urine are collected in the form of deposit by centrifugation. A small drop of the sediments poured onto a glass slide, a cover slip is placed over it and observed under microscope.

A variety of normal and abnormal cellular elements

May be seen in urine sediment such as:

1-Red blood cells or Erythrocytes (RBCs)

2-White blood cells (WBCs)

3-Mucus

4-Different types of epithelial cells

5-Different types of Crystals

6-Casts

7-Bacteria**8-Fungi****9-Parasite****10-Artifacts**

Abnormal findings:

***Per high power field (HPF) (400X)**

- > 3 Erythrocytes
- > 5 Leukocytes
- > 2 Renal tubular epithelial cells (RTE)
- > 10 Bacteria

- **Per low power field (LPF) (200X)**

- > 3 Hyaline casts or > 1 Granular casts

*** Presence of :**

- Any other cast (RBCs and WBCs)
- Yeast and parasite
- Pathological crystals (Cystine , Leucine and Tyrosine)
- Large number of Uric acid or Calcium oxalate

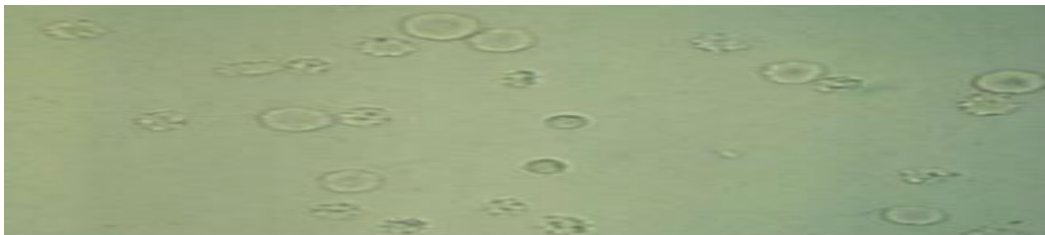
1-Red blood cells or Erythrocytes (RBCs)

• Hematuria is the presence of abnormal numbers of red cells in urine due to any of several possible causes:

a) Glomerular damage

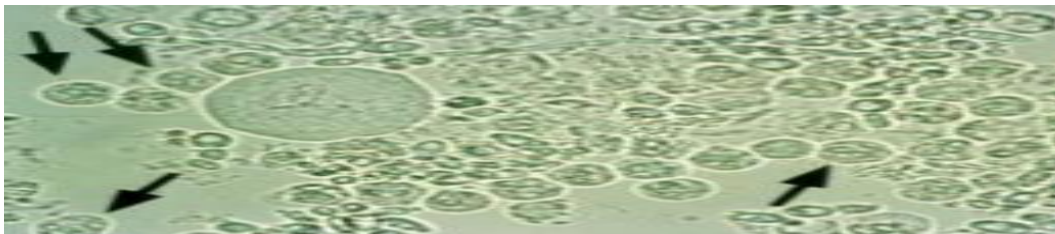
- b) Kidney trauma
- c) Urinary tract stones
- d) Urinary tract infections
- e) Physical stress

In fresh urine these cells have a normal ,pale or yellow appearance ,they do not contain nuclei .



2-White blood cells (WBCs)

•Pyuria refers to the presence of abnormal numbers of WBCs that may appear with infection in the urinary tract



WBCs have lobed nuclei and granular cytoplasm

3-Mucus

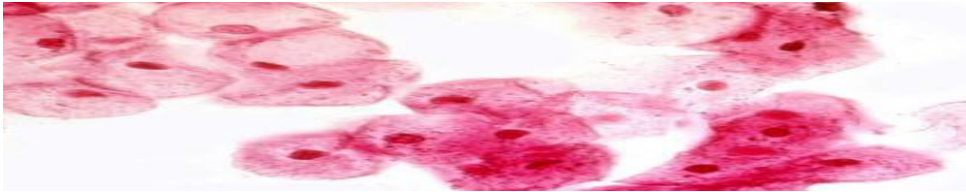
•A protein material produced by the glands and epithelial cells of lower genitourinary tract and the renal tubular epithelial (RTE)



4-Different types of epithelial cells

- Three types of epithelial cells may be recognized

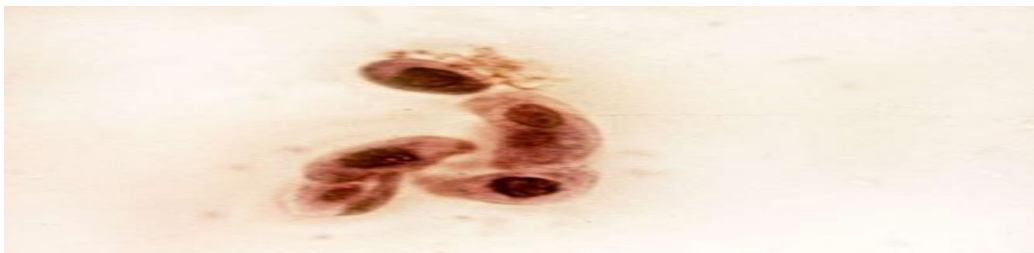
A-Squamous epithelial cells



These are large ,flat and irregular in shape and contain abundant cytoplasm and small central nuclei

B-Transitional epithelial cells

- They may be pear shaped or round



- These cells may contain two nuclei

C-Tubular epithelial cells

- They may be round shaped or egg-shaped



These cells may contain a large round or oval nucleus

5-Different types of Crystals

*Formed by precipitation of urinary salts when alteration in multiple factors affect their solubility like pH , temperature and concentration

* Urine can contain several types of crystals

* They are found in both acidic urine and alkaline urine

•Crystals found in acidic urine

- | | | | |
|-------------------|------------|------------------|---------------|
| 1-Calciumoxalate | 2-Uricacid | 3-Amorphousurate | 4-Sodiumurate |
| 5-Calciumsulphate | 6-Cystine | 7-Tyrosine | |

•Crystals found in acidic urine

1-Calciumoxalate

-These are colorless and envelop shaped

-These can be present in urine after the ingestion of tomatoes ,Oranges and Vitamin C

-Can cause extensive tubular injury



2-Uricacid

-Appear mostly as diamond rhombic or rosette form

-Increase amount are associated with increase levels of purine and nucleic acids, also, in patients with leukemia receiving therapy .



3-Amorphousurate

-Pink to red dust , they do not form a crystalline



4-Sodiumurate

-These are in the form of elongated prisms or plates



5-Calciumsulphate

-These are long ,thin needle arranged in star-like manner



6-Cystine

-These are hexagonal plates with equal or unequal sides



7-Tyrosine

-These appear in the form of fine, needles that forms rosettes

