# Understanding Your Pet's Diagnostic Testing

## Blood Chemistries

These common blood tests allow veterinarians to assess your pet's overall health. Blood tests are often recommended in healthy pets, in pets about to undergo anesthesia and in sick pets. Interpretation of multiple tests in conjunction with one another (profiling) allows quick and noninvasive assessment of the major organ systems of the body.

### Kidney

- ☐ **BUN** (blood urea nitrogen)— increases may be seen with decreased kidney function, dehydration, heart disease, shock or urinary obstruction as well as following a high protein diet; decreases may be seen with overhydration
- ☐ **CREA** (creatinine)—increases may be seen with decreased kidney function and other conditions as noted with BUN, but is not affected by a recent high protein diet; decreases may be seen with overhydration
- ☐ **PHOS** (phosphorus)—elevations are seen with decreased kidney loss through conditions like kidney disease, increased intake through the gastrointestinal tract and increased release from injured tissues; increases in growing puppies and kittens can be normal; decreases may be seen with increased loss or decreased intake
- ☐ **$Ca^+$** (calcium)—increases may be seen as a result of a variety of diseases including kidney disease, certain cancer types, certain toxicities and parathyroid disease; decreases may be seen with certain parathyroid diseases and with low albumin

### Liver

- ☐ **ALT** (alanine aminotransferase)—increases are a sensitive indicator of liver cell damage
- ☐ **ALKP** (alkaline phosphatase)—increases may indicate a liver abnormality (cholestasis), Cushing's disease, active bone growth in young pets, active bone remodeling after bone injury; may be induced by multiple drugs and nonspecific conditions
- ☐ **GGT** (gamma glutamyl transferase)—increases may indicate a certain type of liver abnormality (cholestasis)
- ☐ **ALB** (albumin)—increases may indicate dehydration; decreases may be seen with decreased liver function, blood loss, gastrointestinal disease or kidney disease
- ☐ **TBIL** (total bilirubin)— increases may be seen with liver disease (cholestasis and insufficiency) and certain types of anemia
- ☐ **Bile acids**—increases in this blood component may be an indication of decreased liver function, abnormalities in blood flow to the liver or possible bile duct obstruction

### Pancreas

- ☐ **AMYL** (amylase)—increases may be seen with pancreatitis, kidney disease, gastrointestinal disease or certain drug treatments; degree of change and other laboratory data may help identify pancreatitis specifically
- ☐ **LIPA** (lipase)—increases may be seen with pancreatitis, kidney disease, gastrointestinal disease and certain drug treatments; degree of change and other laboratory data may help identify pancreatitis specifically

### Protein Profile

- ☐ **TP** (total protein)— increases may indicate dehydration or an inflammatory condition; decreases may be seen in decreased liver function, blood loss, gastrointestinal loss and kidney loss
- ☐ **ALB** (albumin)— increases may indicate dehydration; decreases may be seen with decreased liver function, blood loss, gastrointestinal disease and kidney disease
- ☐ **GLOB** (globulin)—increases may be seen with inflammation and potential chronic infection; decreases may be seen with blood loss, gastrointestinal loss and immune deficiencies

### Electrolytes

- ☐ **$Na^+$** (sodium)—increases may indicate dehydration; decreases may be seen with loss during diarrhea and vomiting or with Addison's and kidney disease
- ☐ **$K^+$** (potassium)—increases may indicate kidney disease due to decreased excretion, with Addison's disease, dehydration and kidney obstruction; decreases may be seen with loss during diarrhea or vomiting
- ☐ **$Cl^-$** (chloride)—increases may indicate dehydration; decreases may be seen with loss during diarrhea or vomiting

### Miscellaneous Chemistries

- ☐ **GLU** (glucose)—increases may indicate diabetes mellitus; decreases may be due to liver disease, pancreatic disease and other conditions and could lead to collapse, seizure or coma
- ☐ **AST** (aspartate aminotransferase)— increases are associated with liver or muscle damage
- ☐ **CK** (creatine kinase)—increases are associated with muscle damage
- ☐ **CHOL** (cholesterol)— increases may be seen with a variety of metabolic disturbances including diabetes mellitus, hypothyroidism, Cushing's disease, pancreatitis and some types of kidney disease; decreases may be seen with liver insufficiency and intestinal disease
- ☐ **TRIG** (triglycerides)— increases may be seen in a variety of conditions including non-fasted samples, in miniature schnauzers, and in patient's with pancreatitis, diabetes, Cushing's disease or hypothyroidism
- ☐ **Cortisol**—increases may be seen with Cushing's disease (measured in different protocols including ACTH stimulation and Dexamethasone suppression tests); decreases may be seen with Addison's disease
- ☐ **$T_4$** (thyroxine)—increases may indicate hyperthyroidism (primarily cats); decreases may indicate hypothyroidism (primarily dogs)
- ☐ **LACTATE**—increases indicate either local or general decreased blood perfusion and can potentially serve as a prognostic indicator for the critical patient

## Complete Blood Count (CBC)

This is a common test performed on pets to provide objective information about the general health status of an animal. The objective data obtained from a CBC can be helpful in monitoring ill patients undergoing therapy; therefore, serial CBC requests are common.

### Red Blood Cell (RBC) Parameters

- ☐ **RBC** (red blood cell count), **HCT** (hematocrit) and **HGB** (hemoglobin)—increases in these parameters may support dehydration or a disease of increased production of RBCs; decreases indicate anemia and decreased oxygen-carrying capability of the blood
- ☐ **MCV** (mean cell volume)—increases indicate the presence of larger than normal cells, which may be related to young cells during response to an anemia; decreases indicate the presence of smaller than normal cells, which may be associated with chronic blood loss/iron deficiency
- ☐ **MCH** (mean cell hemoglobin) and **MCHC** (mean cell hemoglobin concentration)—increases suggest the presence of hemolysis or an interference in hemoglobin measurement; decreases suggest decreased hemoglobin concentration, which can be seen during response to anemia and chronic blood loss/iron deficiency
- ☐ **RDW** (red cell distribution width)—increases in this objective measure of variability of RBC size indicates increased variability in size that can aid the veterinarian in identifying the cause of an RBC problem
- ☐ **RETIC** (reticulocytes)—increases indicate growing numbers of immature RBCs, indicating a response to a peripheral demand for RBCs; decreases indicate few or no immature RBCs, indicating the body is unable to respond to a demand for RBCs (nonregenerative anemia)

### White Blood Cell (WBC) Parameters

- ☐ **WBC** (white blood cells)—increases may be due to inflammation, stress, excitement and leukemia; decreases may be due to overwhelming inflammation and bone marrow failure
- ☐ **Leukocyte Differential**—Various patterns of change in numbers of NEU (neutrophils), LYM (lymphocytes), MONO (monocytes), EOS (eosinophils), and BASO (basophils) may be seen with different types of inflammation, stress, excitement and leukemia
  - **NEU**—inflammatory cell associated with infectious and noninfectious disease processes
  - **LYM**—immune cell highly responsive to "stress" and potentially increased during chronic infection
  - **MONO**—inflammatory cell associated with repair of tissue injury
  - **EOS**—inflammatory cell associated with parasitic disease, hypersensitivity and allergy
  - **BASO**—inflammatory cell associated with parasitic disease, hypersensitivity and allergy

### Platelet (PLT) Parameters

- ☐ **PLT** (platelet) and **PCT** (platelet crit)—increases in these parameters of overall platelet mass are potentially associated with hypercoagulable state; decreases may be seen with decreased production (bone marrow failure), increased consumption (coagulation, inflammation, etc.) and destruction in the blood (infectious, immune-mediated, etc.)
- ☐ **MPV** (mean platelet volume)—increases indicate presence of larger than normal platelets commonly associated with response to need for platelets (not significant in the cat)
- ☐ **PDW** (platelet distribution width)—increases in this objective measure of variability of platelet size indicates increased variability in size which may be an indicator of response to a need for platelets (not significant in the cat); decreases may be seen with immune-mediated thrombocytopenia

## Urinalysis

A urinalysis is performed on a urine sample and provides insight into kidney functions as well as the hydration status of the animal. This valuable test may also be helpful in diagnosing and monitoring various diseases and metabolic disturbances throughout the body.

- ☐ **Specific Gravity**—determined by the kidney's ability to concentrate urine in response to the hydration status
- ☐ **pH**—reflect the acid-base status if the animal is well-hydrated
- ☐ **PRO** (protein)—small amounts of protein may be normally found in urine, but larger amounts may indicate kidney disease
- ☐ **GLU** (glucose)—high levels are usually associated with an elevated blood glucose concentration
- ☐ **KET** (ketones)—elevated levels may indicate an increase in breakdown of lipids within the body
- ☐ **UBG** (urobilinogen)—abnormally high levels may indicate liver or hemolytic disease
- ☐ **BIL** (bilirubin)—abnormally high levels may indicate liver or hemolytic disease; in dogs (especially male dogs) bilirubinuria is common even under normal conditions; bilirubinuria in cats is significant
- ☐ **RBCs** and **Hemoglobin**—the test may be positive due to hematuria, hemoglobinuria or myoglobinuria; blood in the urine is often a sign of inflammation, infection and/or trauma
- ☐ **WBCs**—excessive numbers of WBC indicate inflammation somewhere in the urinary tract
- ☐ **UPC**—(urine protein:creatinine ratio)—an important screening test for early kidney disease and to help monitor treatment of renal disease; increases may indicate significant protein loss through the kidney

## Other Possible Tests

- ☐ **Canine/Feline *Giardia***—test for a protozoan parasite that may inhabit the small intestine of dogs, cats, humans and most domesticated animals often causing diarrhea
- ☐ **Canine/Feline Heartworm**—test for deadly parasites that can live in the heart, major blood vessels and the lungs
- ☐ **Canine Tick-Borne Diseases**—tests for commonly seen and serious diseases transmitted by ticks including Lyme disease, ehrlichiosis and anaplasmosis
- ☐ **Canine Parvovirus**—test for one of the most common and severe gastrointestinal diseases in young dogs
- ☐ **Feline Immunodeficiency Virus (FIV)** and **Feline Leukemia Viruses (FeLV)**— tests for two of the major causes of illness and death in cats

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