Understanding Your Pet's Urinalysis

Your veterinarian will recommend a urinalysis for your pet for a variety of different reasons. A urinalysis will record the chemical and physical properties of your pet's urine sample. This information can then be used to assess the urinary system, kidney function, hydration, and it can also be used to diagnose certain metabolic diseases.

There are different ways to obtain a urine sample from a pet. The least sterile option is obtaining a sample from the floor, once an animal has urinated. This is not ideal, as there may be traces of bacteria on the floor and it is not always easy to collect a decent sample. The most common way is known as the *"free-catch"* method, where a sample is collected while the pet is urinating - preferably mid-stream. Samples collected via the free-catch method should always be collected in a clean container and should be refrigerated if the sample cannot be brought to the hospital for analysis. It is always best to provide your veterinarian with the most recent sample possible. Another method of obtaining a sample is via *catheterization;* a sterile catheter is placed into the bladder, through the urethra and a sterile syringe is used to obtain a sample. This method is more sterile than a free-catch sample and is useful when a pet will not voluntarily provide a sample. The most sterile way to obtain a urine sample is through cystocentesis, where a needle is used to extract urine through the abdominal wall. An ultrasound is used to locate the bladder and to see if the bladder is full enough to obtain a sample.

Once a sample is collected, your veterinarian will run a urinalysis on the sample to get a better look on hydration, kidney function, and potential disease processes. There are many different values that are measured from one sample:

1. Specific Gravity - This is a measurement of how concentrated the urine is, or how much water it contains; this can give insight to hydration status as well as how well the kidneys are functioning. If the concentration is higher than normal, this would indicate dehydration. If the concentration is higher than normal, this indicates that there is more water in the urine than normal. Urine that is too diluted may indicate that the kidneys cannot retain enough water to prevent dehydration; this can occur from various diseases and additional testing may be necessary to determine the cause.

2. pH - Urine pH is a measure of how acidic or alkaline the urine is. The pH can change with diet, but can also signal the presence of infection or metabolic disease. Normal urine in cats and dogs ranges from mildly acidic to mildly alkaline. Extremes in urine pH beyond this range are more likely to be associated with disease.

3. PRO (protein) - small amounts of protein may be normally found in urine, but large amounts of protein found in dilute urine may indicate kidney disease.

4. GLU (glucose) - Sugar found in the urine; healthy animals should not have glucose in the urine, High levels of glucose are usually associated with an elevated blood glucose concentration. If a pet has had blood work done and the blood glucose is found to be high, a urinalysis can confirm a diagnosis of diabetes mellitus if the urine also contains a high glucose level. Small amounts of glucose are found in the urine of animals with kidney disease.

5. KET (ketones) - Ketones appear in urine whenever the body breaks down excessive amounts of stored fat to meet its energy needs. This occurs most frequently in diabetes mellitus, but can also be found in healthy animals during prolonged fasting or starvation.

6. UBG (urobilinogen) - A small amount of urobilinogen in a pet's urine is normal and indicates that the bile duct is open and bile can flow from the gallbladder to the intestine. However, a negative urobilinogen result doesn't necessarily mean the bile duct is blocked. Abnormally high levels can indicate liver or hemolytic disease (anemia).

7. BIL (bilirubin) - Bilirubin is a substance that is produced in the liver and normally excreted in the bile. Bilirubin is not found in the urine of healthy cats but may be found in small quantities in the urine of healthy dogs. Abnormal amounts of bilirubin in the urine are associated with liver disease or red blood cell destruction (called hemolysis), and should always be investigated.

8. RBC's (red blood cells) - Small numbers of red blood cells are often found in urine collected by cystocentesis or catheterization, but large numbers of red blood cells usually indicate bleeding. This may be caused by conditions such as bladder stones, infection, coagulation problems, trauma, cancer, etc.

9. Hemoglobin - Hemoglobin is a protein that is found in red blood cells, and it is responsible for carrying oxygen from the lungs to the rest of the tissues of the body. When hemoglobin is found in the urine, it is called hemoglobinuria. This usually occurs

when red blood cells are destroyed, and free hemoglobin is excreted into the urine through the kidneys. Hemoglobin in the urine is usually a sign of either inflammation, infection, and/or trauma.

10. WBC's (white blood cells) - Small numbers of white blood cells in a free-catch sample may not be significant, but in general, an increased number of white blood cells indicates inflammation somewhere in the urinary system. Inflammation is often secondary to bacterial infection.

11. UPC (urine protein:creatinine ratio) - This value measures the amount of protein being lost through the kidneys, which can help diagnose serious kidney disease. Trace amounts of protein can be found in the urine of healthy pets, but an elevated UPC can indicate decreased kidney function/kidney disease. Further tests should be performed to confirm a diagnosis.

12. Bacteria - The presence of bacteria in a urine sample indicates an infection somewhere within the urinary system. Your pet will be treated with antibiotics if they are experiencing UTI symptoms and test positive for bacteria. If a pet experiences recurrent UTIs, additional diagnostics are warranted - urine can be sent to a lab for a culture and sensitivity test, pet may have x-rays done to rule out bladder or kidney stones.

13. Crystals - There are many different types of crystals that can appear during a urinalysis. Some crystals are unique and can help pinpoint a diagnosis, some form when pet's take certain medications, while others are not diagnostic, and appear if the urine has sat for a long period of time before analysis. For this reason, it is always important to provide your vet with the most recent sample of your pet's urine. Based on the crystals found in the urine, your veterinarian may want to do further testing, such as x-rays, to rule out bladder or kidney stones.