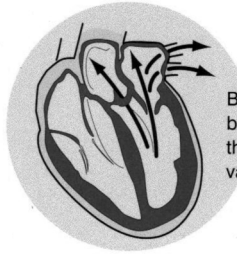


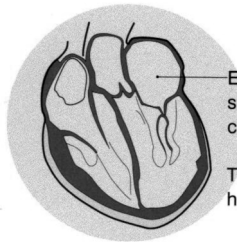
# ProBNP Testing

Some types of heart disease are remarkably difficult to diagnose, especially in cats, yet heart disease is very common. 5 -15% of dogs and cats have heart disease. It's important to diagnose heart problems early for the best possible outcome and longest life expectancy. We have many medications for heart disease but we first have to recognize that a problem exists. A new blood test makes screening for occult (hidden) heart disease easier.



Blood backflow through valve

The most common types of heart disease in dogs are mitral valve insufficiency (MVI), where a valve inside the heart wears out; and dilatative cardiomyopathy (DCM), where the heart becomes dilated and flabby. Smaller breeds of dogs are more prone to valve disease and larger breeds are more likely to get DCM. The picture on the left shows a cross section of a heart that is mostly normal size and shape but with a bulge in the left atrium, at upper right in the picture, where the blood is backing up, causing the heart wall to stretch and bulge outward.



Enlarged spherical chambers  
Thin/weak heart walls

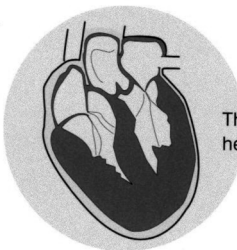
The next picture on the left shows a heart with DCM. The heart is becoming larger and rounder while the thickness of the heart walls is decreasing. It is becoming a flabby, inefficient pump.

In dogs it can be difficult to tell whether symptoms such as coughing and shortness of breath are coming from heart or respiratory disease. Many small dogs with heart disease also have respiratory problems such as collapsing trachea. The new test, which measures the level of cardiac enzymes in the bloodstream, can help to

evaluate the severity of the heart problem

so we can deliver appropriate treatment. It is also a good test to do annually for the specific breeds of dog that are prone to DCM, along with an electrocardiogram (ECG). Many dogs with

DCM will have an abnormal heart rhythm that will be seen on the ECG so we like to do both tests.



Thick heart walls

In cats, the primary heart problem we encounter is called hypertrophic cardiomyopathy or HCM. In this disease the heart muscle becomes abnormally thick and stiff (picture at left). As

the heart muscle thickens the chamber inside the heart that holds the blood shrinks. The heart has to work harder and harder to pump a smaller and smaller amount of blood.

This disease affects 1 in 6 cats to some degree. Many cats with HCM have heart murmurs that would indicate there is a problem but these murmurs are often soft and difficult to hear. 1/3rd of affected cats don't have a murmur at all.



**HEART DISEASE =**  
The heart has structural abnormalities, but it still maintains its ability to pump blood adequately.

**HEART FAILURE =**  
The diseased heart can no longer compensate and symptoms are appearing, especially trouble breathing and exercise intolerance.

HCM can be a deadly disease but it is treatable if we can find it. Heart failure progresses and begins with mild signs. Not all disease will progress to failure but most will worsen with time.

Symptoms to watch for include panting or open mouth breathing, tiring quickly and inactivity. Severe signs include sudden death, respiratory distress (open mouth breathing/panting) and painful blood clots that may be fatal. Symptoms may be so mild the pet owner doesn't notice them, but when stressed with heat, heavy exercise or anesthesia the cat may die suddenly.

## HCM has 2 forms in cats

- 1) Genetic, inherited HCM starts when a cat is young, and is often severe and fatal.
- 2) Acquired HCM, seen in older cats, may be secondary to valve disease or hyperthyroidism, and is usually more mild.

HCM is the most common cause of unexpected death under anesthesia in cats. A heart that is functioning adequately under normal circumstances may fail under the stress of anesthesia or heavy exercise, which is why some affected pets die under anesthesia while they had no symptoms beforehand. This is especially common for the genetic forms of disease we see in younger cats. Anesthesia in cats is actually more dangerous for young cats than old ones, as they are more likely to have more severe disease yet no heart murmur to clue us in. ECG screening and chest x-rays may be normal even with severe disease because the heart doesn't always become enlarged. It's a bigger heart that shows up on these tests, not a thicker, stiffer one.

Cardiopet® proBNP is the new screening test for HCM. The ProBNP enzyme is released from heart muscle cells in response to wall stress. The



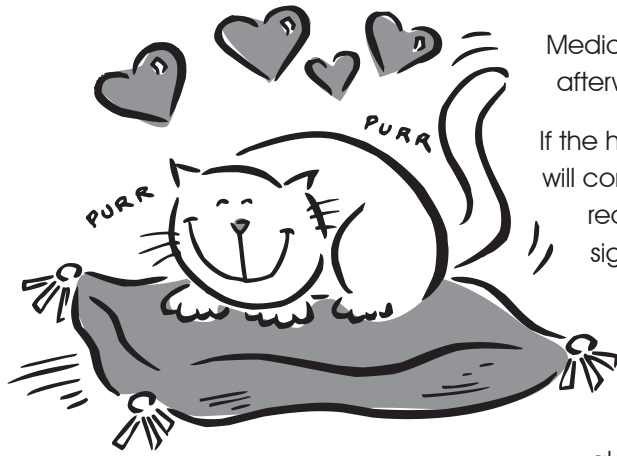
cells are stretched or damaged and start leaking muscle enzymes. The more stressed or damaged the muscle the higher the levels will be. Test results will be normal, mildly high or high. If a cat seems normal but the proBNP level is in the mildly high range we will wait 3 months and test it again.

If anesthesia is needed more urgently we may recommend further testing sooner.

If the level is high or we have other signs such as a heart murmur we will recommend an ECG (\$42), an echocardiogram (an ultrasound of the heart performed by a veterinary internist or cardiologist, \$350) and possibly chest x-rays, to confirm whether heart disease exists. If the echocardiogram shows heart muscle thickening, the specialist will recommend medications and tell us whether it is likely to be safe to perform anesthesia.

Breeds of cat with higher risk for cardiomyopathy include:  
Abyssinian  
American short hair  
British short hair  
Cornish & Devon Rex  
Domestic short hair  
Domestic long hair  
Maine Coon  
Persian  
Ragdoll  
(a DNA test is also available in this breed)  
Siamese





Medication and rechecks will be needed regularly afterwards.

If the heart looks normal on echocardiogram now, we will continue to monitor proBNP in the future and will recommend an echocardiogram again if it climbs significantly later on. Heart disease is progressive and can start very mild but become more serious later on.

What population of cats should be tested?

We consider proBNP when screening is already occurring because it's relatively inexpensive to do it along with wellness bloodwork panels but it's pricey to do

it by itself – the lab discounts it heavily if they are already doing a CBC and chemistry panel.

We are currently enrolled in a clinical study that allows us to do this testing for free if it's done in addition to a CBC and chemistry panel sent to our outside lab, through 9/30/11.

After that time the cost will be about \$40 when done with a CBC and chemistry panel sent to our outside lab. It takes several days to get the results of the proBNP test from the lab.

When done by itself and not part of a trial the test costs about \$150, which is more than the cost of the CBC + panel + proBNP! It will be better, if proBNP is recommended, to do pre-anesthetic bloodwork ahead of time rather than on the day of the procedure so that we can send the blood out to get the discounted price. This also means we get our results back before we actually anesthetize your cat!

We will usually recommend it be done with any wellness, pre-anesthetic or senior screen, especially for certain breeds. Early detection and treatment can prevent/slow disease progression and of course could save your cat's life. How much better is it to find out there is a problem and manage it versus having your pet die under anesthesia from a problem you didn't even know it had?

We will also want to test sick cats and those with medical problems such as hyperthyroidism, which is a common cause of HCM in older cats. We are looking for subclinical disease prior to onset of signs so we can intervene with treatment and avoid disease complications.

**WE HIGHLY RECOMMEND this test**

- For all cats before anesthesia
- For all hyperthyroid cats
- For all cats with heart murmurs or symptoms that could be due to heart disease
- For all dogs with heart murmurs or symptoms that could be due to heart disease

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2082 Cheyenne Court, Grafton, WI 53024 • phone: 262-375-0130 • fax: 262-375-4196 • [www.bestfriendsvet.com](http://www.bestfriendsvet.com)

