

## Blood Work: CBC and Chemistry Panel

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### VP Client Information Sheets



*Photo by Natalie Rowe*

What does it mean when a veterinarian says she needs to run some blood work on your pet? Blood work - presurgical or otherwise - is usually a combination of a complete blood count (CBC) and a blood chemical analysis. Blood work is a basic evaluation tool. Pets, particularly senior ones, should have a CBC at every annual examination. In addition, blood work allows a veterinarian to monitor the progression of a pet's disease.

When the blood sample is drawn from your pet, both the cells and the fluid they "travel" in are examined.

The cell part of the blood is examined in the CBC. The CBC determines the number of erythrocytes (red blood cells), the number and

type of leukocytes (white blood cells), the number of platelets (thrombocytes), the hemoglobin level, and the hematocrit (packed cell volume, PCV). Erythrocytes carry oxygen throughout the body. Leukocytes fight infection and are part of the immune system. There are five different types of white blood cells: neutrophils, lymphocytes, basophils, eosinophils, and monocytes. Platelets are clotting proteins and indicate how fast your pet's blood can clot; slow clotting can be a serious problem. A CBC can tell your veterinarian if your pet has an unusual number of erythrocytes (anemia, polycythemia), leukocytes (leukopenia, leukocytosis), or platelets (thrombocytopenia).

A chemistry panel (blood chem, chemistry screen), tests kidney function, liver function, electrolyte levels, etc. Blood chemistries are run on the fluid in the blood sample. (The CBC is the examination of the cells in the blood sample.)

The chemistry panel usually includes the following tests: alkaline phosphatase (SAP, ALP), alanine transaminase (alanine aminotransferase, ALT), bilirubin total (T Bili), blood urea nitrogen (BUN), creatinine, creatine kinase (CK, CPK), sodium, potassium, glucose, total protein, albumin, etc. Alkaline phosphatase, alanine transaminase, bilirubin, and albumin give your veterinarian information about the pet's liver function. Blood urea nitrogen, creatinine, and creatine kinase tell your veterinarian how well your pet's kidneys are functioning.

*Alkaline phosphatase:* An elevated alkaline phosphatase is the most common biochemical abnormality seen in "normal" animals. (In other words, clinically-normal animals can have mildly elevated levels.) Elevated levels are seen in liver injury, bone injury, pregnancy, dental disease, skeletal growth, reactive hepatopathies, and animals who are or have been taking glucocorticoids. Growing animals also normally have higher levels of this enzyme. Elevated levels can be used as a tumor marker, particularly with tumors that have metastasized to the liver. Low levels of alkaline phosphatase may not be clinically significant. However, in humans, decreased serum levels have been observed in hypothyroidism, scurvy, achondroplastic dwarfism, magnesium deficiency, malnutrition, cardiac surgery, cardiopulmonary bypass, and hypophosphatasia.

*Alanine transaminase:* Decreased ALT in combination with increased cholesterol levels is seen in cases of a congested liver. Increased levels are also seen in liver damage, kidney infection, chemical pollutants, or myocardial infarction.

*Bilirubin (total):* Elevated in liver disease, hemolytic anemia, low levels of exposure to the sun, and toxic effects to some drugs. Decreased levels are seen in people with an inefficient liver, excessive fat digestion, and possibly a diet low in nitrogen bearing foods.

*Blood urea nitrogen:* Increases can be caused by excessive protein intake, kidney damage, certain drugs, low fluid intake, intestinal bleeding, exercise, or heart failure. Decreased levels may be due to a poor diet, malabsorption, liver damage, or low nitrogen intake.

*Creatinine:* Low levels are sometimes seen in kidney damage, protein starvation, liver disease, or pregnancy. Elevated levels are sometimes seen in kidney disease due to the kidneys job of excreting creatinine, muscle degeneration, and some drugs involved in impairment of kidney function.

*Glucose:* Elevated in diabetes, liver disease, obesity, and pancreatitis due to steroid medications, or during stress. Low levels may be indicative of liver disease, overproduction of insulin, or hypothyroidism.

*Total protein:* Decreased levels may be due to poor nutrition, liver disease, malabsorption, diarrhea, or severe burns. Increased levels are seen in lupus, liver disease, chronic infections, leukemia, etc.

*Albumin:* High levels are rarely seen and are primarily due to dehydration. Low levels are seen in poor diets, diarrhea, fever, infection, liver disease, inadequate iron intake, third-degree burns and edemas, and hypocalcemia.

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