

Provider Performed Microscopy

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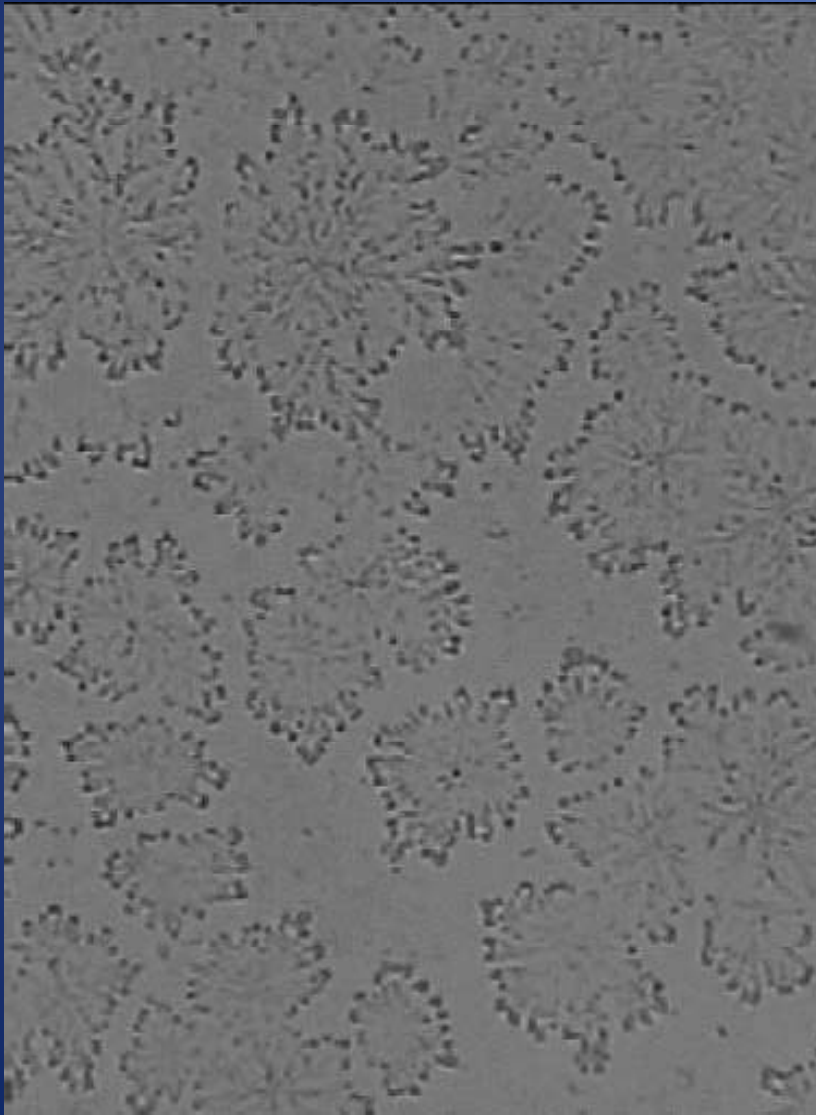
Ferning Testing

- Also called arborization test or fluid crystallization test, refers to a branched heterogeneous network of crystallized glycoprotein and various salts.
- Waived test used to determine if the fluid been analyzed is amniotic fluid. Also used to test for ovulation (seen at midpoint of cervical cycle):
 - Presence of estrogen in cervical mucus produces a fern-like pattern (ferning indicates presence of estrogen)
- Presence of fern-like crystals indicate that the fluid is amniotic fluid.
- Specimen obtained by sterile swab from posterior vaginal pool. Do not use lubricants

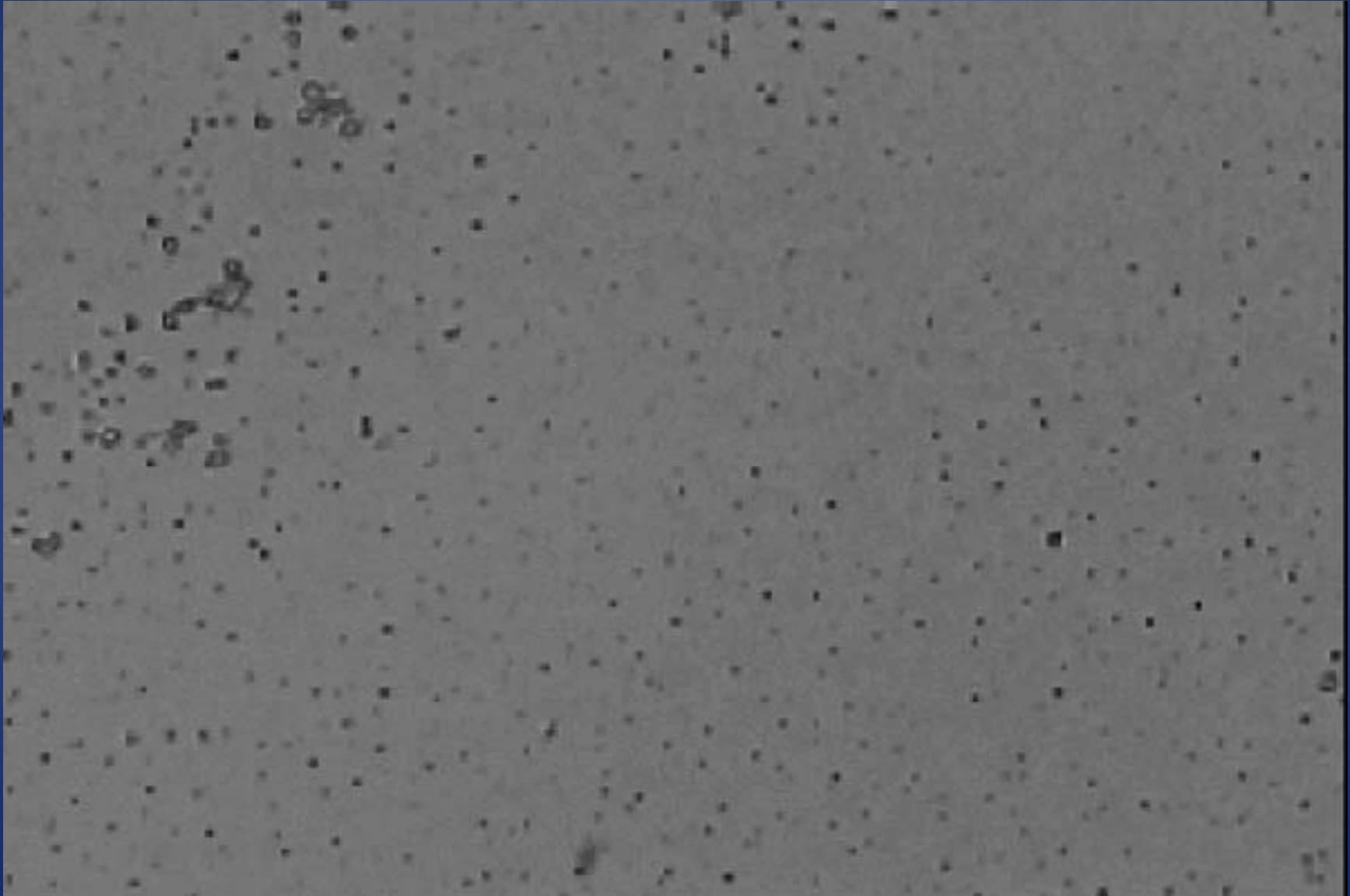
Ferning Testing

- False positive results: Blood, urine, antiseptical solutions/lubricants or cervical mucus can produce a false positive result if present in the sample.
- False negative results: Prolonged rupture of membranes (>24 h) can produce false negative result

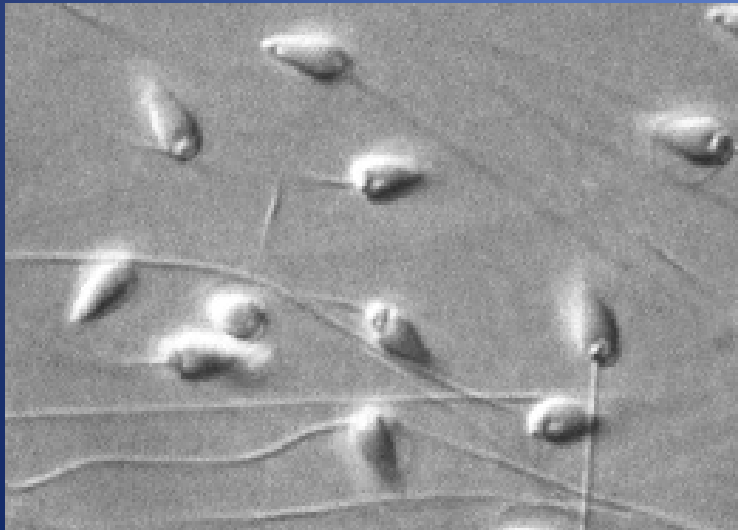
Positive Ferning Test-note crystals formation with branching



Negative Ferning Test – No crystal formation



Sperm Cells present



Wet Mounts

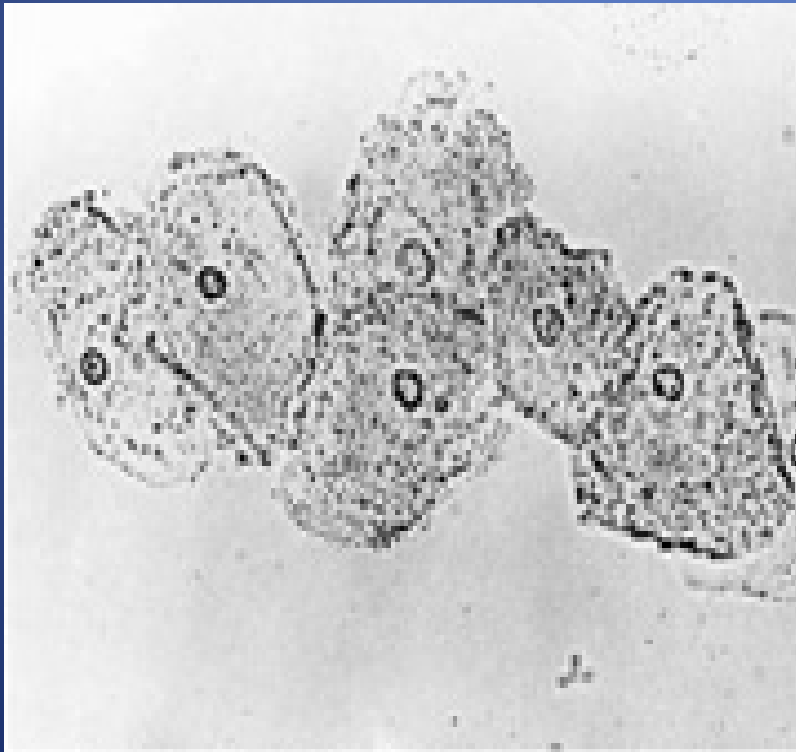
- A vaginal wet mount (also called vaginal smear) is a test used to determine the cause of vaginitis or inflammation of the vagina and vulva, not related to urinary tract infections.
- Can be used to determine the presence of bacterial vaginosis, Trichomonas infection and yeast infection.

Wet Mounts

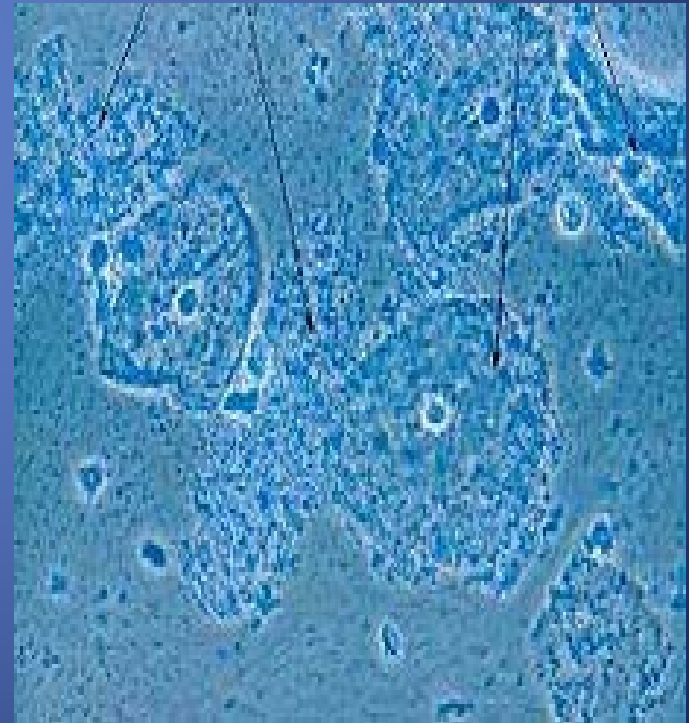
- Cells or organisms that can be seen in wet mounts include:
 - Squamous cells
 - White Blood Cells
 - Yeast
 - Bacteria
 - Parasites such as *Trichomonas vaginalis*

Wet Mounts-Squamous cells

- Squamous cells are polyhedral in shape and has a small central nucleus



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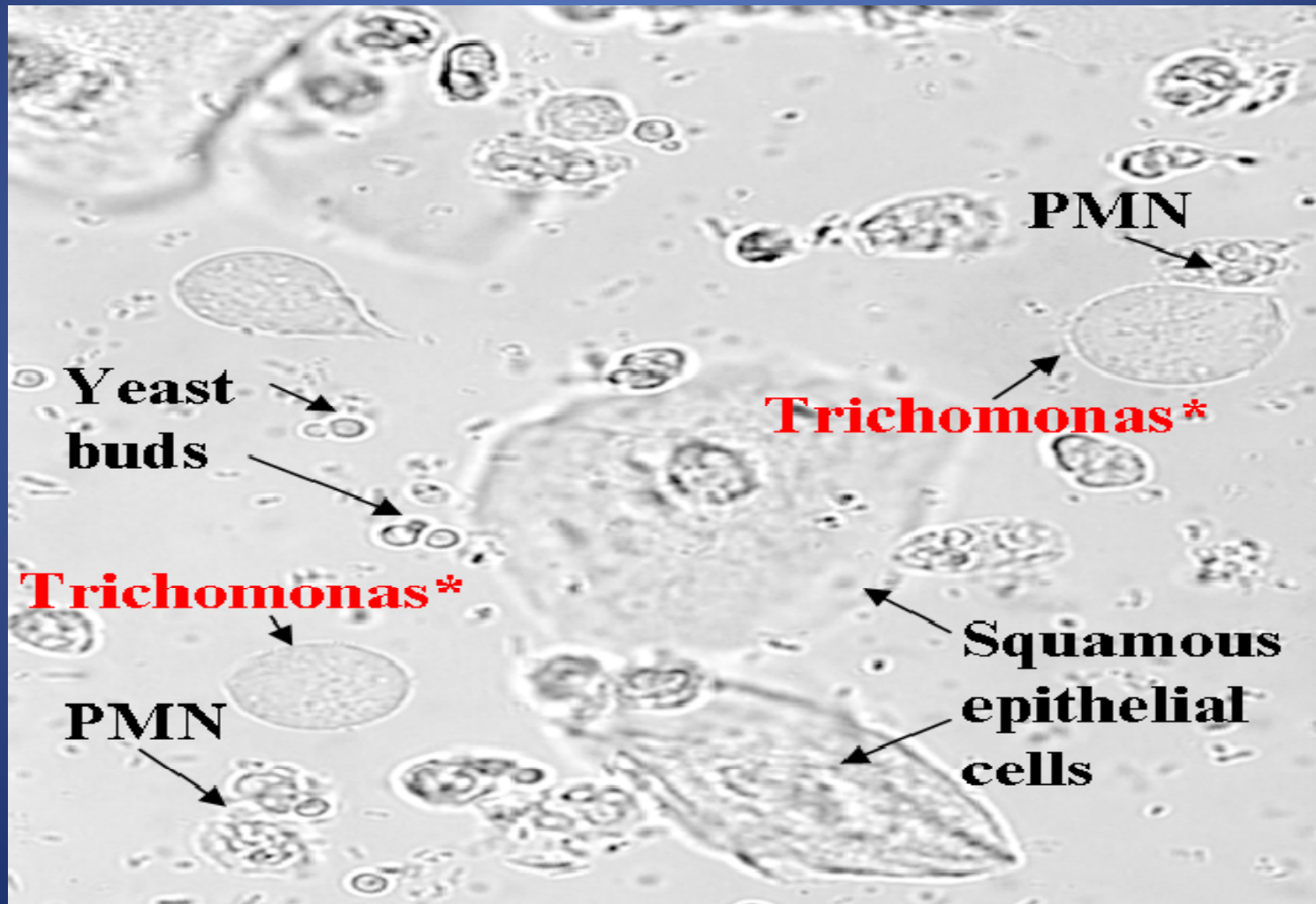


Wet Mounts-WBC on lower right corner of picture

- Look for bi-lobed or tri-lobed nuclei

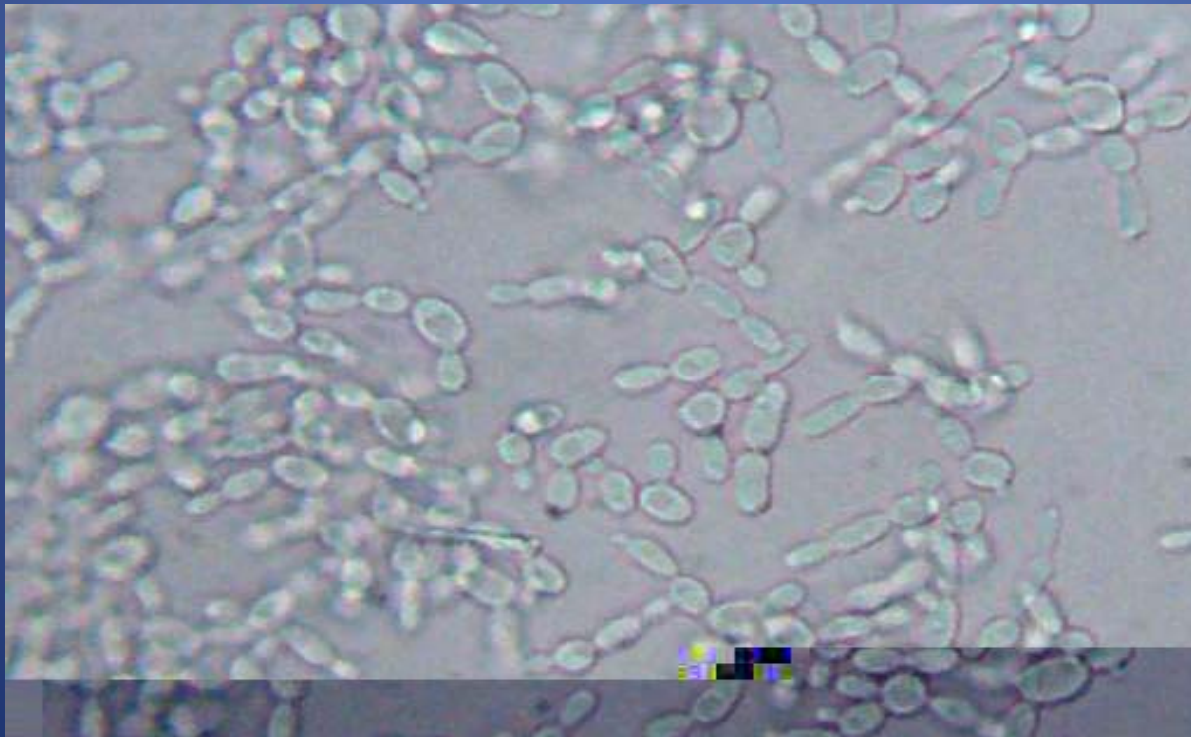


Wet Mount – WBCs: Look for trilobed (triple lobe) nuclei
(example in upper right corner of picture)

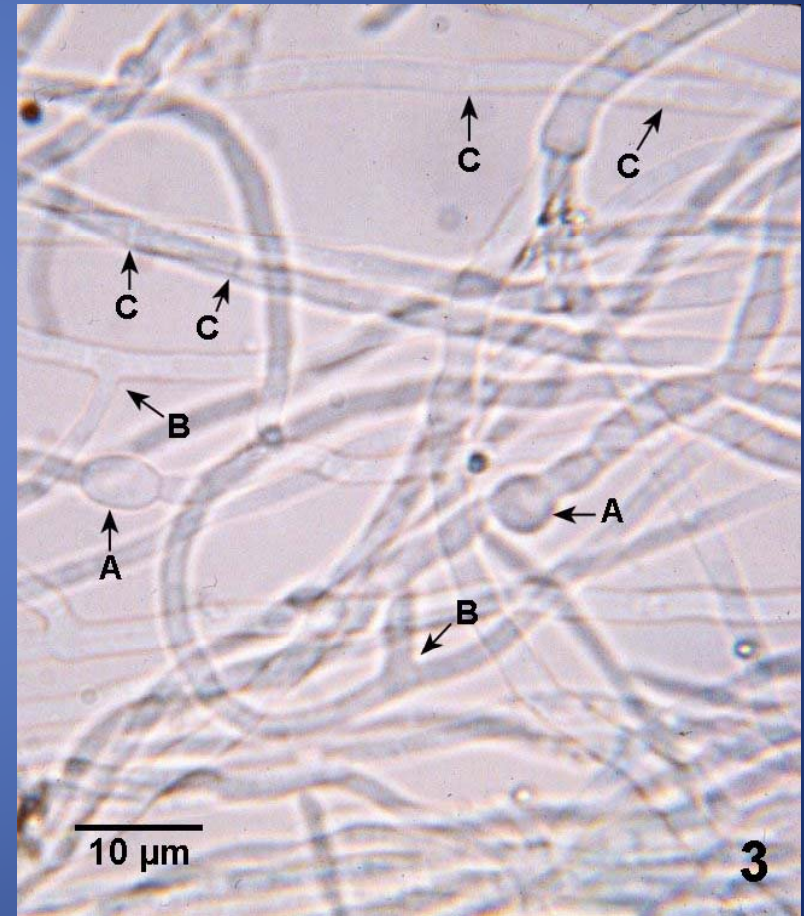


Wet Mounts - Yeasts

- Budding/branching organisms with hyphae (septations) and pseudohyphae. Example below is *Candida* species: note regular points of constriction of cell wall (resembling sausage links)



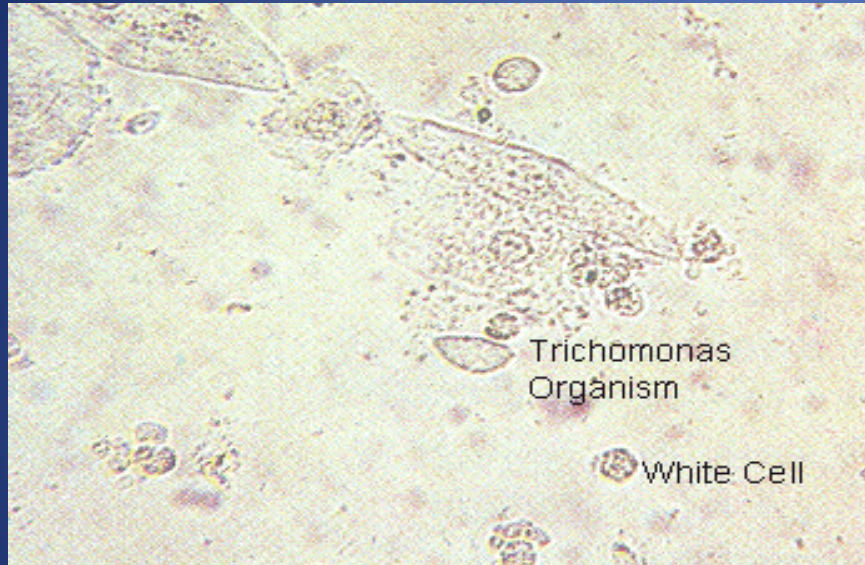
Wet Mounts – Yeasts: look for septations or point of constriction



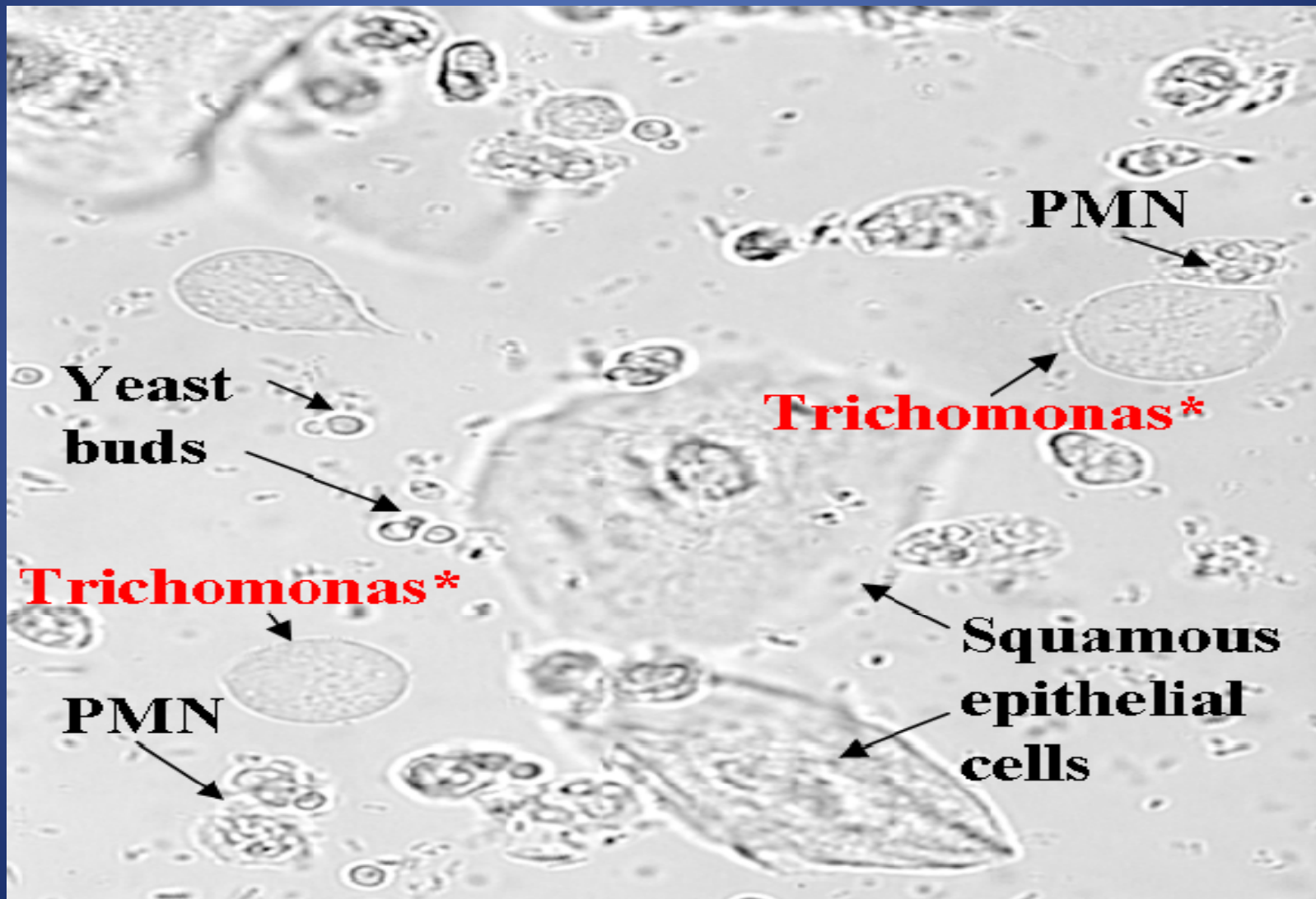
Wet Mounts - Trichomonas

- Sexually transmitted flagellated motile parasite. Infection may be asymptomatic.
- Trophozoite found in vaginal secretions, prostatic fluid and urine sediment.
- Often diagnosed by motility in urine sediment or wet preparations.
- Organisms are oval (lemon shaped), possesses four flagella, have a single large nucleus and a short undulating membrane.

Wet Mount – Trichomonas: note the presence of flagella (bottom picture)

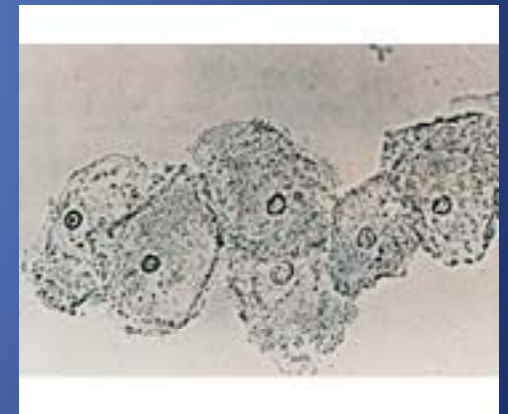
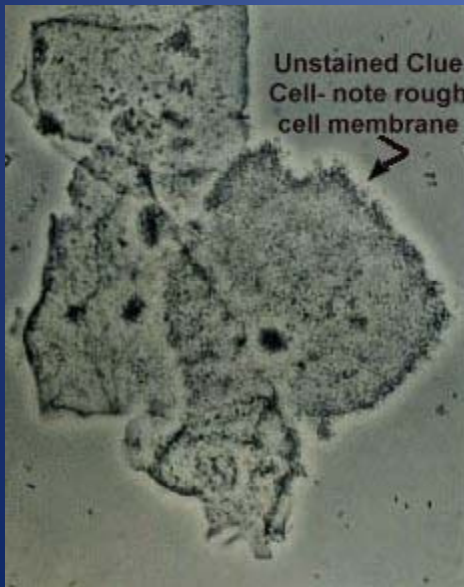


Wet Mount – Trichomonas: lemon shaped



Wet Mount – Clue cells

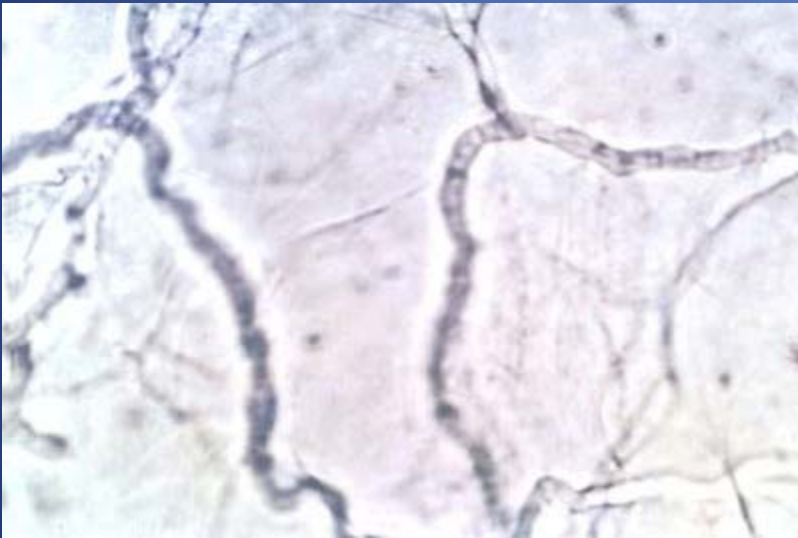
- Epithelial cells of the vagina covered by bacteria. Cells show “rough” cell membrane; cells have a “dirty” appearance.



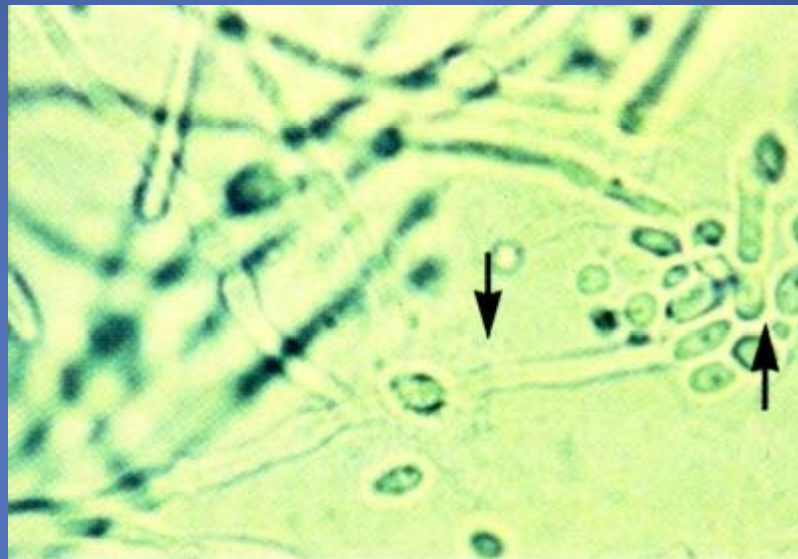
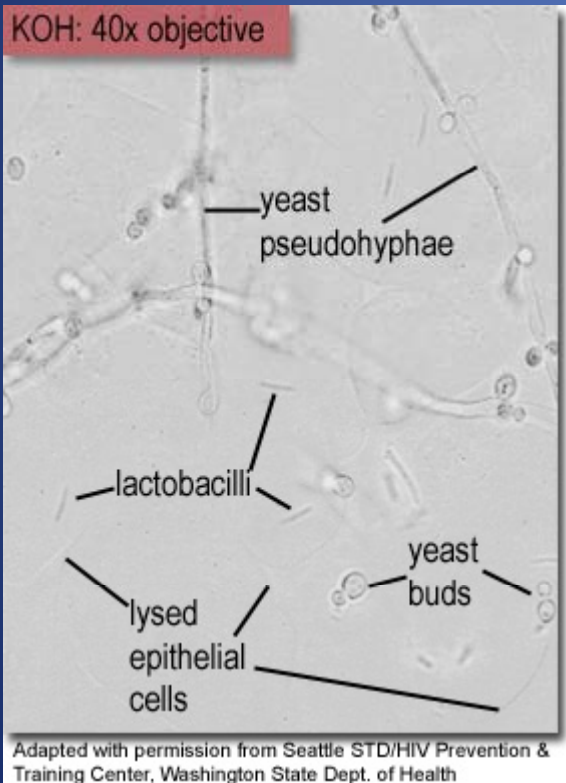
KOH (potassium hydroxyde) prep

- KOH prep is a test performed to rapidly diagnose the presence of fungal elements (yeast [Candida] or dermatophytes) in hairs, skin or nails tissue.
- KOH prep involves the preparation of a slide for viewing under microscope. KOH mixed with a black-blue dye is added to the sample. KOH dissolves the skin, hair and debris; the dye adds color.
- Dermatophytes recognized by their long branch-like structures. Yeasts have round or oval shape.

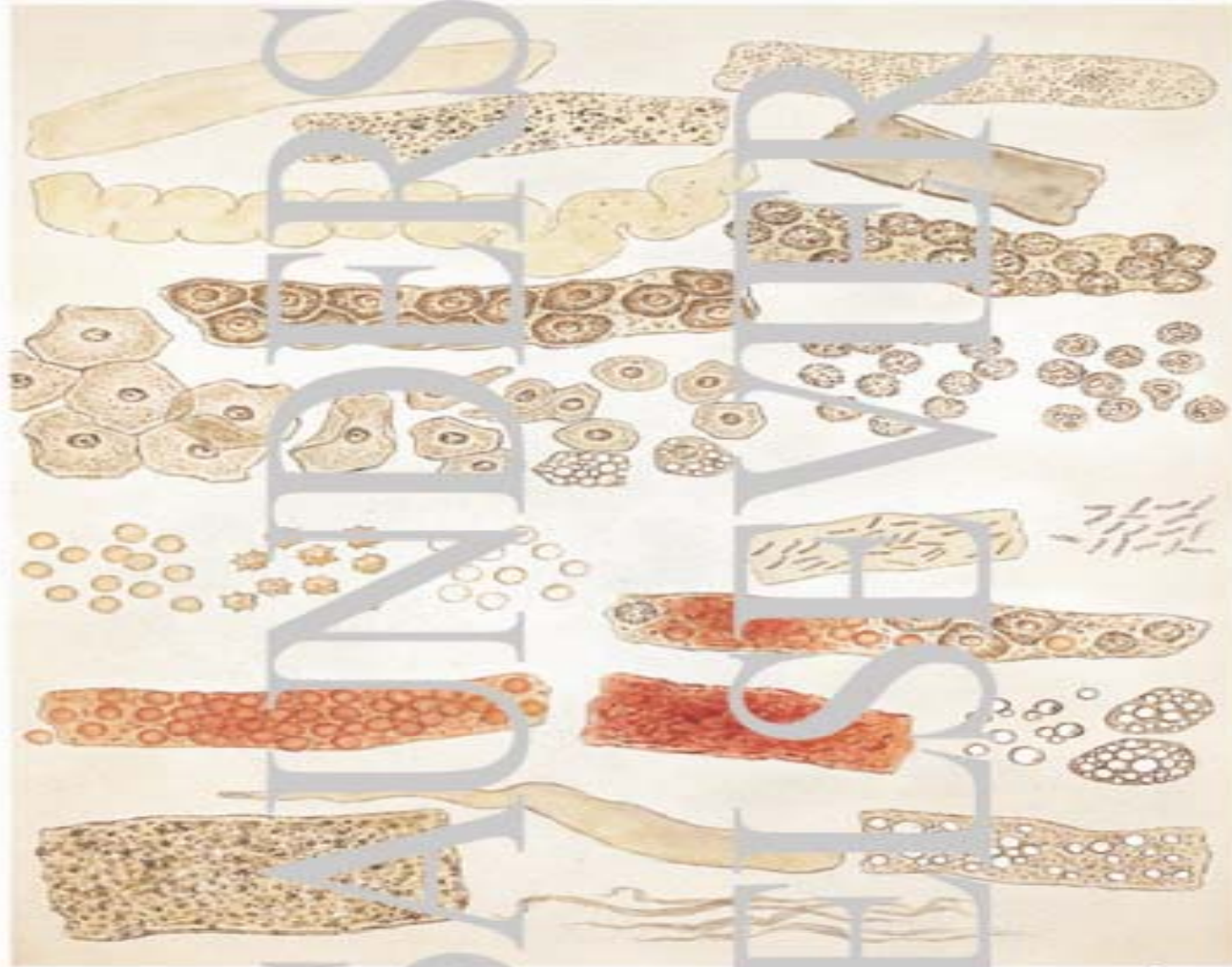
KOH prep – dermatophytes: branched septated structures



KOH prep – yeasts: look for oval/round structures



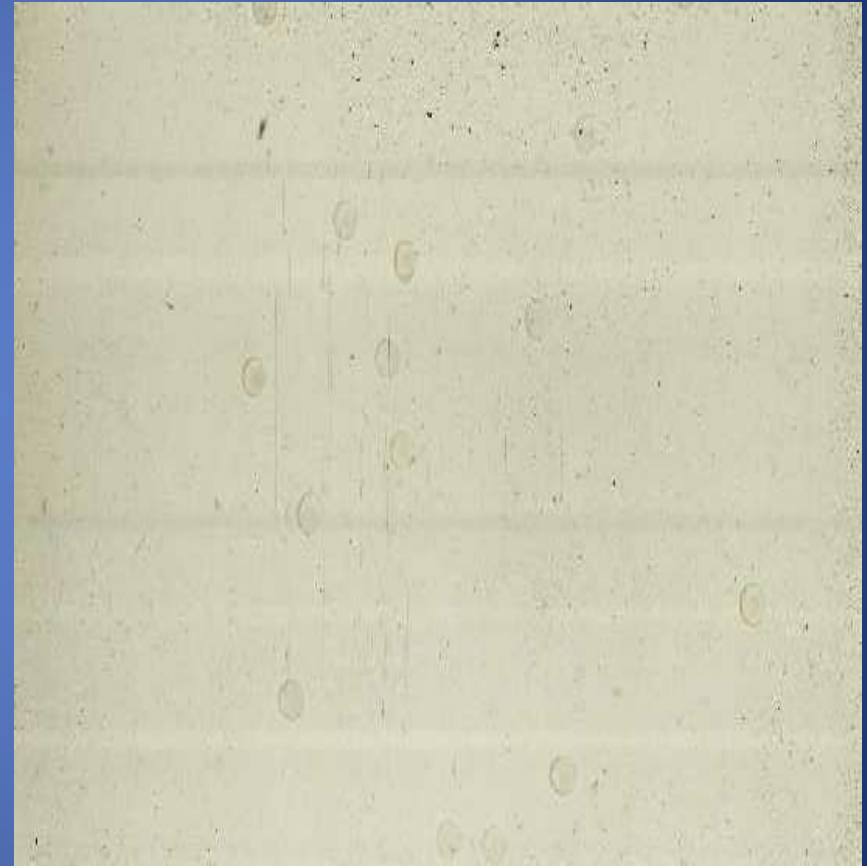
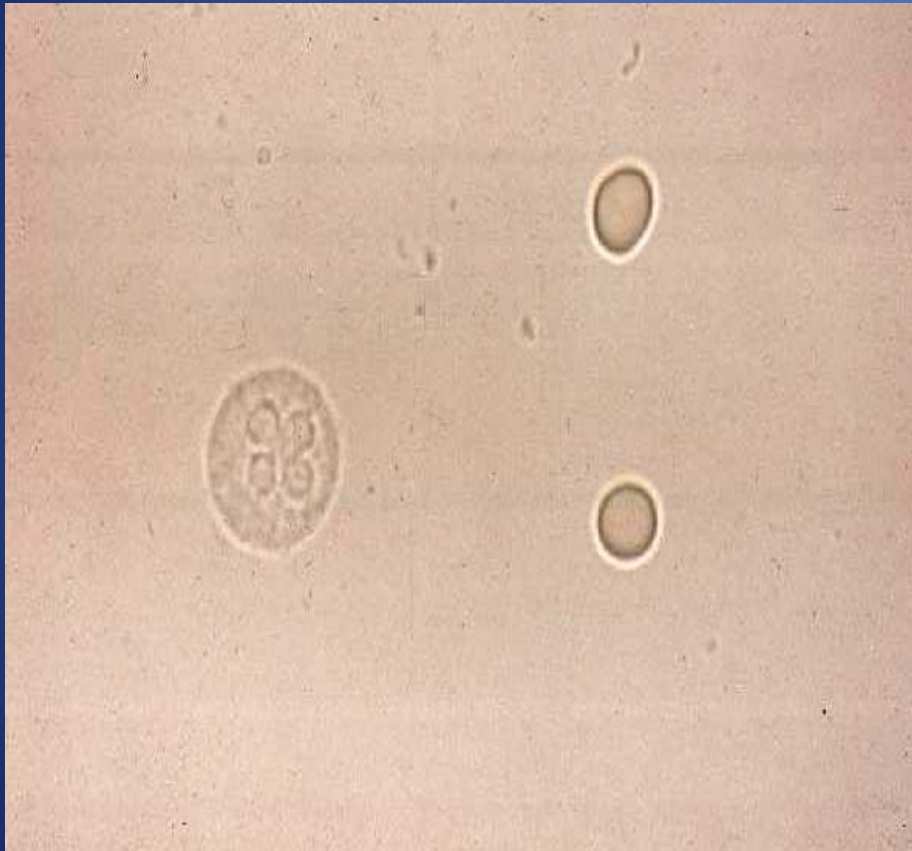
Urine Sediment Evaluation



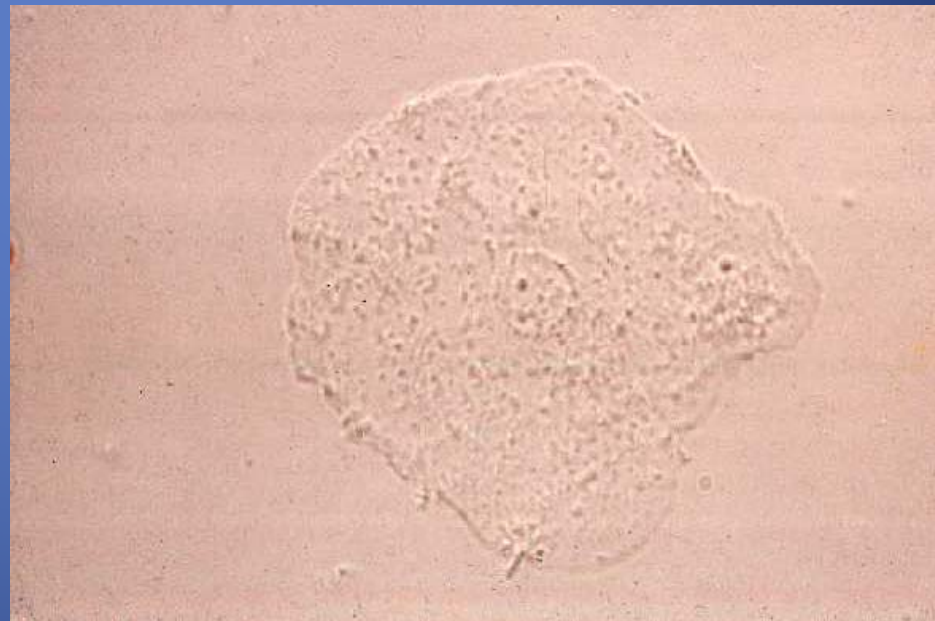
Urine Sediment Evaluation

- Microscopic Examination involves looking for:
 - RBCs: Biconcave discs
 - WBCs: Multilobed nuclei
 - Epithelial Cells (squamous cells, transitional cells)
 - Casts
 - Bacteria
 - Crystals

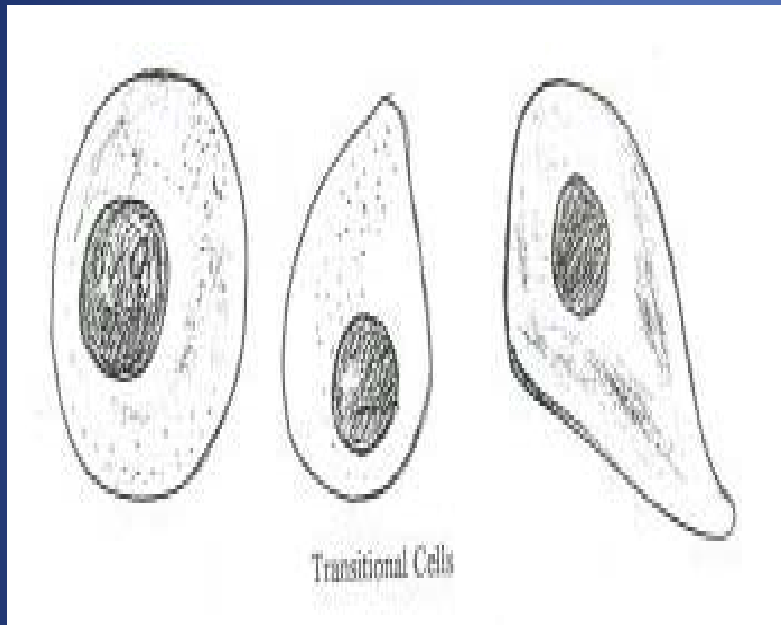
Urine Sediment Evaluation: WBC → look for multilobed nucleus;
left picture shows 1WBC (neutrophil) and 2 RBCs; right picture shows multiple RBCs



Urine Sediment → Squamous Cells: most common epithelial cell



Urine Sediment → Transitional cells: cuboidal; central to peripherally located nuclei



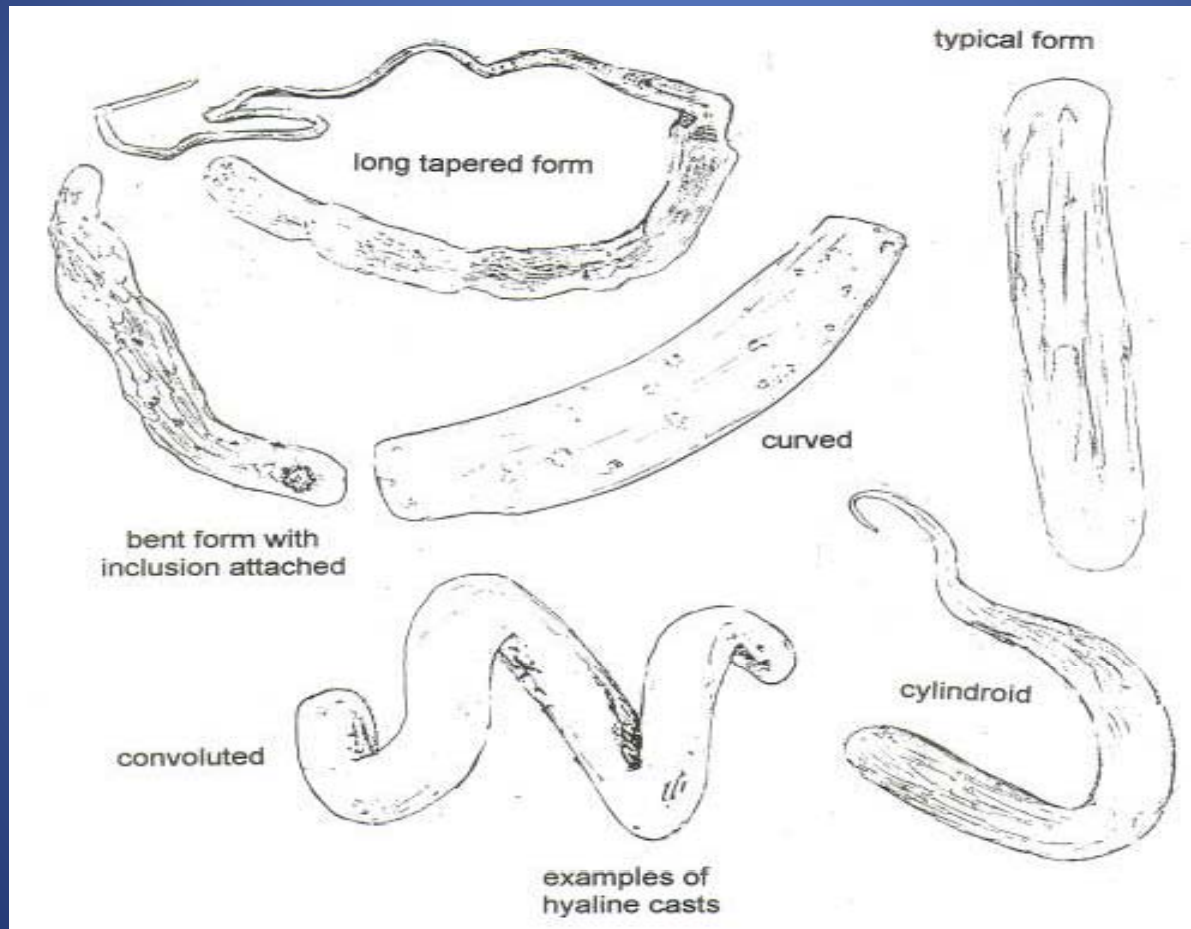
Urine Sediment: Casts

- Formed in the renal tubules and the collecting ducts; most commonly in the distal tubules.
- Protein matrix: Tamm-Horsfall mucoprotein.
- Factors influencing formation: stasis, decrease pH, increased Tamm-Horsfall mucoprotein.
- Casts may be hyaline if made of protein matrix only.
- Granular: protein matrix + granules.
- Cellular casts: red cells/WBCs/epithelial cells + protein matrix.

Urine Sediment: Hyaline Casts

- Most frequently observed cast. Composed almost entirely of Tamm-Horsfall protein.
- 0-2 hyaline casts per low power field: normal
- Hyaline casts are translucent with brightfield microscopy. More difficult to appreciate than waxy casts.
- Increased numbers seen with exercise, heat exposure, dehydration, fever, congestive heart failure and diuretic therapy

Urine Sediment: Hyaline casts → may be seen in healthy individuals



Urine Sediment: Waxy Casts

- Seen in chronic renal disease (chronic renal failure) and in acute or chronic renal allograft rejection.
- Differ from hyaline casts in that they are easily visualized because of their high refractive index.
- Smooth in appearance with sharp margins, blunted ends and cracks frequently seen along the lateral borders

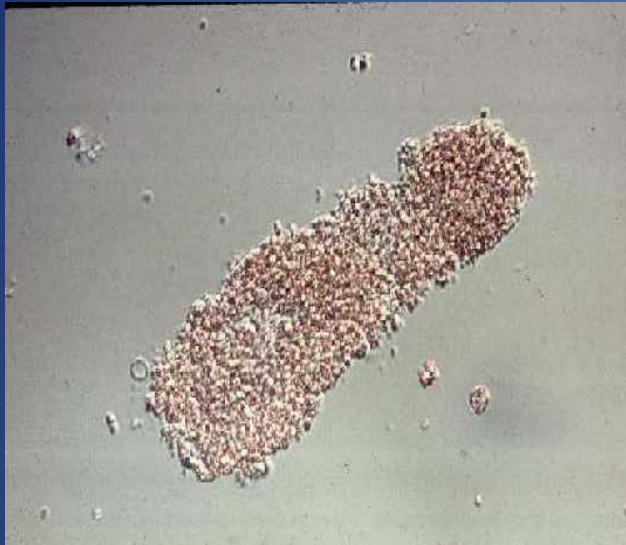
Urine Sediment → Waxy casts: note cracks and blunted ends



Urine Sediment: Granular Casts

- Common casts seen in pathologic and non pathologic conditions.
- Granules are small or large and originate from plasma protein aggregates or from cellular remnants of WBCs, RBCs, or damaged renal tubular cells.
- Granular casts appear with glomerular and tubular diseases, tubulo-interstitial disease and renal allograft rejection.
- Coarsely granular casts occur, with hematuria, in cases of renal papillary necrosis.

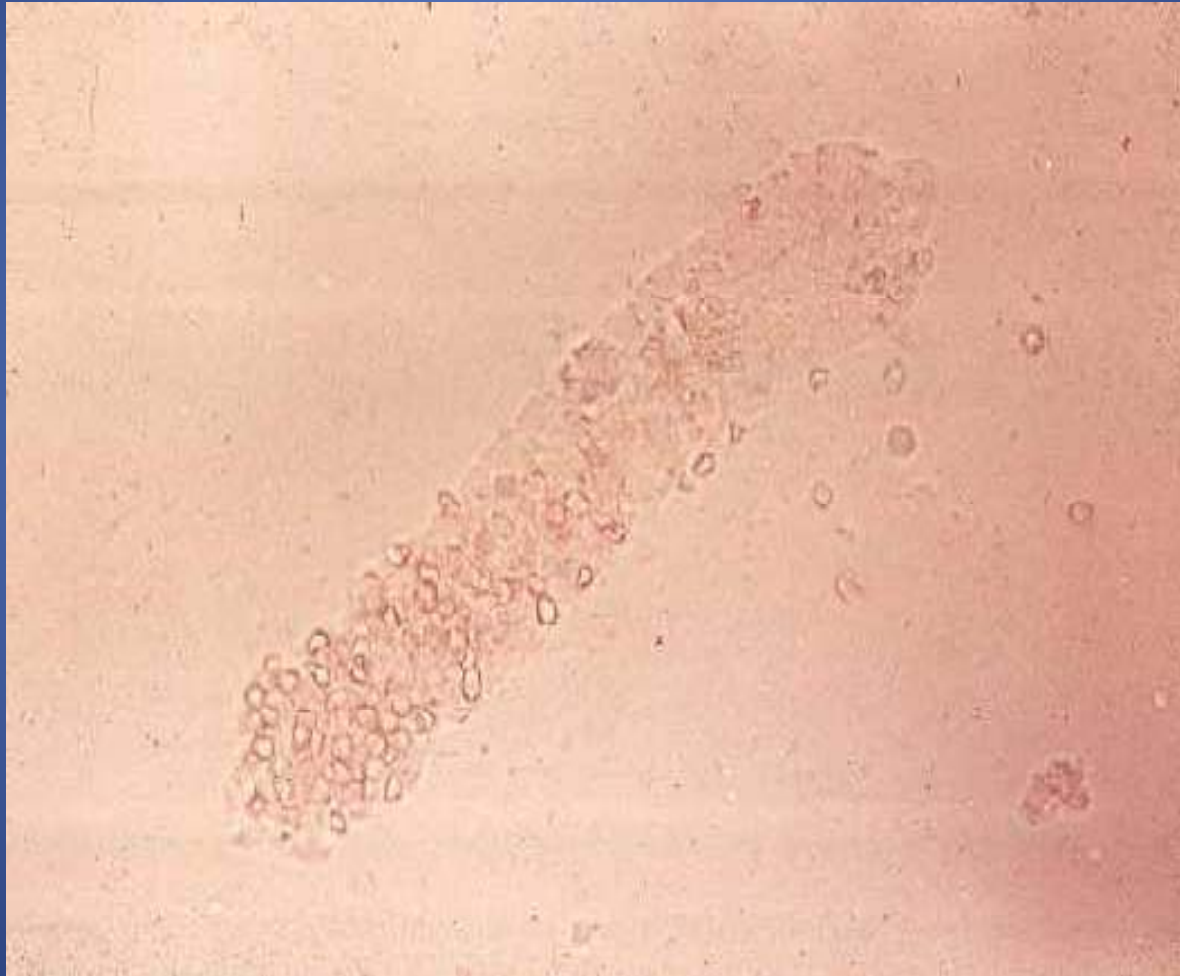
Urine Sediment: Granular Casts → note numerous granules



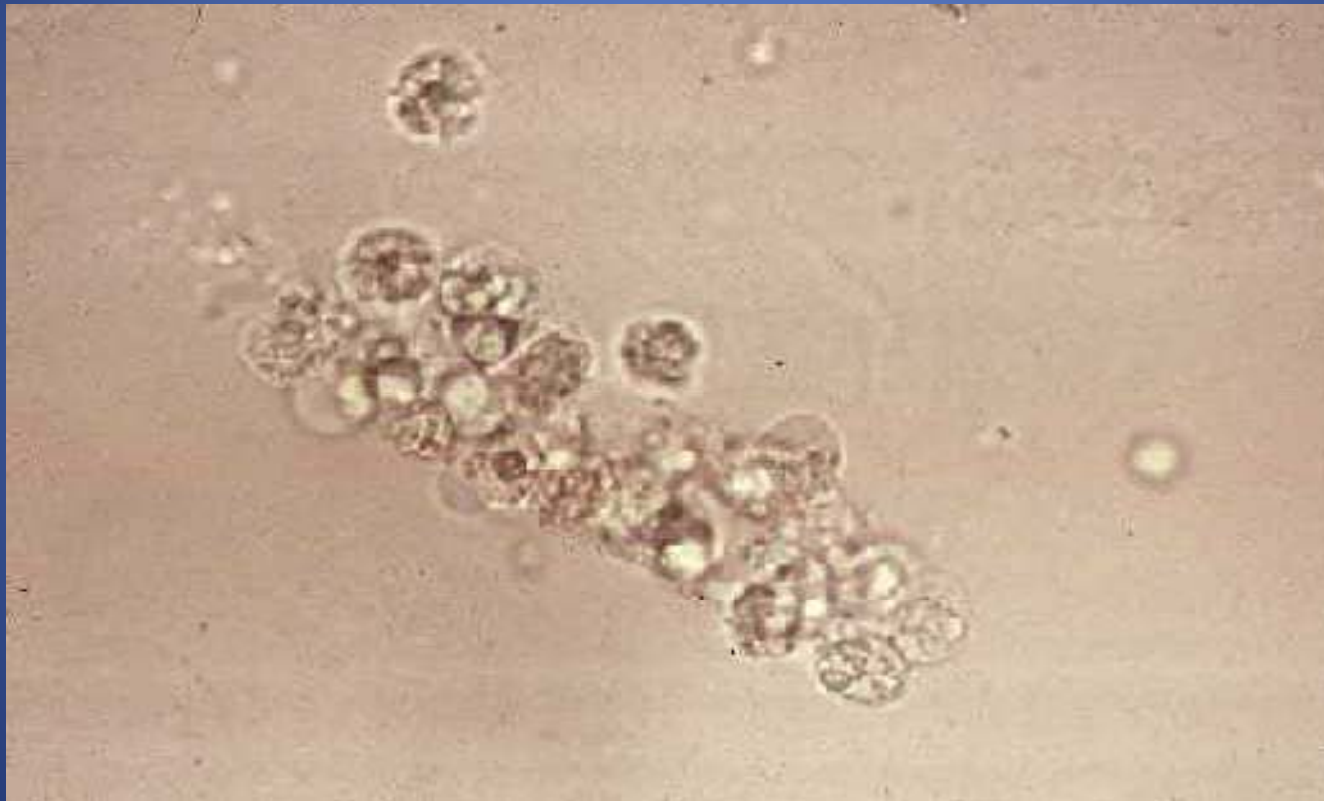
Urine Sediment: Cellular Casts

- Erythrocyte (RBCs) Casts: Finding of these casts is always significant because they are an indication of bleeding within the nephron. Glomerular damage allows escape of RBCs; if proteinuria is present red cell casts will form (in distal nephron). For identification RBC outlines have to be sharply defined in at least part of the cast.
- Leukocyte (WBC) Casts: Reflect tubulointestinal disease with neutrophilic exudates and interstitial inflammation. Most common disease in which these casts are seen is pyelonephritis. These casts are refractile, exhibit granules and multilobated nuclei.

Urine Sediment: RBC cast → RBC outlines are sharply seen in bottom of cast



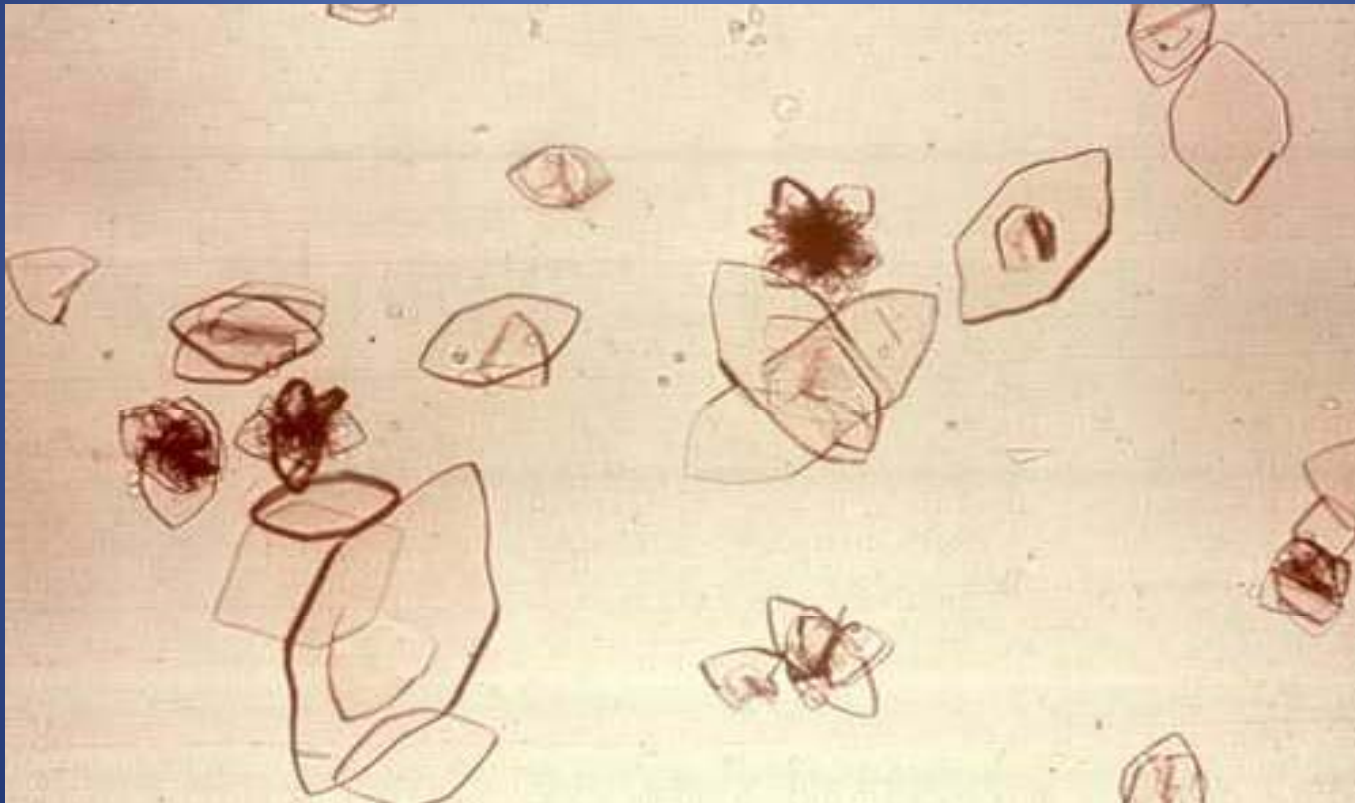
Urine Sediment: WBC cast → WBC with multilobed nuclei seen at right bottom part of cast



Urine Sediment: Crystals

- Crystals seen in acidic urine:
 - Uric acid: very pleomorphic; lemon shaped crystals
 - Amorphous urates: sediment is pink
 - Calcium Oxalate: tomatoes, apples, oranges and carbonated drinks are rich in oxalic acid; crystals look like an envelope

Urine Sediment: Uric Acid → lemon shaped crystals



Urine Sediment: Calcium Oxalate crystals → look like envelopes

