

Why Is My Dog's Labwork Different From Yours?

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With the increasing popularity of retired rescued Greyhounds, veterinarians are likely to evaluate dogs of this breed more frequently in their practice. It is estimated that approximately 120,000 Greyhounds lived in homes as pets, compared to 55,000 Greyhounds in racetracks. In the past few years, private Greyhound adoptions ranged from 15,000 to 18,000/year (Gary Guccione, National Greyhound Association, personal communication).

Greyhounds have evolved over several thousand years into sprinters. However, earlier on in time, they were long-distance runners, traveling with their masters for several days until they were ready to hunt hares or rabbits.

Therefore, sight hounds in general, but Greyhounds in particular, have developed a variety of clinicopathologic "idiosyncrasies" that have allowed them to adapt to these physiologic conditions. Several of these idiosyncrasies result in Greyhounds having test results outside the reference range for dogs.

It has been known for decades that Greyhounds have higher packed cell volumes (PCV), red blood cell (RBC) counts, and hemoglobin concentrations than dogs in other breeds. This has been attributed to their "athletic" conformation; however, Greyhounds raised in a kennel who are not allowed to exercise as their athletic counterparts have similar blood values. Because Greyhound hemoglobin has a higher affinity for oxygen, the higher PCV in his breed may not be solely an adaptation to better athletic performance. Interestingly, Greyhound RBCs have shorter survival times than those in other breeds (53 days versus 104 days).

Other hematologic "abnormalities" in the breed include low white blood cell (WBC) counts (from 1,800-2,000 cells/ μ l and up), low neutrophil counts (same as WBCs), low platelet counts (70,000-120,000/ μ l), abnormal granulation in eosinophils, and low plasma or serum protein concentration.

Eosinophils in Greyhounds frequently lack the typical orange granules; instead, they have empty granules that appear to be vacuoles, thus suggesting toxic changes in the neutrophils. The vacuolated appearance of Greyhound eosinophils is more common in Diff-Quik-stained slides than in those stained with Giemsa.

Serum biochemical parameters are also frequently outside the reference range in Greyhounds. It has been recognized for over 3 decades that Greyhounds have higher sodium, chloride, and bilirubin concentrations and higher AST activities than non-Greyhound dogs. Recently, it was also recognized that Greyhounds have higher bicarbonate and creatinine concentrations, and lower protein and globulin concentrations than non-Greyhound dogs.

We recently documented that retired racing Greyhounds have higher creatinine concentrations than non-Greyhound dogs. The mean creatinine concentration in the Greyhounds was 1.6 mg/dL (median 1.6 mg/dl; range 1.2-1.9 mg/dL), and in 14 of 30 dogs the concentrations were above the reference interval established by the OSU-VTH (0.6-1.6 mg/dL). The mean creatinine concentration in non-Greyhound dogs was 1.03 mg/dL (median 1.0 mg/dl; range 0.8-1.7 mg/dL), and in 1 of 30 dogs the concentration

was above the reference interval established by OSU-VTH. These values are more similar to creatinine concentrations in cats than in dogs.

Serum protein and globulin concentrations are significantly lower in Greyhounds. In most Greyhounds evaluated at the OSU-VTH, the “hypoglobulinemia” is due to low alpha-1 and -2, and beta-1 and -2 globulin concentrations; gamma globulin concentrations are similar to those in other dogs.

A controversial area in Greyhound medicine has been how to test for thyroid function. It has been stated numerous times in the lay literature that there is a high proportion of hypothyroid Greyhounds, and a large number of dogs have been placed on thyroid hormone supplementation for life on the basis of “low levels of T₄”. However, scientific evidence suggests that Greyhounds have resting (basal) T₄ and free T₄ concentrations below the reference range for the dog. Gaughan and Bruyette demonstrated that the mean basal T₄ concentration in Greyhounds is 13.9 nmol/L (reference range, 2.1 to 25.7 nmol/L), the mean basal free-T₄ concentration is 11.3 pmol/L (reference range, 0 to 23.5 pmol/L). In contrast, non-Greyhound dogs had mean basal T₄ concentrations of 25.7 nmol/L (reference range, 10 to 45.5 nmol/L) and free-T₄ concentrations of 19.3 pmol/L (reference range, 3.9 to 39.9 pmol/L). After TSH or TRH stimulation, Greyhounds’ T₄ concentrations were also significantly lower than in the control group. Hill et al also demonstrated that total T₄ concentrations increase and TSH concentrations decrease after racing 500 m.

In summary, don’t forget that Greyhounds’ reference ranges for hematology and biochemistry don’t typically fit within the reference range provided by your lab!

References:

- Cline Iazbik MC, Couto CG: Abnormal eosinophil granulation in retired racing Greyhounds. *J Vet Clin Pathol in press.*
- Feeman W, Couto CG, Gray TL: Serum creatinine concentrations in retired racing Greyhounds. *Vet Clin Pathol* 2003; 32:40-42.
- Gaughan KR, Bruyette DS: Thyroid function testing in Greyhounds. *Am J Vet Res* 2001;62:1130-1133.
- Hill RC, Fox LE, Lewis DD, et al: Effects of racing and training on serum thyroid hormone concentrations in racing Greyhounds. *Am J Vet Res* 2001;62:1969-1972.
- Porter J, Canaday WR Jr: Hematologic values in mongrel and Greyhound dogs being screened for research use. *J Am Vet Med Assoc* 1971;159: 1603-1606.
- Steiss JE, Brewer WG, Welles E, Wright JC: Hematologic and serum biochemical reference values in retired Greyhounds. *Compend Cont Educ* 2000; 22:243-248.
- Sullivan PS, Evans HL, McDonald TP: Platelet concentration and hemoglobin function in Greyhounds. *J Am Vet Med Assoc* 1994; 205:838-841.