

Understanding Common Blood Tests

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When your veterinarian recommends blood tests for your dog, do you feel uncertain, not sure what the tests are for or what the terminology means? If so, this article is for you. After you read it, you'll have a working knowledge of the more common blood tests and what they can show.

Blood tests are performed for any number of reasons.

By far the most common reason is to diagnose disease, determine prognosis and monitor therapy. Routine screening tests detect serious diseases such as heartworm infection before they are clinically apparent, so your dog can be treated before the disease irreversibly damages the body.

A "maturity profile" can identify problems early, so your dog can benefit from treatment early in the course of a disease. Golden Retrievers entering the DVGR program over age 7 are evaluated through a complete blood count, chemistry screen and urinalysis. An older Golden whose test results are within normal limits has a better chance of being adopted; and even if there's a problem, the new family will know about it and be prepared to manage it.

It is important to recognize that no diagnostic test is perfect, so occasional "false positives" or "false negatives" may occur. And tests may be expensive if ordered indiscriminately, but they are cost-effective when performed strategically.

Common blood tests include:

The CBC (complete blood count) evaluates red blood cells, white blood cells and platelets.

The chemistry screen or chemistry profile ("chem screen") evaluates kidney function, liver function, electrolytes, glucose (high in diabetes), levels of various proteins (including antibodies), and other constituents of the blood.

Endocrinology tests evaluate, most commonly, thyroid and adrenal gland function.

Now let's get a little more specific about each of these tests.

The CBC

The CBC evaluates red blood cells, white blood cells and platelets. Red blood cells (RBCs) carry oxygen from the lungs to body tissues. A deficiency of RBCs, called anemia, may be caused by decreased RBC production, loss of RBCs through bleeding, or RBC destruction. RBC parameters include the PCV (packed cell volume, an indication of the percentage of RBCs in the blood, analogous to the hematocrit), hemoglobin concentration, size of the RBC, and numbers of RBC precursor cells.

White blood cell (WBC) numbers increase when the immune system is stimulated, such as in an infection, parasitic disease or allergies. Evaluation includes total WBC count and the "differential", i.e., the number of each WBC type: neutrophils (and their precursors, called band cells), lymphocytes (T-cells and B-cells), monocytes, eosinophils and basophils.

The platelet count is important because platelets play a crucial role in the clotting of blood,

along with coagulation factors produced by the liver.

Chem Screen Tests To Evaluate Kidney Function

BUN (blood urea nitrogen) is made by the liver (from ammonia, a breakdown product of dietary proteins) and excreted by the kidneys. Increased BUN levels suggest kidney dysfunction, decreased circulation of blood to the kidneys (as in dehydration or shock), urinary obstruction, or, in the absence of elevated creatinine, digestion of a super-high protein source such as blood (e.g., from a bleeding ulcer or blood-sucking intestinal parasites).

Creatinine (a breakdown product of phosphocreatine, a molecule involved in energy production in skeletal muscles) is excreted primarily by the kidneys. Increases in BUN and creatinine occur when 75% of kidney cells have been damaged.

Phosphorus is excreted by the kidneys and may therefore be increased in the blood of dogs with kidney dysfunction.

Other lab changes associated with kidney dysfunction include alterations in electrolytes (increased potassium and decreased sodium), diminished excretion of some biochemicals (e.g., pancreatic enzymes), and eventually anemia (since the failing kidney secretes less-than-normal amounts of erythropoietin, a hormone which stimulates red blood cell production).

Chem Screen Tests To Evaluate Liver Function

ALT, alanine aminotransferase (previously known as SGPT), is an enzyme found in liver cells. Damaged liver cells leak ALT, which is then detected in increased quantities in the blood. AST (aspartate aminotransferase, previously known as SGOT) is a similar enzyme found in many cells, including liver, muscle and heart. ALT elevations in the blood are specific indicators of liver disease, while AST elevations are not.

Serum alkaline phosphatase (SAP, ALP or "alk phos") is an enzyme present in liver, bone, intestine and kidney. Increases related to the liver may result from a blockage of bile flow, the actions of some drugs (e.g., steroids, phenobarbital) or hyperadrenocorticism (Cushing's disease). SAP elevations may also indicate active bone metabolism, such as bone growth in youngsters or bone cancer.

Bilirubin (the yellow-orange pigment in bile) may be elevated in the blood if bile flow is obstructed. Since it is formed by the breakdown of hemoglobin in RBCs, increases may also suggest RBC destruction.

Products made by a healthy liver, and therefore found in abnormally low levels if the liver is not functioning well, include urea (BUN), cholesterol, albumin, globulins (antibodies) and eventually glucose.

Blood Tests Which May Suggest Cancer

Cancer is rarely diagnosed through blood tests, but occasionally, some blood tests may suggest its presence.

On the CBC, elevations in eosinophils (a type of white blood cell) may occur in some patients with cancer. However, increased "eos" are much more commonly seen in patients

with allergies and parasites (even intestinal worms).

On the chem screen, calcium elevations may suggest certain types of cancer and are usually associated with excessive water intake and urination.

Thyroid Tests

T4 (thyroxin), one of the hormones produced by the thyroid gland, is usually present in diminished amounts in the blood of dogs with underactive thyroid glands, called hypothyroidism. TSH (thyroid stimulating hormone) is produced by the pituitary gland and is elevated in the blood of most dogs with hypothyroidism. Other common thyroid tests include T3 (another thyroid hormone, often normal in hypothyroid dogs) and antibodies produced by the body which work against the thyroid.

High cholesterol on the chem screen (especially in a fasted dog) is suggestive of hypothyroidism.

Your Role

Don't be shy about asking for an explanation of any test your veterinarian recommends. Your involvement in the care of your dog is essential, and your veterinarian will appreciate your interest in veterinary medicine. And that's good for everybody.