

# **HYPOTALBUMINEMIA – WHEN THE BLOOD ALBUMIN LEVEL GETS TOO LOW**



Hypoalbuminemia, or low blood albumin level, is a relatively common finding when we do laboratory screening, sometimes in pets that appear perfectly healthy. It's a red flag, telling us that something may be seriously wrong, even if the cat or dog is not apparently sick.

Blood, and more specifically blood plasma, contains two main types of protein – globulins, which make up the antibodies that fight infectious diseases, and albumin, the main building block for all the proteins and tissues in our bodies. Albumin does more than just provide protein – it also provides “oncotic pull”. Large molecules like albumin attract and hold water in the blood vessels. Without it, water leaks into the tissues and causes edema.

We think of blood vessels as being like hoses, rushing blood throughout the body. The smallest blood vessels, called capillaries, are different. They are very porous, allowing the exchange of oxygen, nutrients, hormones, immune system cells and all the other components of the blood to escape from the blood vessels to feed tissue and cells. In turn, waste products enter the bloodstream to be transported to the lungs, liver and kidneys for processing and removal from the body.

When we eat food containing proteins, the digestion process breaks them into small enough sized molecules to allow passage through the intestinal lining and into the bloodstream. The liver grabs these molecules as they flow through it, and transforms them into albumin, which the body can then remanufacture into all the various proteins needed for life. Proteins digest our food, build our muscles, ligaments, tendons and other tissues, and form signal molecules such as insulin that regulate body processes.

When there isn't enough albumin to hold enough water molecules in the blood vessels, water leaks out. It accumulates around the cells, making the tissues spongy and preventing the exchange of nutrients and oxygen. The capillaries collapse from lack of water, lowering blood pressure and eventually leading to shock and death. Patients that are ill with an albumin level less than 2.0 have much lower survival rates than patients with normal albumin levels.

We expect the albumin level to drop quickly with certain serious diseases. Burns that expose tissues to the air cause a rapid and high loss of both fluid and protein, so burn victims need massive amounts of IV fluids and blood plasma. Severe vomiting and diarrhea also can lead rapidly to low albumin levels, as fluid and nutrients exit the body at high speeds, preventing nutrient absorption from the intestines. For emergencies like

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these, we transfuse the patient with plasma and with fluids called colloids that contain large sized molecules to help increase osmotic pull.

Harder to detect are the patients whose albumin levels are dropping slowly, without apparent symptoms. We often find these patients by chance when running routine blood tests such as pre-anesthetic panels.

Low albumin levels in the blood may occur because the intestines are diseased and not absorbing nutrients properly – usually the pet has had loose stools, blood in the stools or other signs of problems, but not always. If the low albumin level is caused by intestinal disease, treating the disease process and restoring the intestines to better health usually resolves the problem.

If the liver isn't working properly, it may not be able to make enough albumin. Low albumin levels from liver disease don't develop until liver dysfunction is severe, so hypoalbuminemia with liver disease is a very worrisome finding.

Diseased kidneys can also cause low albumin levels, as they may be leaking albumin into the urine. The prognosis in these cases will depend on the degree of kidney disease present.

Lastly, sometimes the body is fighting a chronic disease and producing extra globulin, so less albumin is needed. In this case, we start looking for chronic disease processes, such as Lyme disease in dogs or FIP in cats.

If we find a low albumin level without an obvious cause, we will need to figure out why it is occurring. In order to diagnose a pet's problem we usually need to investigate the three major possible problems – intestinal disease, liver disease and kidney disease. We may check stool samples for occult (hidden) blood, passing through in amounts too small to be noticed by the pet owner. We test the urine for excess protein, and we also test for liver function. Usually after these tests are completed we know which organ to focus on for further testing, such as a liver or intestinal biopsy. Occasionally all the testing comes up normal and we don't find a specific disease causing the albumin level to be low.

For patients that are not critically ill, we generally don't do plasma transfusions. Instead, we usually have the pet owner supplement the pet's diet with eggs or egg whites, which contain large amounts of albumin. We recheck the albumin level several times to see if the egg supplementation is working. If the pet seems fine and is doing well we may eventually stop supplementing and then subsequently retest to see if the albumin level drops again, in order to determine how long we need to keep cooking the pet eggs. (They should be cooked in order to prevent Salmonella infection.)

Low albumin level is a serious problem that warrants immediate investigation when it is found. Heading off a major illness by catching problems early is one of the major reasons we perform wellness blood testing on pets.