Epithelial Cells
in the Urine Microscopic

Microscopic Sediment
- Epithelial Cells

- Epithelial Cells
  - Cells sloughed from the kidney, urethra, bladder and genital track.
  - Unless increased in number or abnormal forms, they are normal part of sediment.
  - May be reported as present or differentiated as to types.

- Epithelial Cells
  - Three major types
  - Classified according to site of origin
    - Squamous
    - Transitional
    - Renal tubular.
Microscopic Sediment
- Epithelial Cells

- Squamous epithelial cells
  - Physically the largest.
  - Small centrally located nucleus
  - Abundant cytoplasm
  - May be rolled-up or folded and appear to be casts.
  - Easy to see under lpm.
  - Origins
    - Lower part of urethra
    - Female vagina
    - Specimen contaminant

- Report as average number seen / lpf.
- See: Urinalysis Reporting Standardization Guide

Sternheimer-Malbin-stained RBCs, WBCs, and Squamous epithelial cells

Sternheimer-Malbin-stained RBCs, WBCs, and Squamous epithelial cells
Microscopic Sediment - Epithelial Cells

- **Squamous epithelial cells**
  - Clue cells - squamous epithelial cells with *Gardnerella vaginalis* bacteria colonizing the cell - a sign of vaginal infection.
  - Wet prep specimen of vaginal scrapings/washings are most often used in diagnosis.
  - Urine specimen may also demonstrate clue cells.

- **Transitional epithelial cells**
  - Line urinary track from renal pelvis to upper portion of the urethra.
Transitional epithelial cells

Microscopic Sediment – Epithelial Cells

- Transitional epithelial cells

Report as average number / hpf
- On left, squamous and transitional cells, hpf, Toluidine blue stain.

Renal Tubular Epithelial Cells (RTEs)
- Line the tubules of the nephron
- Shape varies
  - Depending on exact origin
  - They may be flat, cuboidal, or columnar.
- Larger than leukocytes
- Contain a large round nucleus
Renal Tubular Epithelial Cells (RTEs)
- Most significant of the epithelial cells
- Increased numbers of tubular epithelial cells suggest tubular damage:
  - Glomerulonephritis, acute tubular necrosis,
  - Salicylate intoxication, heavy metal poisoning,
  - Diethylene glycol (antifreeze) poisoning,
  - Kidney transplant rejection, some viral infections
- Can absorb pigments such as hemoglobin & bilirubin
- Can contain vacuoles
  - Non-lipid vacuoles = bubble cells
  - Lipid vacuoles = oval fat bodies

Renal Tubular epithelial cell types
- Proximal tubular renal epithelial cells
  - Rarely found
  - Round eccentric nucleus, granular cytoplasm, may have brushy border.
  - Their long trip from the proximal tubule usually results in cell degenerating (may explain why cytoplasm gets granular).
  - Columnar in shape and may look like small casts
  - Pictures are hpf magnification

- Distal tubular epithelial cells
  - Smaller, round to oval shaped
  - May resemble WBCs, or spherical transitional cells
  - Round eccentric nucleus, granular cytoplasm, may have brushy border.
  - Pictures are hpf magnification
Renal tubular epithelial cell types
- Collecting duct epithelial cells
  - Cuboidal, never round
  - At least one straight edge
  - Eccentric nucleus
  - Three or more cells in clump is renal fragment; often large sheets
    - Proximal and distal RTEs do not do this.
  - Pictures are x400 magnification.

Microscopic Sediment - Epithelial Cells
- Transitional cell (A), Renal epithelial cells (B) and WBCs (C).

Microscopic Sediment - Epithelial Cells
- RTEs; 250x magnification
- Also WBC and RBCs
References

- Susan Strassinger & Marjorie Di Lorenzo, *Urinalysis and Body Fluids*, 5th Ed.
- Mary Haber, MD, *A Primer of Microscopic Urinalysis*, 2nd Ed.
- Zenggang Pan, MD, PhD, Dept of Pathology, U of Alabama at Birmingham
- Department of the Army, Landstuhl Regional Medical Center
- http://www.dcss.cs.amedd.army.mil/field/FLIP%20Disk%204.2/FLIP42.html
- Seattle STD/HIV Prevention & Training Center, Washington State Dept. of Health (clue cells)