

UNDERSTANDING YOUR DOG'S BLOOD WORK

(Please consult your medical adviser for professional assessment)

A typical blood chemistry panel usually includes ...

<u>General Metabolism</u>	<u>Kidney Function</u>	<u>Electrolytes</u>	<u>Liver Function</u>	<u>Thyroid</u>	<u>Pancrea</u>
(Glucose) lacta dehydrogenase) Creati: phosphokinase)	BUN (Blood Urea Nitrogen) CREAT (Creatinine)	Na (Sodium) K (Potassium) Cl (Chloride) CA (Calcium) PHOS (Phosphorus)	ALP (Alkaline phosphatase) ALB (Albumin) GGT (Gamma-glutamyl transpeptidase) SGPT (Serum glutamate pyruvate transaminase) TP (Total Protein) CHOL (Cholesterol) GLOB (Globulin) TBILI (Total Bilirubin)	T3 (Triiodothyronine) T4 (Thyroxine)	AMY (Amylase) LIP (Lipase)

Normal values for blood chemistry elements for dogs are displayed in the table below.

Keep in mind that each blood chemistry machine and every veterinary diagnostic lab has their own set of normal values calculated for their particular instrumentation. The values shown here may be different from normal ranges your veterinarian refers to when making judgments about patients' reported blood chemistry values.

BLOOD WORK IS USUALLY DONE AFTER A TWELVE(12) HOUR FAST -
PLEASE CHECK WITH YOUR VETERINARIAN

NORMAL CANINE LEVEL RANGES FOR A LABORATORY'S BLOOD CHEMISTRY VALUES

DOGS

GLU- GLUCOSE	67 - 125 mg/dL	High levels can help diagnose diabetes and can indicate stress, excess of the hormone progesterone, an overactive adrenal gland. Low levels can indicate liver disease, tumors or abnormal growth on pancreas, an underactive adrenal gland.
ALT - Alanine aminotransferase	10 - 84 U/L	An enzyme that becomes elevated with liver disease
Alkaline Phosphatase (ALKP)	20-200	- An enzyme produced by the biliary tract (liver). High levels indicate bone disease, liver disease or bile flow blockage.
TOTAL BILIRUBIN (TBILI)	0.04 - 0.40 mg/dL	A component of bile, bilirubin is secreted by the liver into the intestinal tract. High levels can lead to jaundice and indicate destruction in the liver and bile duct.
TOTAL PROTEIN (TP)	5.2 - 7.8 gm/dL	Increases indicate dehydration or blood cancer, bone marrow cancer; decreases indicate malnutrition, poor digestion, liver or kidney disease, bleeding or burns.
GLOBULIN(GLOB)	.9 - 4.0	Decreased levels indicate problems with antibodies, immunodeficiency viruses or risk of infectious disease. Increased levels may indicate stress, dehydration or blood cancer, allergies, liver disease, heart disease, arthritis, diabetes.
UREA NITROGEN (BUN)	9 - 27 mg/dL	BUN is produced by the liver and excreted by the kidneys. Decreased levels are seen with low protein diets, liver insufficiency, and the use of anabolic steroid drug. Increased levels indicate any condition that reduces the kidney's ability to filter body fluids in the body or interferes with protein breakdown.

PHOSPHORUS (PHOS)	2.6 - 6.8 mg/dL	Affected by diet, parathormone and kidney. Decreased levels shows overactive parathyroid gland and malignancies, malnutrition and malabsorption. Increases with underactive parathyroid gland and kidney failure.
<u>Creatinine (CREA)</u>	.4 - 1.4	Creatinine is a by-product of muscle metabolism and is excreted by the kidneys. Elevated levels can indicate kidney disease or urinary obstruction, muscle disease, arthritis, hyperthyroidism, and diabetes. An increased BUN and normal creatinine suggest an early or mild problem. An increased creatinine and increased BUN with elevated phosphorus indicate a long standing kidney disease.
<u>Amylase (AMYL)</u>	200 - 1290	The pancreas produces and secretes amylase to aid in digestion. Elevated blood levels can indicate pancreatic and/or kidney disease.
Calcium (CA)	9.5 - 12.0	Blood calcium levels are influenced by diet, hormone levels and blood protein levels. Decreased levels indicate acute damage to the pancreas or underactive parathyroid. Muscle twitches may occur in decreased level. Increased levels can be an indicator of certain types of tumors, parathyroid or kidney disease. Dr. Goldstein mentioned in his book, Nature of Animal Healing that low calcium level may indicate deficiency of pancreatic enzymes, and high calcium level may indicate poor metabolism of fats and protein.
SODIUM (Na)	140 - 153 mmol/L	
CHLORIDE (Cl)	106 - 118 mmol/L	
LACTATE DEHYDROGENASE (LDH)	10 - 273 U/L	
MAGNESIUM	1.5 - 2.7 mg/dL	
LIPASE (LIP)	200 - 700 U/L	
CPK (Creatine phosphokinase)	20 - 200	
GGT (Gamma-glutamyl transpeptidase)	1.2	
Albumin (ALB)	2.5- 4.3	Produced by the liver, reduced levels of this protein can point to chronic liver or kidney disease, or parasitic infections such as hookworm. High levels indicate dehydration and loss of protein.
CHOLESTEROL(CHOL) -	110- 314	Decreased levels are found in an overactive thyroid gland, intestinal malabsorption. Elevated levels of cholesterol are seen in a variety of disorders including hypothyroidism and diseases of the liver, kidneys, cardiovascular, diabetes, stress.
Triglycerides	20 - 200	
LDH (Lactate dehydrogenase)	30-190	
THYROXINE (T4)	1.0 - 4.7 ug/dL	

MATOLOGY: Normal ranges for blood cell elements for dogs are displayed in the table below. These values are approximate and may not be the "normal" values established for any other individual veterinary pathology lab or blood analyzer.

**NORMAL RANGES FOR A LABORATORY'S HEMATOLOGY VALUES
(Canine)**

DOGS

Red Blood Cell Count (RBC)	5.5 - 8.5 X 100,000/L	Responsible for carrying oxygen and carbon dioxide throughout the body. Iron deficiency will lower RBC count. In more reduced count, it may indicate hemorrhage, parasites, bone marrow disease, B-12 deficiency, folic acid deficiency or copper deficiency. RBC lives for 120 days so an anemia of any kind other than hemorrhage indicates a long standing problem.
White Blood Cell Count (WBC)	6.0 - 17 x 1000/L	The body's primary means of fighting infection. Decreased levels may indicate an overwhelming infections (viruses), or drug / chemical poisoning. Increased levels indicate bacterial infection, emotinal upsets and blood disorders.
(MCH) Mean Corpustular Hemaglobin	19.5 - 25.5 pg	
(RDW) Red Cell Distribution Width	14 - 19 percent	
Hematocrit - (HCT)	37 - 55 percent	or Packed Cell Volume (PCV) - Provides information on the amount of red blood cells (RBC) present in the blood. Decreased levels means anemia from hemorrhage, parasites, nutritional deficiencies or chronic disease process, such as liver disease, cancer, etc. . Increased levels are often seen in dehydration.
Hemoglobin (HgB or Hb) g/L	120-180	The essential oxygen carrier of the blood. Decreased levels indicate the presence of hemorrhage, anemia, iron deficiency. Increased levels indicate higher than normal concentrate of RBC, B-12 deficiency (because there are fewer cells).
Reticulocytes	0-1.5%	Immature red blood cells. Decreased count is usually associate with anemia. Increased count is associated with chronic hemorrhage or hemolytic anemia
Segs x1000/ul	3.6-11.5	
Bands x1000/ul	0.0-0.3	
Lymphocytes x1000/ul	1.0-4.8	(L/M) - These smooth, round white blood cells increase in number with chronic infection, recovery from acute infection or underactive glands and decrease with stress, or treatment with steroids and chemotherapy drug.
Monocytes x1000/ul	0.15-1.35	
Eosinophils x1000/ul	0.01-1.25	
Electrolytes - (Sodium, Potassium, Chloride) -		The balance of these chemicals is vital to health. Abnormal levels can be life threatening. Electrolyte tests are important in evaluating vomiting, diarrhea and cardiac symptoms.
Platelets x 100000/ul (PLT)	2-9	Play an important role in blood clotting. Decrease in number occurs in bone marrow depression, autoimmune hemolytic anemia, systemic lupus, severe hemorrhage or intravascular coagulation. Increased number may occurs with fracture or blood vessel injury, or cancer.