

# Elevated Liver Enzymes in Scotties

## *New Developments*

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The mystery of elevated liver enzymes in Scotties, specifically Alkaline Phosphatase (ALP), is still commonly seen and still unresolved. However, as some of you already know, we now have three important studies to report on elevated liver enzymes in Scotties! The first was an independent study conducted at Michigan State University. The second study, funded by the San Francisco Bay Scottish Terrier Club, was conducted at Colorado State by Dr David Twedt. And the third study, Grant # 395-A entitled *Elevated Serum Alkaline Phosphatase Activity in Scottish Terriers*, was co-funded by the AKC Canine Health Foundation and the STCA Health Trust Fund and conducted by Dr Kurt Zimmerman at the Virginia-Maryland Regional College of Veterinary Medicine. These researchers took different approaches and tested different hypotheses, thereby increasing the chances of finding some useful answers.

First, in the January 15, 2006 issue of the *Journal of the American Veterinary Medical Association (JAVMA)* [2006;228:222-224], there was a report from Michigan State University on elevated liver enzymes in Scotties. Entitled *Serum alkaline phosphatase activity in Scottish Terriers versus dogs of other breeds*, the article described a retrospective case-control study of elevated ALP levels in 85 Scotties and 340 age-matched controls over a 10-year period at MSU. Conducted by Drs Nestor, Holan, Schall *et al*, this study was the first to scientifically prove what we have all known anecdotally up to now:

- Scotties do in fact have a higher serum ALP activity as a breed.
- Scotties can have elevated ALP levels in the absence of any clinical disease;
- This level usually increases with age.
- In addition, Scotties also have a higher prevalence of diseases (liver disease, Cushings, diabetes mellitus, and pancreatitis) than other breeds;
- The ALP levels in Scotties with these diseases are higher than other breeds of dogs afflicted with the same diseases.

Next, from Dr Twedt, we received this report, delivered to the ACVIM in June 2006:

“...in investigating 12 dogs we did not identify a significance difference in the level of sex hormones suggesting that may not be the cause of the high alkaline phosphatase. We are currently investigating this further and actually have several littermates some with high ALP and others with normal levels. The analysis on these is still pending. We now wonder if it in fact could be an abnormal gene that just tells the liver to produce too much ALP. This is an area we are also collecting samples to investigate as well. So as you can see, this is an ongoing study. What we believe now is [in] dogs with only ALP and no clinical signs,...this condition appears to be... relatively benign but it must be differentiated from other more serious liver conditions. A clue for more serious problems might be where there is concurrent elevations in other liver tests (ALT, AST, GGT, Bilirubin, Bile Acids) in addition to ALP.”

And finally, in another important study now nearing an end, Dr Zimmerman and his team investigated elevations in ALP considered to be a “benign” finding in 34 healthy adult Scotties. He studied a wide array of blood results including CBC, bile acids, chemistry, ALP enzyme in all of its chemical twin forms or isoenzymes, as well as coagulation panels, tests for Cushings disease, and the complete panel of other adrenal gland steroid hormones. Liver histopathology was also done to investigate the structure of the organ as well as check for copper. Unlike Dr Twedt’s preliminary conclusions, Dr Zimmerman’s results suggest that atypical adrenal disease with abnormal elevations in other adrenal steroid hormones leading to increased ALP may in fact be the root cause of this baffling and not so benign disorder in Scotties. (Communication from the AKC-CHF 6/21/07).

All Scottish Terrier breeders and owners should consider themselves very fortunate indeed to have so many world class scientists researching the underlying mechanisms of elevated ALP in our dogs!

In the meantime, what can you do right now with your dogs diagnosed with elevations in liver enzymes?

First and foremost, is your Scottie feeling OK or is he/she sick? Are there any other abnormal findings in the blood work? If the dog is sick, and the blood work shows abnormalities in addition to elevated ALP, then there is no mystery involved. Your veterinarian will know best what diagnostic steps to take and treatments to follow.

On the other hand, if an elevated ALP is the **only** abnormal finding, if your Scottie is feeling and acting fine, and if your vet has ruled out Cushing's disease with a variety of specific tests, then I would not go overboard with more diagnostics at this point. Don't be in a huge rush to do a liver biopsy. You can always do that later if you must. I would certainly monitor the enzymes, but excessive retesting may not be necessary. I would suggest a liver panel every 6 months to see if other abnormalities are present which may herald clinical disease. Consider testing the adrenal gland for abnormal elevations in adrenal steroids if the ALP levels reach really high values. Your vet may periodically test for Cushing's, but this test very often will come back negative. However, I would continue to watch for increases in thirst and urination, the development of a pot-belly, the continuous panting, the hair loss, thin skin and lazy attitude of a typical Cushing's dog. Bottom line is, if your Scot is happy, acting fine and life is normal, I would just monitor the situation.

It is advisable to steer clear of corticosteroids like Prednisone as much as possible. Also it may be wise to avoid elective anesthetic procedures, such as teeth cleaning, when not absolutely needed. Teach your Scottie to tolerate hand scaling and brushing of the teeth. Periodontal disease can be very serious in our older Scotties especially, so you can't ignore dental hygiene.

Discuss with your vet the vaccination schedule for your dog, and find out what he or she recommends as the basic core vaccine protocol. Consider every three years instead of yearly vaccinations, and omit any non-core or nonessential vaccinations. Discuss with your vet any other medications that are prescribed for your dog and the potential liver effects. In other words, **treat the liver gently**.

Some Scottie owners have used liver antioxidants, such as Denosyl SD4 (a SAME product available through your veterinarian), or Milk Thistle (active ingredient silymarin), available at the health food store. Another product called Denamarin combines the two antioxidants. It is questionable whether these products really make a difference in Scotties with unexplained liver enzyme elevation, but these products are known to help repair and restore the liver after bouts of primary liver disease or hepatitis. If in fact the elevated ALP is derived not from the liver but is a result of an abnormal adrenal gland, then it is doubtful that these products will help at all.

And remember in many cases, an elevated ALP appears to be a single red flag of warning for some other disease process somewhere. For example, in many cases of bladder cancer or other cancers, the manifestation and diagnosis of the actual disease is correlated with and is preceded by several months of unexplained, seemingly unrelated liver enzyme elevations. Could the body be responding to a deeply underlying disease process by releasing the stress steroid we call ALP?

So stay tuned! We are getting closer all the time to solving the mystery of elevated ALP in our Scotties.

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