

# Urinalysis and Body Fluids CP9

Unit 2; Session 2

RBCs in the Urine Microscopic

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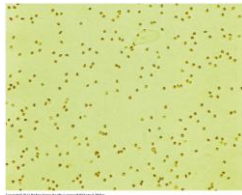
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## Microscopic Sediment - Red Blood Cells

- Red blood cells
  - Pathological finding - cannot appear in filtrate if nephron is intact.
  - result of damage / injury to glomerular membrane, or urinary tract (inc. renal calculi)
    - Isomorphic / fresh looking RBCs usually come from lower tract
    - Dysmorphic / oddly shaped RBCs been subjected to effects of urine environment longer.

Many RBCs and a squamous epithelial cell, low power magnification / 1pf



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## Microscopic Sediment - Red Blood Cells

- differentiate:
  - Hemoglobinuria - free hemoglobin in urine
  - Hematuria - presence of increased numbers of intact RBCs in urine
  - Hemosiderin - orange/ brown pigment found as intracellular granules

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## Microscopic Sediment - Red Blood Cells

- Red Blood Cells
  - Although NV = 0-2 hpf, an occasional RBC is more significant than occasional WBC.
  - American Urological Association
    - defines clinical significant microscopic hematuria as: three or more RBC / hpf in 2 of 3 properly collected urine samples.

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## Microscopic Sediment - Red Blood Cells

- Red Blood Cells  
NV = 0-2 / hpf



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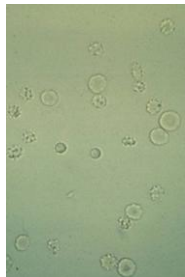
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## Microscopic Sediment - Red Blood Cells

- Red Blood Cells
  - Detection
    - High power magnification
    - Reduced light
    - yellow - red sheen (sometimes blue-green)
    - Usually highly retractile,
      - Use fine adjustment knob
    - In dilute or alkaline urine appear as ghost or shadow cells
    - Can be any shape
      - Normal disc
      - Dysmorphic
        - swollen or
        - crenated.



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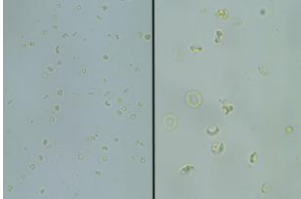
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## Microscopic Sediment - Red Blood Cells

- RBCs of various shapes & different levels of magnification



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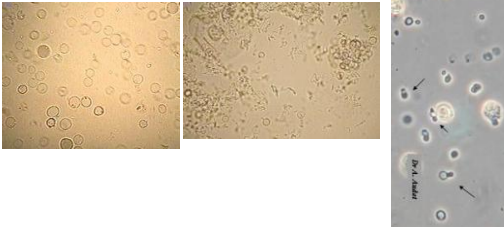
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## Microscopic Sediment - Red Blood Cells

- RBC can even get small 'blebs' on them, making them appear similar to budding yeast.



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## Microscopic Sediment - Red Blood Cells

- Red Blood Cells
- Urine RBCs can be easily confused with:
  - WBCs
    - Generally larger
    - Contain nucleus
    - Do not lyse in 2 % acetic acid



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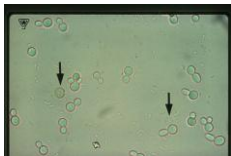
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## Microscopic Sediment - Red Blood Cells

- Red Blood Cells
- Urine RBCs can be easily confused with:
  - Yeast
    - Generally refract light differently
    - Usually have buds / and often are more egg shaped
    - Sometimes demonstrate branching
    - Do not dissolve in 2% acetic acid
    - Do not stain with eosin



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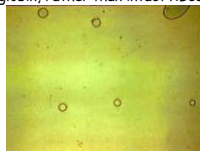
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## Microscopic Sediment - Red Blood Cells

- Red Blood Cells
- Urine RBCs can be easily confused with:
  - Bubbles or oil droplets
    - Large variation in size. Even more refractive / and have 'hard' appearing edges.
    - Confirmation- test for hemoglobin - by dipstick, which is most sensitive to free hemoglobin, rather than intact RBCs



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## Microscopic Sediment - Red Blood Cells

⚠ RBC or yeast cell?



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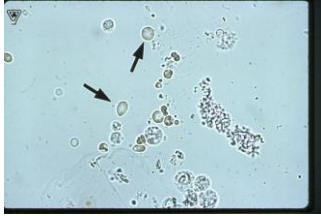
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## Microscopic Sediment - Red Blood Cells

⚡ RBC or yeast cell?



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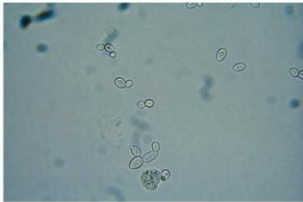
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## Microscopic Sediment - Red Blood Cells

• yeast



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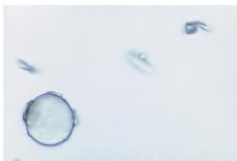
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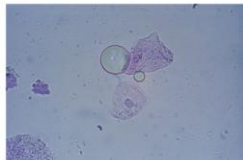
## RBCs (cont'd)

Air Bubble



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Oil Droplets



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## Microscopic Sediment - Red Blood Cells

- Viewed on high dry : 0-2 /hpf
- Damage anywhere in the urinary tract
- No nuclei; Yellow-greenish & biconcave / hourglass - if on edge
- Swollen or Ghosts if in hypotonic or alkaline urine
- Crenated if in hypertonic urine
- Can be confused with
  - WBCs
  - Yeast
  - Oil droplets
  - Air bubbles

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