Urine Analysis

What is urine ???

- It is a sterile liquid produced from body, it excreted by kidney through urination process .
- Umber yellow because of Urochrome pigment .

Major examinations of urine

- physical Examination
- Chemical Examination
- Microscopic Examination

1_ physical Examination

- **1- volume**

  600: 2500 mL/Day **(normal case)**

(Pathogenic cases)

more than 2.5 L/Day → Polyuria

Less than 600 ml/day → Oliguria

Less than 100 ml/day → Anuria

- **2- Colour**

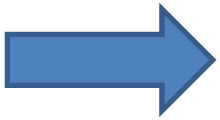
  Amber yellow **(normal case)**

Pathological Cases

COLOUR	INDICATION
colorless	(DIABETES)
Dark yellow	Increase Pus cells or Crystals
Dark orange to brown	Jaundice
Blue	Drugs like antibiotic
Reddish	Inflammation

•3- Aspect

.. clear **(normal)**

.. Turbid **(pathogenic)** 

Bacterial infection OR pus cells OR crystals .

- **4- Odor**

Aromatic

normal

Ammonia

bacterial infection

•5- Specific Gravity

It is ability of kidney to concentrated urine .

[1.015 : 1.025 g/cm³] → **normal**

1.010, 1.030, 1.035 → **pathogenic**

Chemical Examination

1- PH

- Weak acidic [5 -7]

normal

2- Proteins (Albumin):

- -Ve  normal

For indication we use

((tetrabromophenol)) in the strip

Traces = [Few]

3- Glucose :

- - ve  **normal**
- If it increased in blood more than 180 gm/dl
  We will find it in urine.

Indication by :

- Strip
- Benedict Test

4- Ketone Bodies : are produced as by-products when fatty acids are broken down for energy in the liver and kidney. They are used as a source of energy in the heart and brain. In the

- -Ve  **normal**
- **Causes of presence in urine :**

➢ Starvation

➢ Decrease of carbohydrates in diets

➢ High fat diet

➢ Diabetes mellitus

5- Bilirubin :

-Ve  **normal**

It is pigment made by liver due to lysing of RBCs .

What are causes of presence ??

- ✓ Jaundice
- ✓ Liver diseases

6- Urobilinogen :

- Secreted in normal urine [1 – 4] ml gram/day
  = normal traces

Methods of indication :

➢ Strip

MICROSCOBIC EXAMINATION

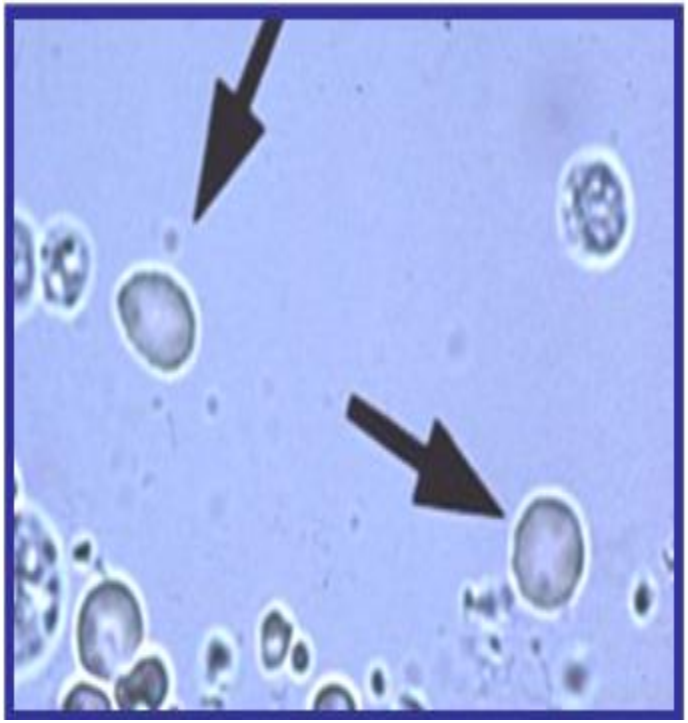
PUS CELLS

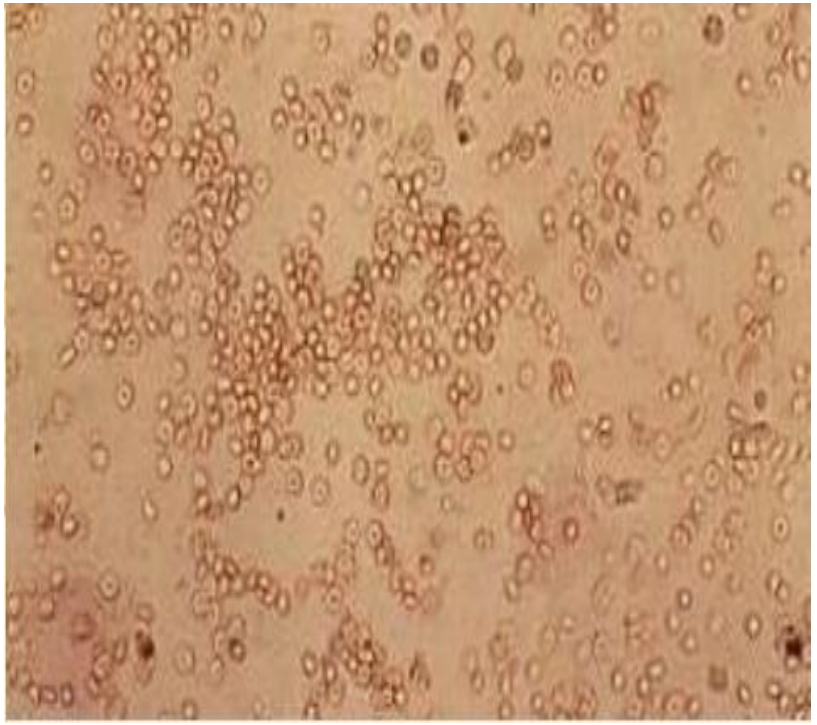
An increase in urinary WBCs is called pyuria and indicates the presence of an infection or inflammation in the genitourinary system.

These white blood cells in urine have lobed nuclei and retractile cytoplasmic granules.

RED BLOOD CELLS

no red cells → ***termed hematuria***



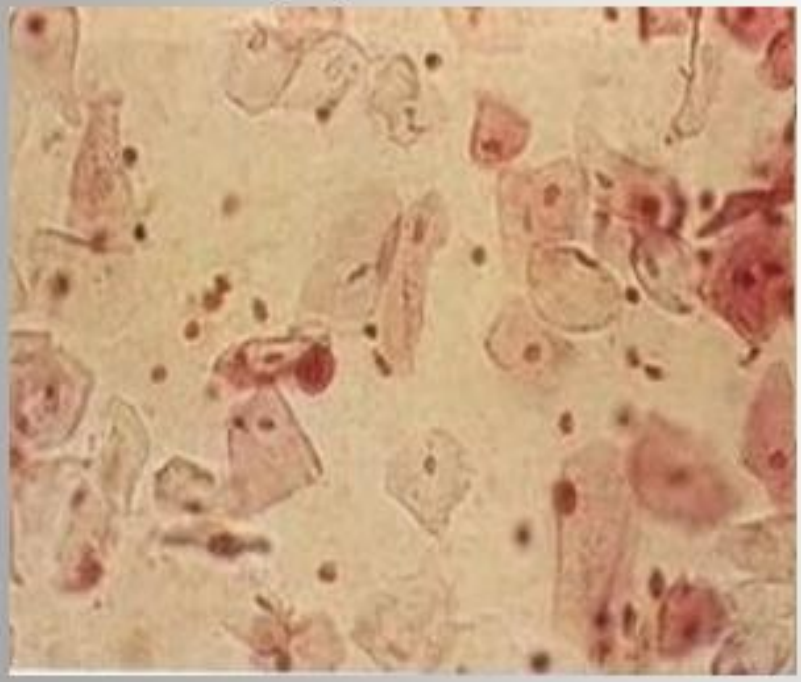


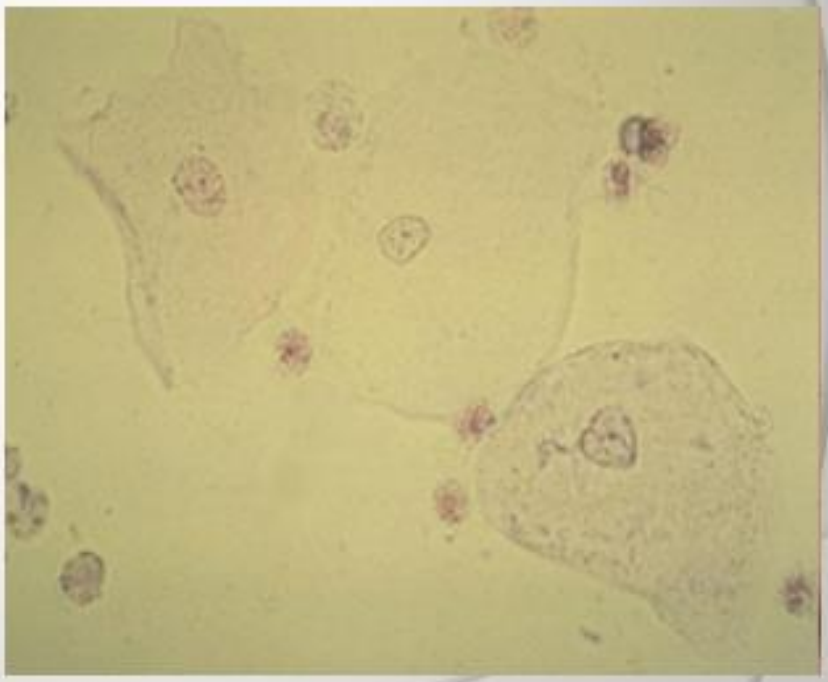
Urine Epithelial cells

Appearance

Urine epithelial cells are of three kinds: Renal tubule epithelial cells, Bladder epithelial cells, and Squamous epithelial cells

They are large (the largest cells which can be present in normal urine samples), flat cells with irregular borders, a single small nucleus, and abundant cytoplasm





More in female than male

CASTS

Urine Castes

Overview:

Urinary casts are cylindrical aggregations of particulate matter that form in the distal nephron, dislodge, and eventually pass into the urine.

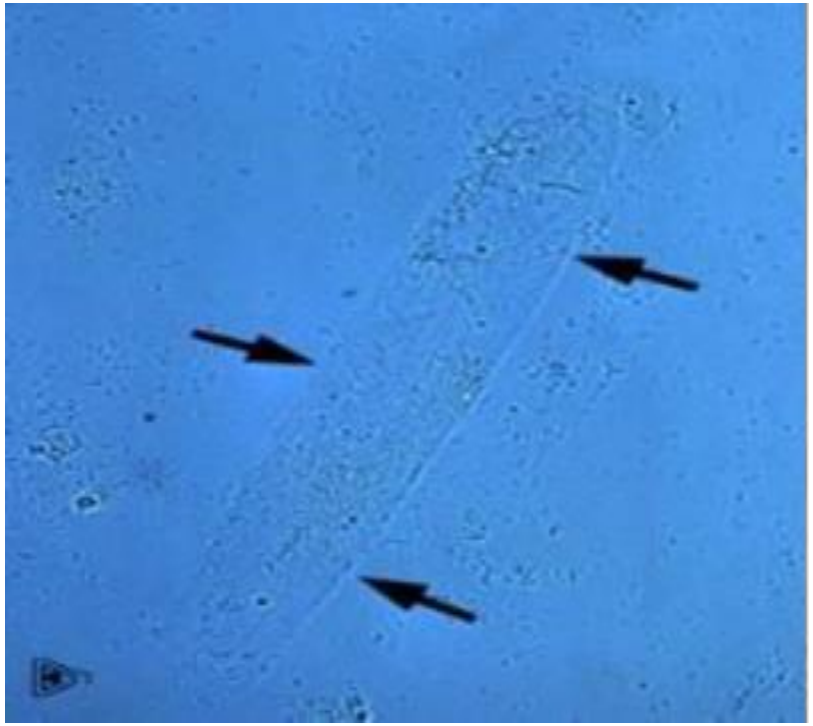
Function

Uromodulin may act as a constitutive inhibitor of calcium crystallization in renal fluids, and t may provide defense against urinary tract infections.

Normal:

They are absent or very few in urine samples

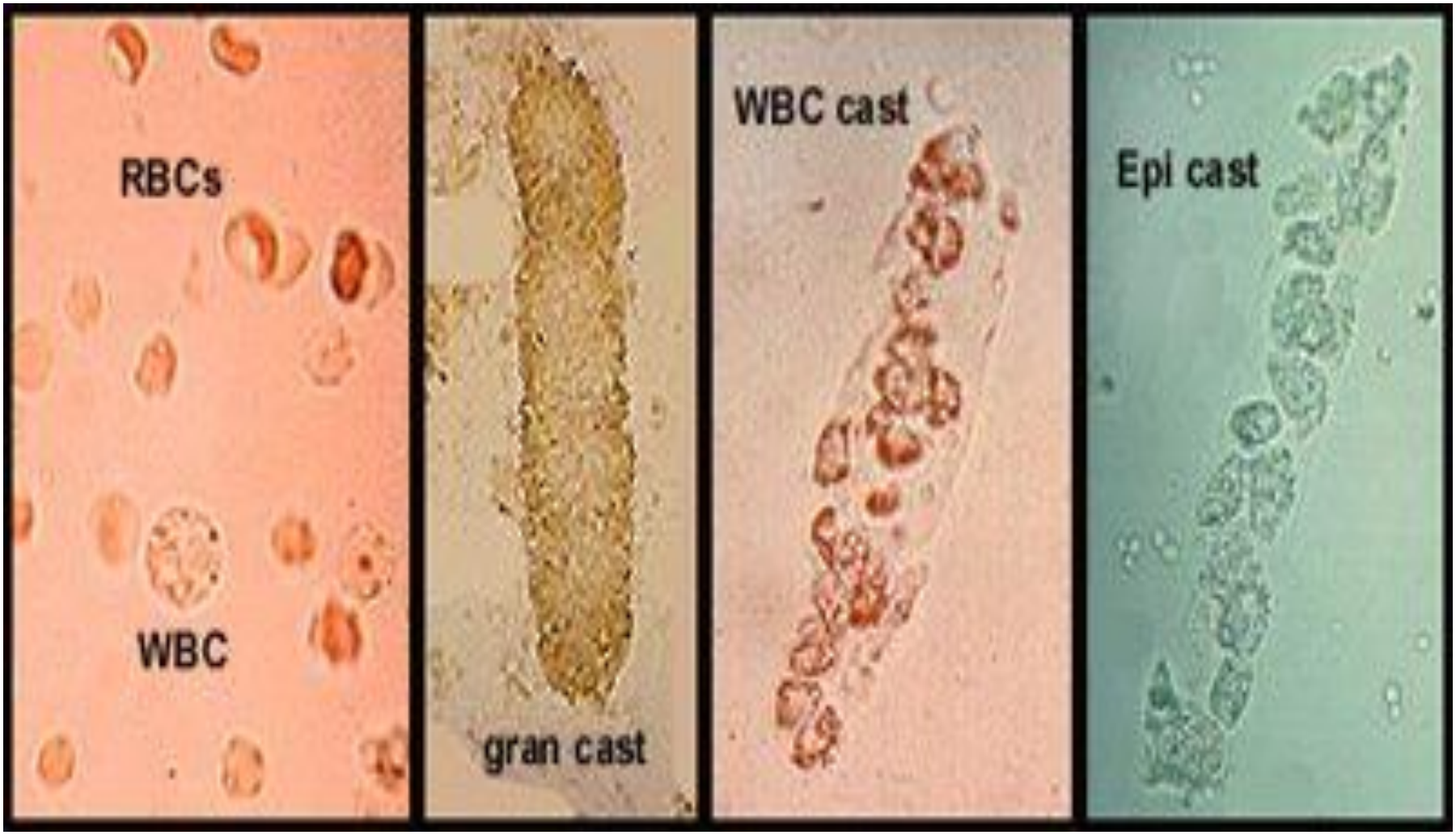
HYALINE CASTS



nephrons.

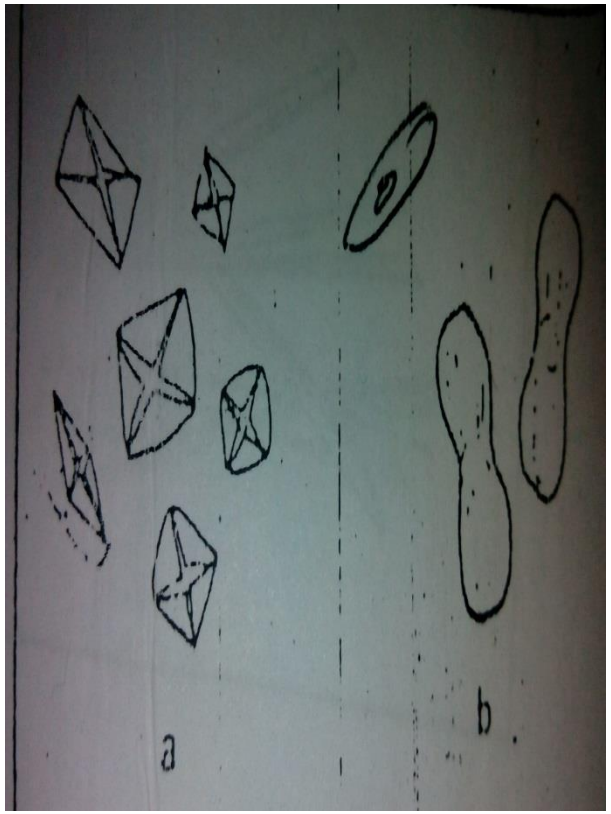
GRANULAR CASTS

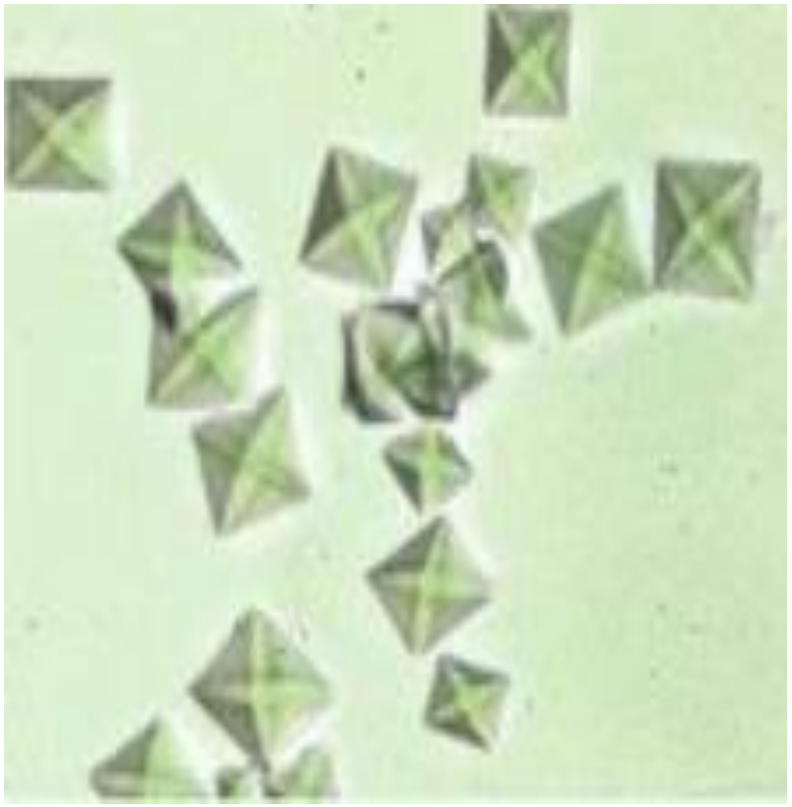
- aggregates of plasma proteins (eg, albumin)


RBCs
WBC
gran cast
WBC cast
Epi cast

URIC ACID CRYSTALS

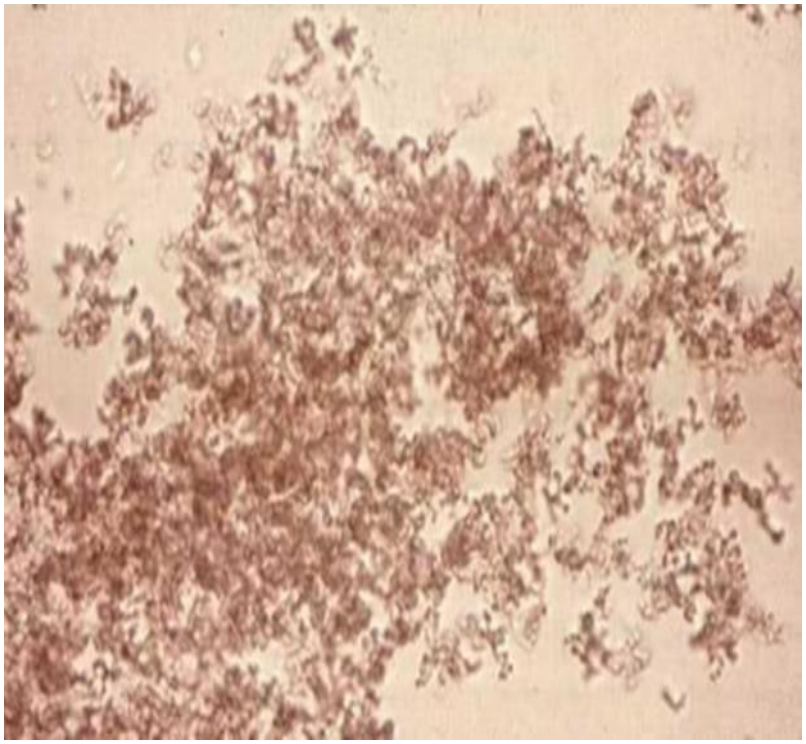
CALCIUM OXALATE





AMORPHOUS URATES

- Amorphous urates of Na, K, Mg or Ca tend to form in acidic urine

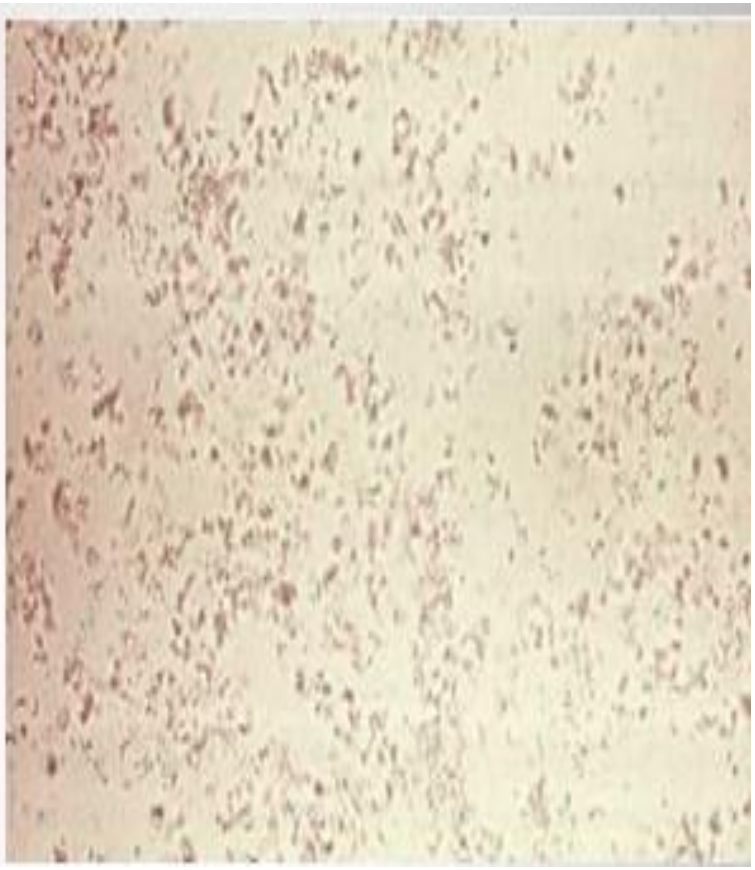


Triple Phosphate crystals

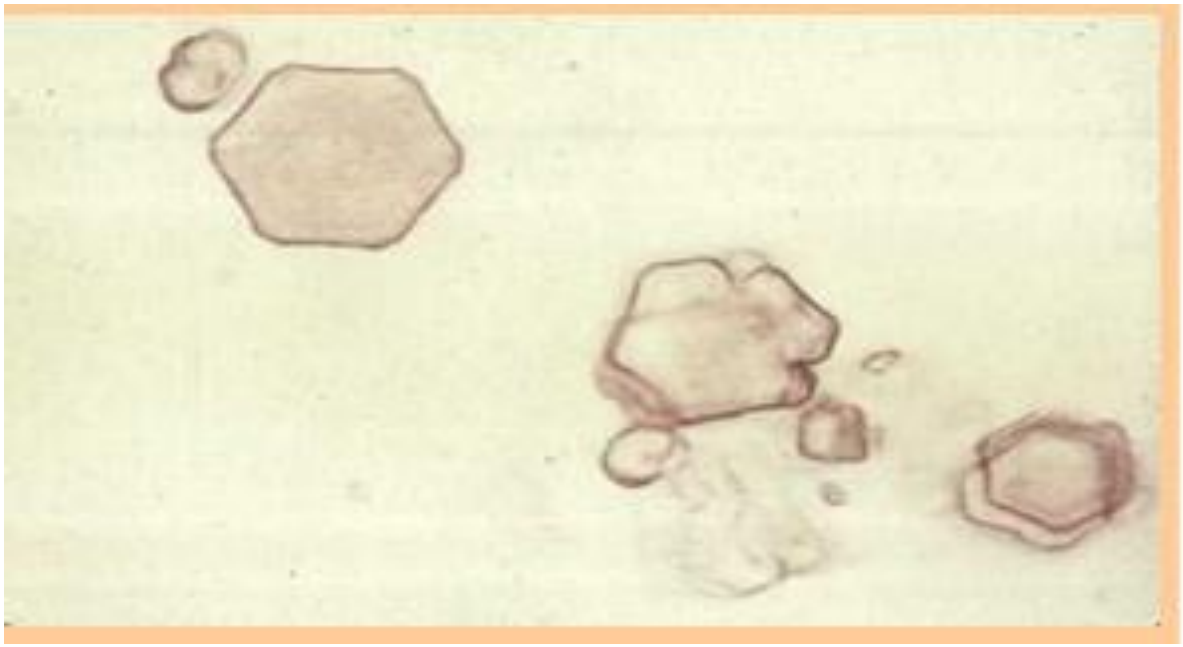
- .

#Amorphous phosphates

alkaline urine



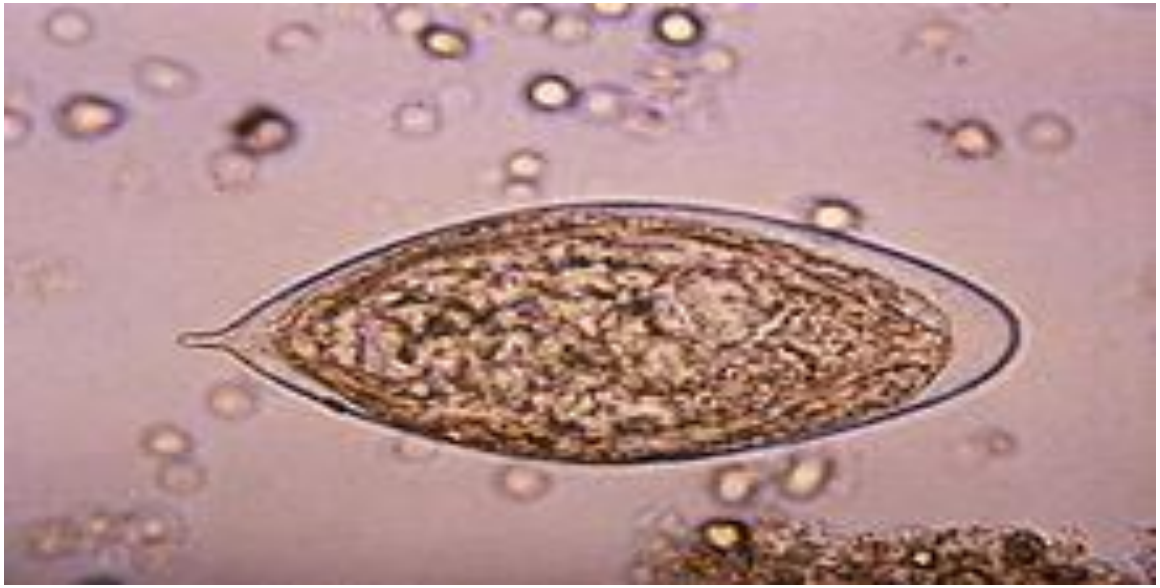
CYSTINE CRYSTALS

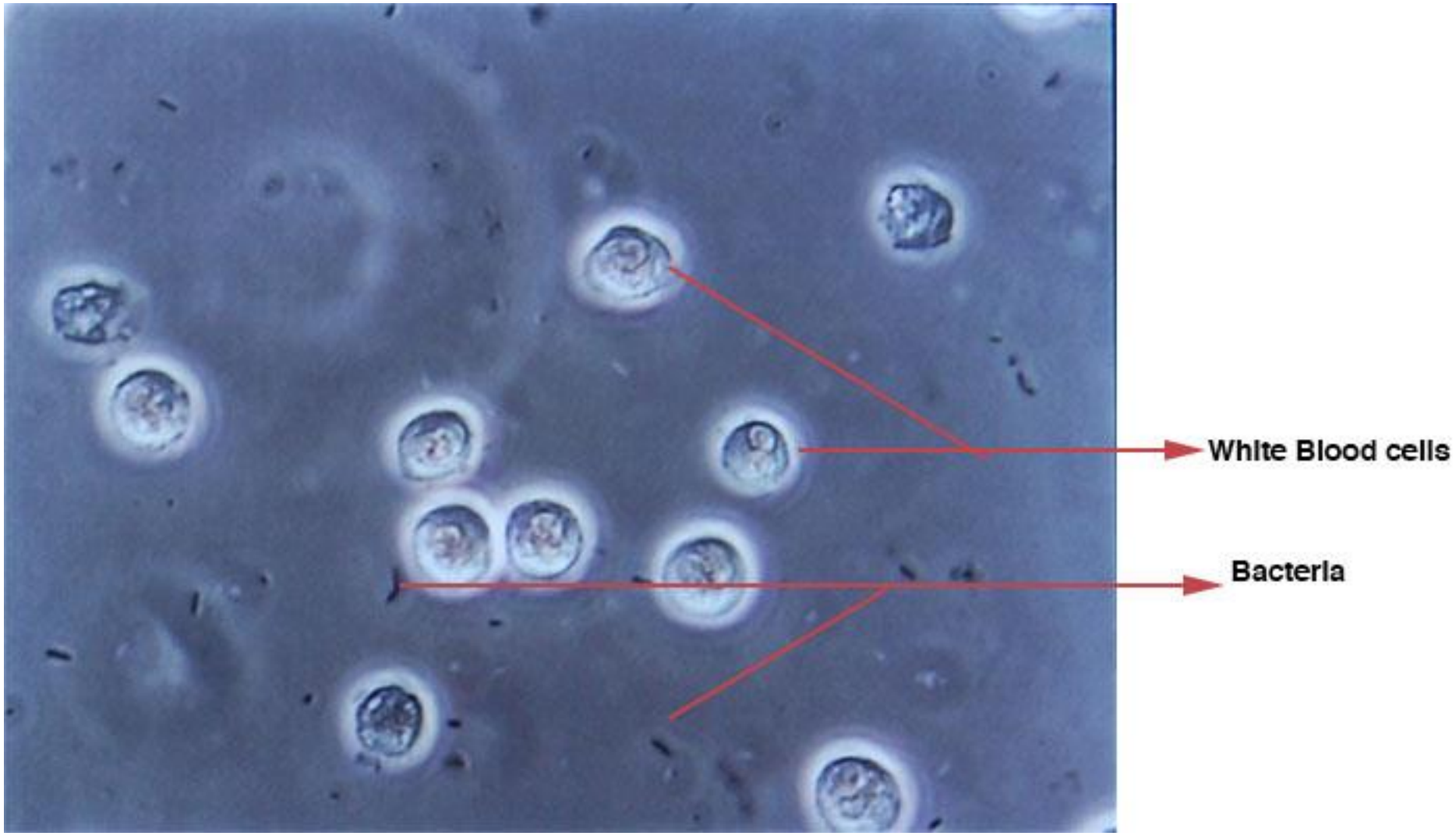


MICRO-Biology EXAMINATION

Trichomonas Vaginalis

Schistosoma Haematobium Egg




White Blood cells
Bacteria

Enterobious Vermicularis ova


Thank you ...