

IDEXX SNAP Feline proBNP Test— use NT-proBNP at point of care to assess stretch and stress on the heart

Feline heart disease is more common than many practitioners realize, and identifying cats with this elusive disease can be challenging. Building on the success of the Cardiopet® proBNP Test from IDEXX Reference Laboratories, the SNAP® Feline proBNP Test provides a quick and affordable way to help you identify cats at increased risk of heart disease.

What is BNP and NT-proBNP?

B-type or brain natriuretic peptide (BNP) is a prohormone (proBNP) that is produced in atrial myocytes. Normal, physiologic stretch of the atria causes the proBNP hormone to be cleaved, which releases two smaller peptides: an inactive N-terminal peptide (NT-proBNP) and a biologically active C-terminal peptide (C-BNP). With the development of cardiac disease, the hormone is also produced and released by ventricular myocytes in an amount that is proportional to the severity of the disease. The function of C-BNP is to counteract the stretch, which triggered its release. The hormone acts on receptors in blood vessels to induce vasodilation and promotes natriuresis and diuresis in the kidney. Both the Cardiopet proBNP Test and the SNAP Feline proBNP Test measure the concentration of NT-proBNP in circulation, which is a surrogate marker for increases in atrial and ventricular size as well as wall stress.¹ In general, the NT-proBNP is released in proportion to the degree of stretch and stress on the myocardium, and concentrations increase with increasing severity of cardiac disease.¹

Heart disease in cats

Cardiomyopathies are the most common cardiac diseases in cats, and hypertrophic cardiomyopathy (HCM) is the most commonly diagnosed form of the disease. HCM is typically recognized in young to middle-aged male cats, but any cat can be affected. Certain breeds of cats, such as the Bengal, Himalayan, Persian, and Maine coon, are at increased risk of the disease. HCM is characterized by concentric hypertrophy of the left ventricle and associated diastolic dysfunction (impaired ventricular relaxation). As the disease progresses, enlargement of the left atrium (LA) leads to an increased LA pressure and risk of developing congestive heart failure. Cats with an enlarged LA are also at increased risk of developing thromboembolic disease (saddle thrombus).

Diagnosing heart disease in healthy cats

Cats with cardiomyopathies can appear healthy even though they may have moderate to severe structural and functional heart disease as determined by echocardiography.² When diagnosing heart disease, all cats should have a thorough history and physical examination. On auscultation, a systolic heart murmur at the sternal or parasternal border may be present with or without a gallop sound or arrhythmia. Keep in mind that not all cats with cardiomyopathy will have a murmur and innocent murmurs in healthy, older aged cats can be quite common. Auscultation cannot distinguish between an innocent murmur and one caused by heart disease. The only way to correctly identify and diagnose an underlying cardiomyopathy in an apparently healthy cat is with an echocardiogram.

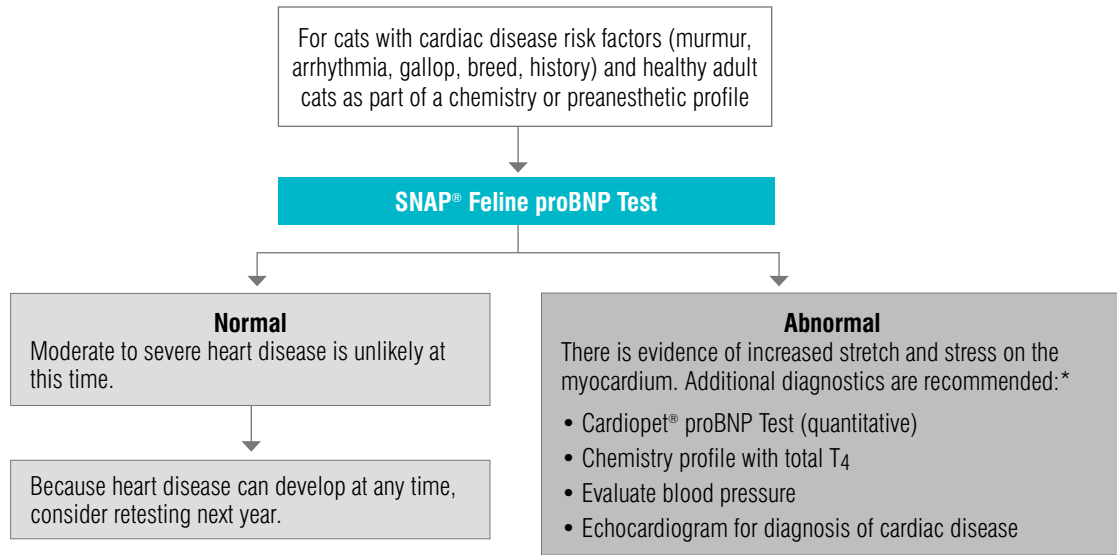
How can the SNAP Feline proBNP Test help?

The SNAP Feline proBNP Test is a diagnostic tool for assessing the presence of increased stretch and stress on the heart.

It provides an objective measure of heart health and should be used in conjunction with auscultation. Approximately 15% of cats (1 in 6) have heart disease, but only about 30% of these will present with a heart murmur.^{3,4} On the other hand, 1 out of 4 apparently healthy cats may have a murmur, but only 25% of these cats will have evidence of cardiomyopathy by echocardiogram.^{3,6}

- Use the SNAP Feline proBNP Test to help determine if a cat with a murmur, arrhythmia, or abnormal heart sound has increased cardiac stretch and stress and is at risk of underlying heart disease (see algorithm).
- Use the SNAP Feline proBNP Test as part of routine adult or preanesthetic profiles in apparently healthy patients. A normal result helps to rule out moderate to severe cardiac disease (see algorithm).⁷
- Use the SNAP Feline proBNP Test to help determine if the cause of respiratory signs in a dyspneic patient is due to primary respiratory disease or congestive heart failure (see algorithm).⁸

Algorithm for identifying heart disease in asymptomatic cats






*Hyperthyroidism and systemic hypertension can have secondary effects on the heart and lead to increases in NT-proBNP concentrations. The presence of severe azotemia consistent with IRIS CKD Stage 3 disease could also result in increased NT-proBNP concentrations due to reduced renal clearance of the peptide. Echocardiography is recommended for the diagnosis and management in the cat. Thoracic radiographs and ECG may also be considered.

Interpreting SNAP Feline proBNP Test results

The SNAP Feline proBNP Test uses the same detection reagents as the Cardiopet proBNP Test but provides results in 10 minutes. The result is displayed as a colored sample spot that is compared to a reference spot. If the color intensity of the sample spot is lighter than the color intensity of the reference spot, then the NT-proBNP concentration is < 150 pmol/L and is considered normal for the SNAP test. If the color intensity of the sample spot and the reference spot are equal, the transition point (cutoff) on the SNAP test, then the NT-proBNP concentration is 150–200 pmol/L and is considered abnormal. When the color intensity of the sample spot is darker than the reference spot, then the NT-proBNP concentration is typically >200 pmol/L (figure 1).

Figure 1. Comparison of the color intensity of SNAP Feline proBNP Test's sample spot to potential Cardiopet proBNP Test results

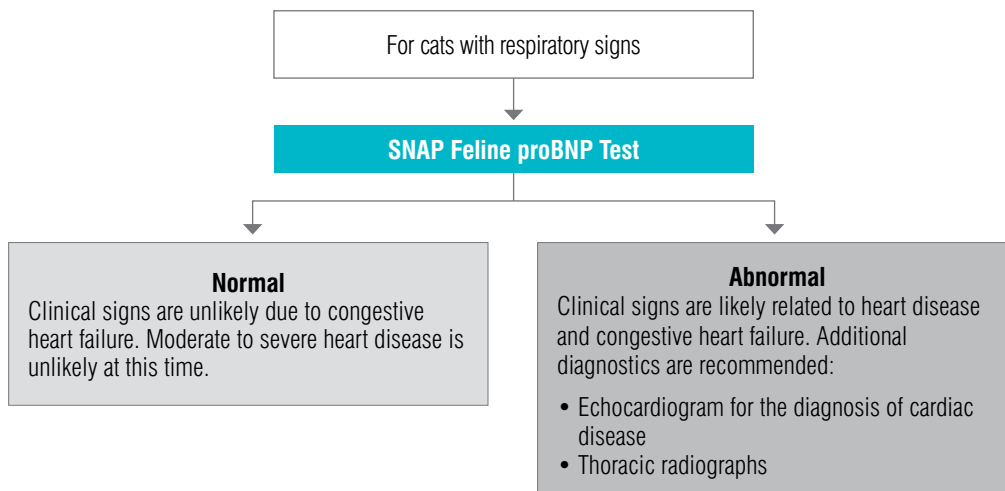
SNAP Feline proBNP Test	Normal	Abnormal	
			
	Sample spot is lighter than reference spot.	Sample spot is the same color as reference spot.	Sample spot is darker than reference spot.
Cardiopet proBNP Test	<150 pmol/L	150–200 pmol/L	>200 pmol/L

What does an abnormal SNAP Feline proBNP Test result mean?

An abnormal SNAP Feline proBNP Test result indicates increased stretch and stress on the myocardium and the need for additional diagnostics. Follow up an abnormal SNAP result with a Feline Cardiopet proBNP Test at IDEXX Reference Laboratories to obtain a quantitative concentration of NT-proBNP for monitoring.

- In a cat with respiratory signs, an abnormal SNAP Feline proBNP Test result is consistent with the presence of congestive heart failure. In a study of 40 cats with pleural effusion, the SNAP test was found to be 95.2% sensitive and 87.5% specific for identifying cats in congestive heart failure.⁸
- In an apparently healthy cat, abnormal NT-proBNP results should be evaluated in the context of total T₄ concentration and blood pressure because systemic hypertension and hyperthyroidism can have secondary effects on the cardiovascular system and lead to increases in NT-proBNP concentrations. The presence of severe azotemia consistent with International Renal Interest Society (IRIS) Chronic Kidney Disease (CKD) Stage 3 disease could also result in increased NT-proBNP concentrations due to reduced renal clearance of the peptide.
- An abnormal SNAP Feline proBNP Test or quantitative Cardiopet proBNP Test can be used to help encourage compliance with an echocardiogram in those asymptomatic cats at risk of underlying cardiac disease.

Algorithm to help determine if clinical signs are due to primary respiratory disease or congestive heart failure



Contacting IDEXX

Expert feedback when you need it

If you have any questions on when to use the SNAP Feline proBNP Test or how to interpret test results, or if you would like treatment advice, please call for a consultation at 1-888-433-9987, option 4.

IDEXX Telemedicine Consultants provides consultation and interpretation services for radiographic, ECG, and/or echocardiographic images. For more information, call 1-800-726-1212.

Recommended reading

Gordon SG, Estrada AH. *The ABCDs of Small Animal Cardiology: A Practical Manual*. Guelph, ON: LifeLearn; 2013.

Oyama MA, Boswood A, Connolly DJ, et al. Clinical usefulness of an assay for measurement of circulating N-terminal pro-B-type natriuretic peptide concentration in dogs and cats with heart disease. *JAVMA*. 2013;243(1):71–82.

References

1. Oyama MA, Boswood A, Connolly DJ, et al. Clinical usefulness of an assay for measurement of circulating N-terminal pro-B-type natriuretic peptide concentration in dogs and cats with heart disease. *JAVMA*. 2013;243(1):71–82.
2. Fox PR, Rush JE, Reynolds CA, et al. Multicenter evaluation of plasma N-terminal probrain natriuretic peptide (NT-pro BNP) as a biochemical screening test for asymptomatic (occult) cardiomyopathy in cats. *J Vet Intern Med*. 2011;25(5):1010–1016.
3. Paige CF, Abbott JA, Elvinger F, Pyle RL. Prevalence of cardiomyopathy in apparently healthy cats. *JAVMA*. 2009;234(11):1398–1403.
4. Payne JR, Brodbelt DC, Luis Fuentes V. Cardiomyopathy prevalence in 780 apparently healthy cats in rehoming centres (the CatScan study). *J Vet Cardiol*. 2015;17(Suppl 1):S244–257.
5. Côté E, Manning AM, Emerson D, Laste NJ, Malakoff RL, Harpster NK. Assessment of the prevalence of heart murmurs in overtly healthy cats. *JAVMA*. 2004;225(3):384–388.
6. Nakamura RK, Rishniw M, King MK, Sammarco CD. Prevalence of echocardiographic evidence of cardiac disease in apparently healthy cats with murmurs. *J Feline Med Surg*. 2011;13(4):266–271.
7. Machen MC, Oyama MA, Gordon SG, et al. Multi-centered investigation of a point-of-care NT-proBNP ELISA assay to detect moderate to severe occult (pre-clinical) feline heart disease in cats referred for cardiac evaluation. *J Vet Cardiol*. 2014;16(4):245–255.
8. Hezzell MJ, Rush JE, Humm K, et al. Differentiation of cardiac from noncardiac pleural effusions in cats using second-generation quantitative and point-of-care NT-proBNP measurements. *J Vet Intern Med*. 2016;30(2):536–542.

The information contained herein is intended to provide general guidance only. As with any diagnosis or treatment, you should use clinical discretion with each patient based on a complete evaluation of the patient, including history, physical presentation, and complete laboratory data. With respect to any drug therapy or monitoring program, you should refer to product inserts for a complete description of dosages, indications, interactions, and cautions.