

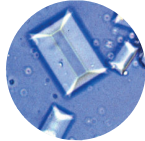


# URINE SEDIMENT ATLAS

Radiopaque stones

Non radiopaque stones

## STRUVITE



Struvite crystals



Struvite stones

- Stones usually white and hard, or yellow and dusty when crushed.

### Predispositions and mean age at occurrence

Cat
Female ≥ Male
1 to 6 years of age
No breed predisposition
Indoor cats
Obesity
Neutering

- Struvite crystals can be a component of urethral plugs.

Dog
Female >> Male
2 to 8 years of age
Miniature Schnauzer / Cocker Spaniel / Bichon Frise / Shih Tzu / Yorkshire Terrier / Miniature Poodle

- Associated with urinary tract infections in dogs.

### Dietary management

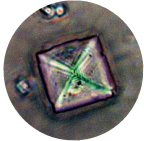


URINARY S/O

URINARY S/O HIGH DILUTION

URINARY S/O MODERATE CALORIE

## CALCIUM OXALATE



Calcium oxalate dihydrate crystal



Calcium oxalate stones



Calcium oxalate monohydrate crystals

- Stones often have a very uneven outline.

Cat
Male ≥ Female
7 to 9 years of age
Persian / Burmese
Indoor cats
Obesity
Neutering

- Monohydrate crystal: often associated with ethylene glycol poisoning.

Dog
Male >> Female
5 to 12 years of age
Miniature Schnauzer / Lhasa Apso / Yorkshire Terrier / Miniature Poodle / Bichon Frise



URINARY S/O

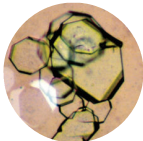
URINARY S/O HIGH DILUTION

URINARY S/O MODERATE CALORIE

Except in renal failure :

RENAL

## CYSTINE



Cystine crystals



Cystine stones

Cat
Female = Male
± 3.5 ans (4 months to 12 years)
Siamese

- May be associated with a disorder of renal tubular reabsorption.

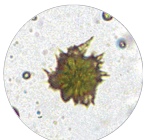
Dog
Male > Female
± 5 years of age (1-8 years)
Dachshund / English Bulldog / Newfoundland / Staffordshire Bull Terrier / Welsh Corgi / Basset Hound



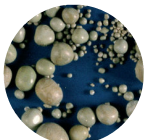
URINARY U/C LOW PURINE

RENAL

## AMMONIUM URATE



Urate crystals



Urate stones

Cat
No predisposition

- Often found in animals with liver disease or portosystemic shunt.

Dog
Male > Female
If no portosystemic shunt is present, otherwise Male = Female
± 3.5 ans without shunt < 1 year with shunt
Dalmation / English Bulldog / Miniature Schnauzer



URINARY U/C LOW PURINE

RENAL

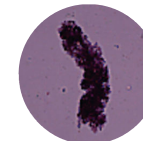
### KEY POINTS :

- The urine should be evaluated immediately after collection.
- Low quantities of crystals are normally present in urine.
- A cat may have stones and be crystal-free.
- In urolithiasis, the type of crystal observed may not reflect the type of stone present.
- A study showed that 92% of urine samples contain crystals when tested after 24 hours, versus 24% when tested immediately.
- Driving the cat to the veterinary surgery is sufficient to increase the urine pH. Indeed, urine pH is altered by stress and may increase by 1.4 as a result of hyperventilation-induced alkalosis.

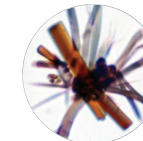


This logo, when featured on a diet's packaging, guarantees that this diet induces urine that is unfavourable to struvite and oxalate crystal formation.

## NORMAL



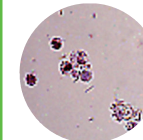
Hyaline cast



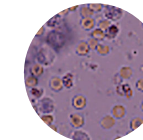
Bilirubin

- Few red and white blood cells.
- Very few squamous epithelial cells or hyaline casts.
- Bilirubin crystals in concentrated canine urine, especially in the male. The presence of these crystals is always abnormal in the cat.

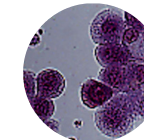
## PATHOLOGICAL



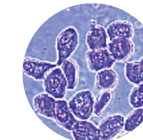
White blood cells



Red blood cells



Transitional epithelial cells



Neoplastic transitional cells

- Increased WBC :**
- urinary tract infection
  - urolithiasis
  - neoplasm

- Increased RBC :**
- cystitis
  - urolithiasis
  - trauma (cystocentesis,...)
  - contamination (prostate, prepuce)

- Transitional epithelial cells :**
- infection
  - neoplasm

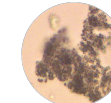
- Increased WBC casts :**
- pyelonephritis
  - interstitial nephritis

- Increased RBC casts :**
- glomerulonephritis
  - trauma

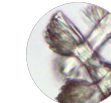
- Increased hyaline casts :**
- fever
  - primary glomerular disease
  - passive congestion of the kidney

- Bacteria :**
- infection (especially when the presence of bacteria is combined with increased WBC)
  - contamination
  - sample left for too long at room temperature before examination.

## ATYPICAL CRYSTALS



**Amorphous calcium phosphate :**  
Formation at neutral and alkaline pH, may be found in the urine of healthy cats



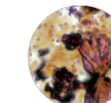
**Calcium phosphate - brushite :**  
Formation at acidic pH, uncommon.



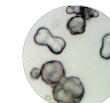
**Xanthine :** Formation at acidic and neutral pH. Rare and always abnormal. May be a result of allipurinol administration.



**Tyrosine :** Formation at acidic pH. Rare and always abnormal. Indicates the presence of liver disease.



**Sulphonamide - urinary metabolites :**  
Formation at acidic and neutral pH.



**Calcium carbonate :**  
Formation at neutral and alkaline pH. Very rare.