



ANEMIA AND THE FIP CAT

Anemia in cats is not a diagnosis but rather a sign of an underlying disease. The diagnostic work-up for an anemic patient is often extensive, starting with classification of the anemia as regenerative or non-regenerative. FIP cats are usually anemic, and the anemia is more often than not the non-regenerative type. But what is anemia, and what does it do to our cats? This article provides general information about anemia, but its focus is on what anemia means for the FIP+ cat, and what your options are.

DEFINITION OF ANEMIA:

Anemia in cats is not a diagnosis but rather a sign of an underlying disease.

Anemia is defined as a deficiency or reduction in the normal number or concentration of red blood cells - called erythrocytes or "RBCs" that are circulating in a cat's blood stream. As a general rule, adult cats are anemic when they have less than 5 million RBCs in 1 milliliter of blood or when the overall RBC percentage in their blood is less than 25%.

WHAT CAUSES ANEMIA:

There are three general causes of anemia in cats: blood loss, destruction of RBCs and inadequate RBC production. The first two categories are called **regenerative anemia**; the last is considered **non-regenerative**.

- Blood loss reduces the number of circulating red blood cells because it decreases total blood volume. It can be caused by trauma, surgery, blood clotting abnormalities, ulcers, blood-sucking parasites (fleas, ticks, lice, hookworms), cancer and many other disorders or conditions (*regenerative anemia*).
- Destruction of RBCs (or an abnormally short RBC lifespan), also called hemolytic anemia, reduces the concentration of red blood cells in the bloodstream rather than total blood volume. Autoimmune hemolytic anemia is uncommon in cats but occasionally occurs when a cat's immune system attacks its own red blood cells for no known reason. Non-immune-mediated hemolytic anemia happens when something else destroys a cat's RBCs, such as parasites, hereditary diseases or exposure to toxins

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(regenerative anemia).

- Inadequate RBC production is the most common form of feline anemia. This serious condition often is attributable to some underlying disease such as feline leukemia, infectious peritonitis, bone marrow cancer, kidney failure, administration of certain drugs and enzyme abnormalities (*non-regenerative anemia, often seen with FIP cats*).

HOW ANEMIA AFFECTS YOUR CAT:

Red blood cells carry oxygen from the lungs throughout the body. Normally, as they age or are damaged, RBCs break down and are either recycled to the bone marrow to be incorporated into new RBCs or processed and excreted by the liver. Anemic cats don't have enough red blood cells to transport sufficient oxygen to their tissues and organs, which causes them to become oxygen-starved. Affected cats get weak, tired and lethargic. They develop exercise intolerance, elevated heart rate, bounding irregular pulses, pale mucous membranes, confusion, appetite loss, rapid breathing and ultimately collapse. Feeding a high-quality diet, preventing traumatic injuries, keeping current on vaccinations and following sound veterinarian-approved methods to keep parasites at bay can all help to reduce the occurrence of anemia in companion cats.

For FIP+ cats, anemia is a serious problem. An anemic cat is unable to fight off the virus very long, and the virus is the underlying cause of the anemia. Catch-22. If you choose to pursue treatment with either Polyphenyl Immunostimulant (PI) or Interferon + Prednisolone, and trying to give your cat a chance at survival, or if you elect to go for steroids only as palliative care, you still need to address the anemia. Otherwise your chances of giving your cat a good quality of life, regardless of the survival time, are severely compromised.

HOW IS ANEMIA DIAGNOSED?

Laboratory diagnosis of anemia is straightforward and often supported by other findings such as pallor, lethargy, or exercise intolerance. The automated hemogram, or complete blood count (CBC), is available through reference laboratories and in many veterinary practice settings worldwide, and the erythrogram component routinely includes the tests used to diagnose anemia (ie, erythrocyte concentration, hematocrit, and hemoglobin concentration). Erythrocyte concentration influences the other two variables, so all 3 are below reference limits in anemic individuals except in marginal cases.

In situations where an automated hematocrit is not an option, the packed cell volume assay may be used to determine the proportional volume of erythrocytes in the blood by centrifugation.

Enumeration of reticulocytes is used to assess the bone marrow response to anemia in most

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species. Reticulocyte counts are performed automatically in most modern laboratories, including many in-clinic veterinary laboratories.

Anemia also may be categorized according to other criteria. A system originating in the 1930s that classifies anemia based on erythrocyte mean cell volume (MCV) and mean cell hemoglobin concentration (MCHC) is still in wide use. MCV and MCHC indices are components of virtually every hemogram, and some patterns correlate with certain pathologic conditions.

IS THE ANEMIA REGENERATIVE OR NON-REGENERATIVE?

In veterinary medicine, anemia accompanied by reticulocytosis (increase in reticulocytes, immature red blood cells) is referred to by convention as regenerative and is typical of anemia occurring due to loss (hemorrhage) or destruction (hemolysis) of erythrocytes in circulation. Conversely, anemia without accompanying reticulocytosis is referred to conventionally as non-regenerative and is typical of anemia occurring due to diminished or ineffective erythropoiesis (the production of red blood cells).

The table below may help you determine if your cat's anemia is regenerative or non-regenerative.

Classification of Anemia According to Presence or Absence of Reticulocytosis.

Classification	Blood Reticulocytosis	Bone Marrow Erythroid Hyperplasia
Nonregenerative	Absent	Absent (diminished erythropoiesis)
	Absent	Present (ineffective erythropoiesis)
Regenerative	Present	Present (physiologic compensation)
Preregenerative	Impending	Present (physiologic compensation)

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WHAT ARE TREATMENT OPTIONS?

Regenerative anemia: Blood-building vitamins and minerals are the treatment regimen of choice; B12, iron supplements and others can be recommended by your vet, along with a recovery diet. Transfusions will be required in severe cases. In the case of hemolytic anemia, this is usually a crisis situation, and transfusions are not effective because the new blood is destroyed as soon as it is added. Hemolytic anemia is treated with antibiotics and drugs, slowing the destruction of red blood cells.

Non-regenerative anemia: Once the cause of the non-regenerative anemia is determined, it can usually be resolved by treating the underlying disease, or, in the case of FIP, managing it. FIP+ cats undergoing treatment with PI or FOI may benefit from B12 injections. Occasional transfusions may be required. You can also ask your veterinarian about EPO. Erythropoietin (also known as EPO) is a growth factor that stimulates the production of red blood cells. Erythropoietin is used to treat anemia resulting from kidney failure or cancer treatment in human medicine. It is considered to be an alternative to blood transfusions. There are several different types of erythropoietins. Procrit® and Epogen® are two brands of epoetin alfa. Aranesp® (darbepoetin alfa) is another type of erythropoietin. The major difference between Procrit/Epogen and Aranesp is that Aranesp is given less often than Procrit. Otherwise, all three agents work equally well in the treatment of anemia (in humans). Your veterinarian can have EPO compounded for your cat in a liquid, easy to give form. A little goes a long way. Talk to your vet about it to see if this may be an option for your cat.

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