

Urinalysis & Fecal Analysis



1. Physical Parameters

Urine Collection Methods

This is how the sample was obtained

- Free Catch - The patient voided urine on their own
- Cystocentesis - We removed it from the bladder
- U-Cath - We removed it from the urinary catheter



Color of Urine

A way to describe the visual appearance of urine



Hematuria

- Red or Red Brown Colored Urine
- UTI or inflammation (cystitis, pyelonephritis, nephritis, prostatitis)
- Due to traumatic cysto or catheter, or manual expression
 - Calculi (Stones)
 - Neoplasia (Tumors)
- When centrifuged the RBC will go to the bottom of the vial



Hemoglobinuria

- Red
- Red/Brown
- Intravascular Hemolytic Anemia
- When centrifuged the color of the urine will be unchanged. RBCs won't all go to the bottom of the tube.



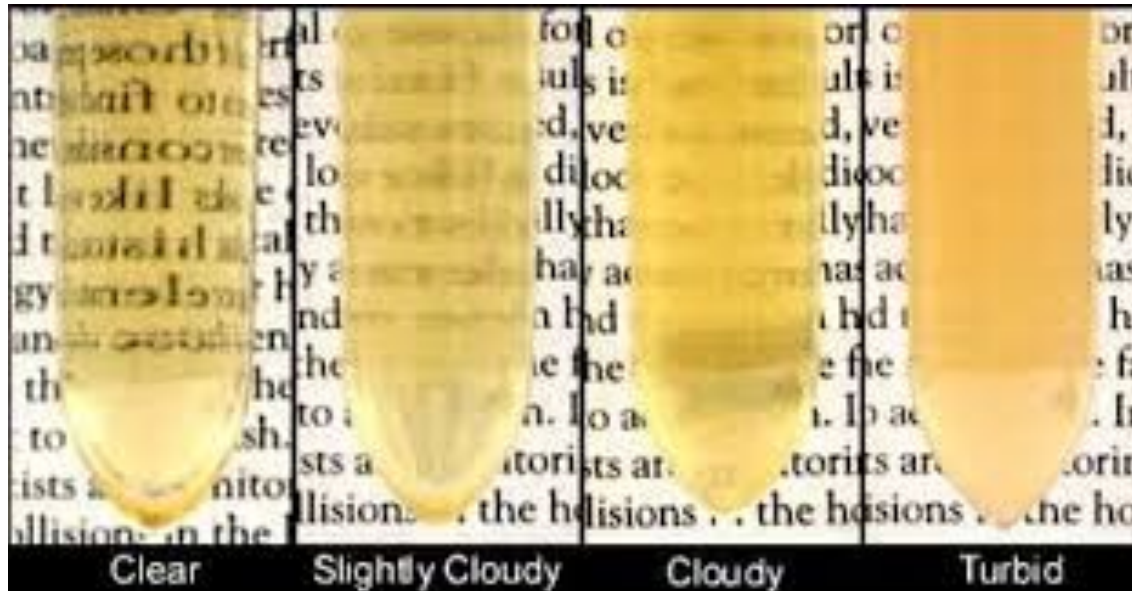
Bilirubinuria

- Yellow/orange
- Yellow/brown
- Hepatic or biliary disease
- Hemolytic disease



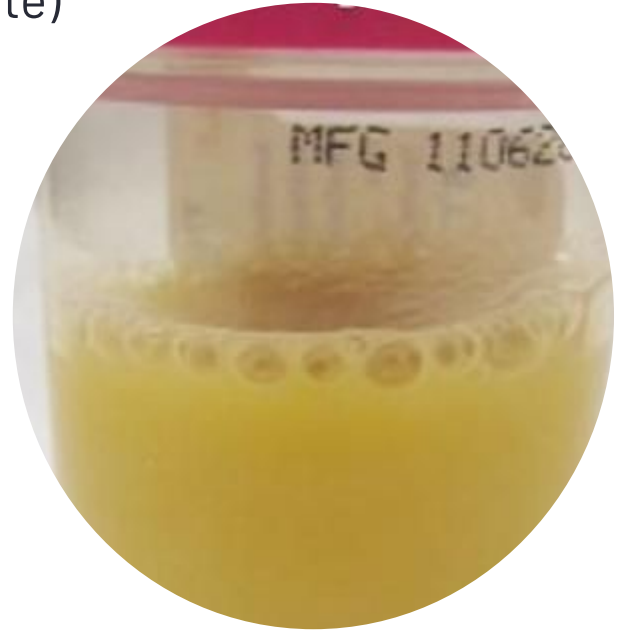
Clarity of the Urine

A way to describe the visual appearance of the urine (clear, cloudy, turbid)



If There is Decreased Clarity

- UTI or Inflammation (Cystitis (Bladder), Pyelonephritis (Kidney), Nephritis (Kidney), Prostatitis (Prostate))
- Urinary calculi
- Neoplasia



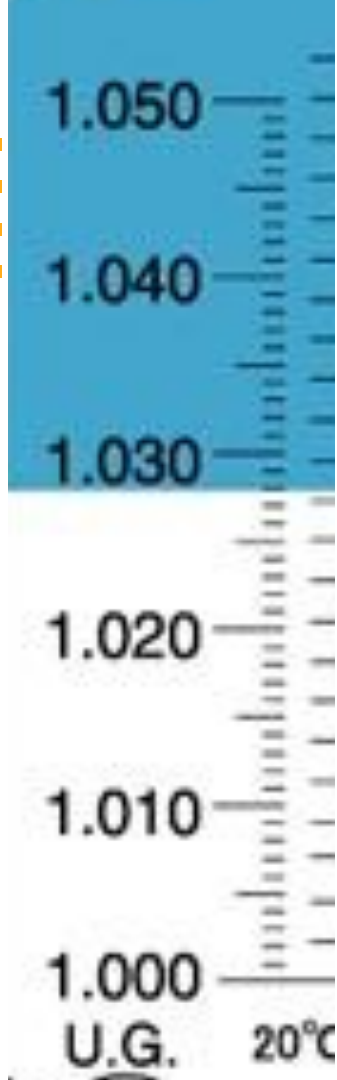
Difference Between Nephritis & Pyelonephritis

- Nephritis is often caused by infections, and toxins, but is most commonly caused by autoimmune disorders that affect the major organs like kidneys.
- Pyelonephritis is inflammation that results from a urinary tract infection that reaches the renal pelvis of the kidney.





2. Urine Specific Gravity



USG!

Urine Specific Gravity

Reflects concentration of particles in the urine.

Urine Specific Gravity

- USG must be interpreted in light of the
- animal's hydration status.
- Values ≤ 1.005 = dilute urine;
- Values > 1.030 (dog) or > 1.035 (cat) = concentrate urine.
- Inappropriate USG implies kidney disease.

Refractometer

- After cleaning with distilled water and drying, place a small drop of urine on the blue portion of the glass.
- Close the lid and hold it down while looking to the eyepiece up at the light to see the line that falls between light and dark.



Hyposthenuria (USG <1.008)

- Low specific gravity due to inability of the kidney to concentrate the urine normally
- Pyometra
- Addison's or Cushing's
- Pyelonephritis
- Hypercalcemia
- Increased water consumption
- Hyperthyroidism
- Medications or fluid therapy

Isosthenuria (USG 1.008–1.012)

- Is neither greater (more concentrated) nor less (more dilute) than that of protein-free plasma
- Renal Disease
- Addison's Disease or Cushing's Disease
- Diabetes Mellitus
- Increased water consumption (primary polydipsia)
- Lack of medullary concentrating ability
- Medications or fluid therapy



Hypersthenuria (USG >1.012)

Appropriate concentration

- Dog >1.030
- Cat >1.035

- Can be a result of dehydration





3. Urine Dipstick



The Urine Dipstick

1 Drop of urine on each pad on the stick will determine various results that help us with a diagnosis.



pH = Potential of Hydrogen

- Urine pH is a measure of acidity or alkalinity of the urine. To help maintain a normal blood pH, the kidney will vary how much acid is put into the urine.
- Carbon dioxide (an acid) in the body affects the acidity
- Bicarbonate (a base) in the body affects the alkalinity in the blood.
- When one goes up the other goes down, there should be a balance (pH of 7 is neutral, >7 Base, <7 Acid)

Decreased pH (acidic) vs Increased pH (Alkaline)

ACIDIC

- Metabolic acidosis (Antifreeze Toxicity, DKA, ARF or CRF, Addison's)
- High-protein or milk-based diet

ALKALINE

- Artifact (Delayed sample analysis (spontaneous degeneration of urea))
- UTI with urease-producing bacteria (Staphylococcus spp., Proteus spp.)



Protein

- **Negative Protein** - Clinically normal animal, Small amounts of protein ((50 mg/dL or less) can be normal in urine, especially if urine is concentrated
- **Increased Protein** - Prerenal proteinuria, Systemic hypertension, Renal proteinuria, Tubular proteinuria, Inflammation or infection of the upper or lower urinary tract, Hemorrhage into the urinary tract or reproductive tract, Neoplasia of the urinary Tract, Cushing's disease, False positives

Other Dipstick Testing

Glucose

Negative - Normal,
False Negatives can
come from low temps.

>Glucose - DM, Lepto,
Pyelonephritis, Renal
Tubular Dysfunction,
Stress in Cats

Ketones

Result from burning
fat for energy

Negative - Normal
False Negatives from
old urine

>Ketones - DKA or
Starvation

Urobilinogen

Byproduct of bilirubin
breakdown in the
intestines

Negative - Normal

Increase - Can be
normal in dogs, IMHA,
Zinc Toxicity, RBC
Parasite

Other Dipstick Testing

Bilirubin

Hemoglobin breakdown product of senescent red blood cells that is cleared by the liver. High concentrations in the blood cause a yellowing of the skin and sclera (jaundice).

Blood/Hemoglobin

Protein within the RBC that carries oxygen

Leukocytes (WBCs)

Feline results: not valid

Canine results: only valid occasionally; therefore, microscopic confirmation recommended

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UA ANALYZER

Automatically reads and captures dipstick strip results

- Please clean daily with alcohol and a lint free wipe
- Make sure it is dry before running the sample.





4. Urine Sediment and Microbiology



SediVue Dx

Urine Sediment Reader

[Click this link to review how to use the analyzer and how to perform a dry prep if you needed to do a manual slide.](#)



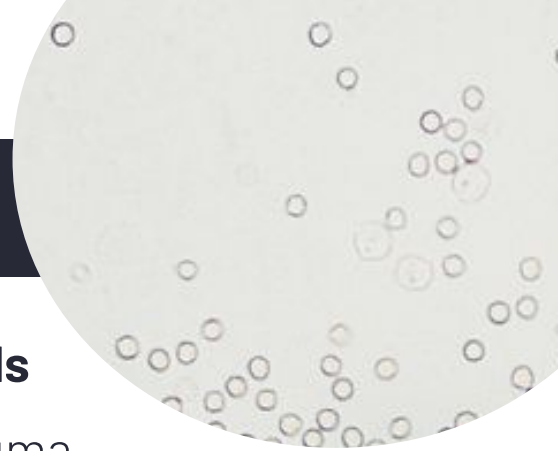
Red Blood Cells

None to rare red blood cells

- Normal (≤ 5 RBC/hpf considered clinically insignificant).
- RBCs rapidly lyse in samples with low urine specific gravity.

> Red Blood Cells

- Urinary trauma
- Cystocentesis, U-Cath, Manual Expression
- UTI or inflammation
- Urinary calculi
- Neoplasia



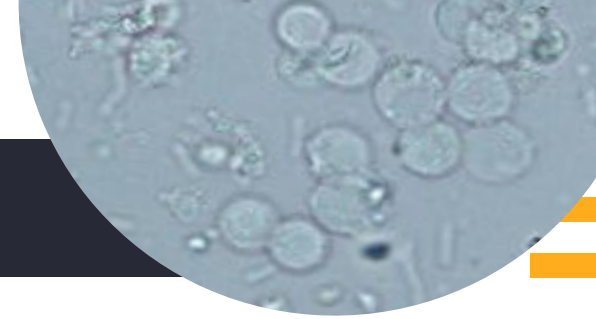
White Blood Cells

None to Rare White Blood Cells

- Normal (≤ 5 WBC/hpf)
- considered clinically insignificant)
- Occult inflammation:
- Low urine specific gravity, DM
- Cushing's disease, and Anti-inflammatory medications

Increased White Blood Cells

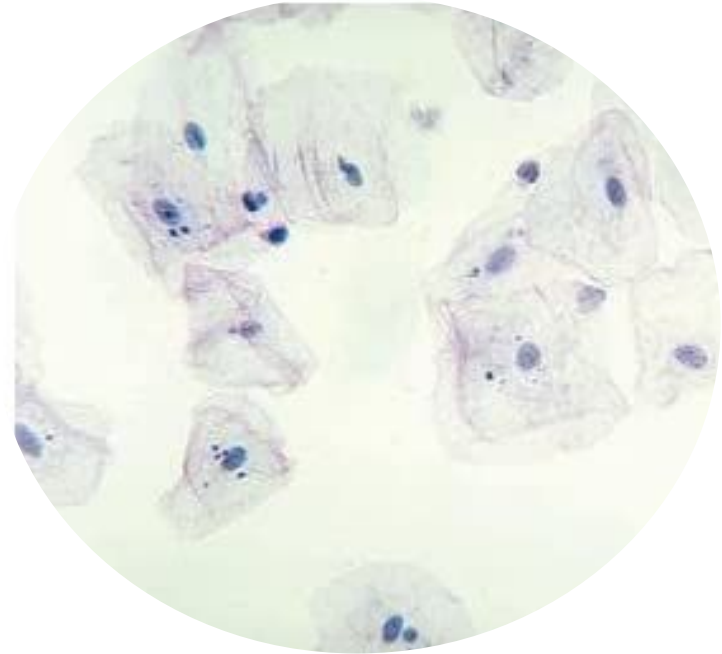
- Urinary tract infection or inflammation
- Urinary calculi
- Neoplasia



Squamous Epithelial Cells

Increased Epithelial Cells

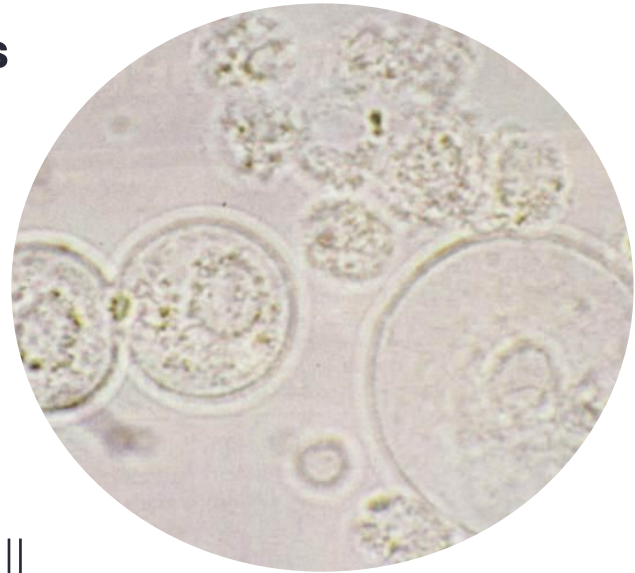
- Cells that line the surfaces of the external genitalia and lower urinary tract
- Possible with voided or catheterized samples from normal dogs and cats
- Urinary tract infection or inflammation, Urinary Calculi
- Neoplasia



Renal Tubular Epithelial Cells

Increased Renal Tubular Epithelial Cells

- Cells that line the urinary system (renal tubules, renal pelvis, ureters, and urinary bladder)
- Urinary tract infection or inflammation
- Urinary calculi
- Neoplasia (especially transitional cell carcinoma)



Hyaline Casts

Increased Numbers Mean

- Cell-free casts (cylinders) formed from Tamm-Horsfall mucoproteins within the renal tubules
- Low numbers may be normal in a highly concentrated urine
- Fever/exercise in low numbers
- Glomerular disease, Glomerulonephritis, Glomerular amyloidosis



Non-hyaline casts

Increased Numbers Mean

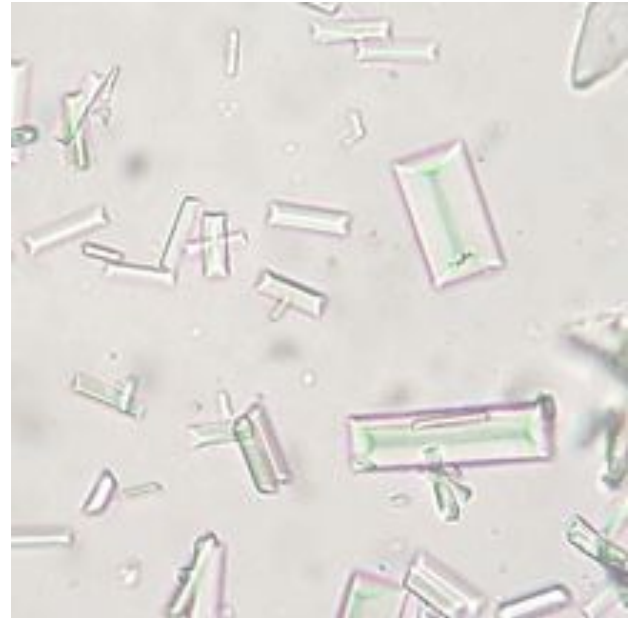
- Fever/exercise: low numbers of fine granular casts
- Active renal injury: epithelial cells, white blood cells, and granular casts possible
- Toxicity (NSAIDs, aminoglycosides, ethylene glycol) Renal ischemia /shock / hypoperfusion
- Renal infarction



Struvite Crystals

Increased Numbers Mean

- May form after collection in stored, refrigerated samples
- Urinary tract infection
- Idiopathic lower urinary tract disease of cats
- Potentially associated with struvite urolithiasis



Ammonium Biurate Crystals

Increased Numbers Mean

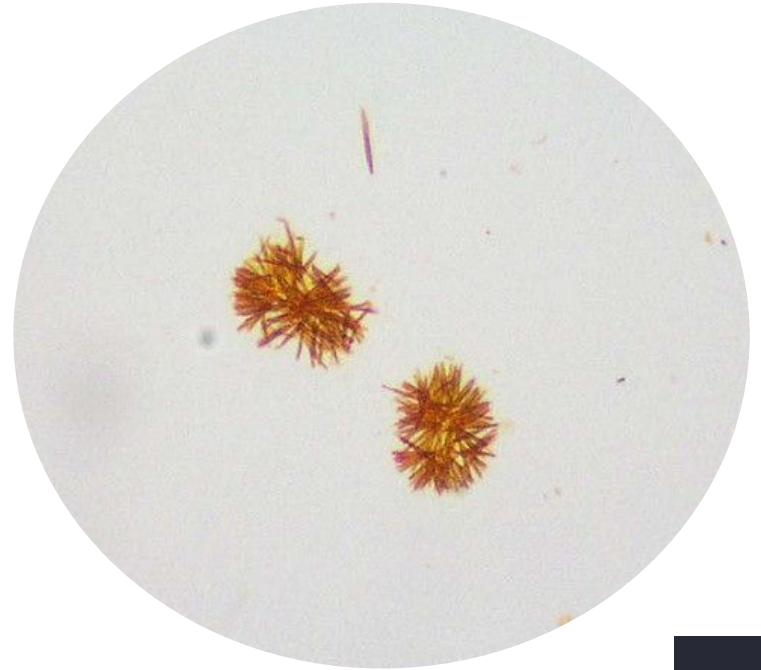
- Possible urate urolithiasis
- Portosystemic shunt
- Liver disease/failure
- May be seen in normal Dalmatians and English bulldogs
- May form after collection in stored, refrigerated sample



Bilirubin Crystals

Increased Numbers Mean

- Highly concentrated urine from normal dogs
- Increased conjugated bilirubin in urine
- Cholestatic liver disease
- Potential hemolytic disease



Uric Acid Crystals

Increased Numbers Mean

- Highly concentrated urine from normal dogs
- Possible uric acid urolithiasis



Uric Acid Crystals

Increased Numbers Mean

- Reported in many breeds; predisposed in Newfoundland, dachshund, mastiff, basset hound, English bulldog
- Result of a genetic abnormality that prevents a dog from reabsorbing cystine from the kidneys. Believed to be inherited in dogs.





Thanks!

Any questions?

You can find me at:

- sgarcia@aavec.com