

## Investigation of values of some clinically important blood parameters in Van cats

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### ABSTRACT

**Objectives:** In this study, normal values of important blood parameters in the clinical direction of blood samples of Van cats living in Van and around Van were investigated.

**Results:** The aim of this study was to investigate the effect of glucose, total cholesterol, total lipid, total protein, total bilirubine, urea, creatinine quantities,  $\alpha$ -Amylase, GOT, GPT,  $\gamma$ GT, CK, ALP, LDH,  $\alpha$ -HBDH, Che, SDH enzyme activities, GOT/GPT,  $\gamma$ GT/GOT, CK/GOT, LDH/GOT, HBDH/LDH ratios and serum protein fractions in 10 Van cats; albumin,  $\alpha$ -1globulin,  $\alpha$ -2 globulin,  $\beta$ -globulin,  $\gamma$ -globulin and albumin / globulin ratio were determined.

**Conclusion:** In order for Van cats that are an important cultural asset and protected rather not to become extinct but to provide them with healthy conditions for living and breeding, we believe that the values we identify will contribute to practice associated with Van cats and generate collective reference values in scientific studies and will help veterinary clinicians.

**Keywords:** Biochemical parameters, cat, Van cats.

### INTRODUCTION

In veterinary medicine, quantitative biochemical blood analysis is essential for disease control and precise diagnosis. In the diagnosis of various diseases, the prognosis and the control of the treatments, the clinician will refer to the source of biochemical data in case of doubt. The use of clinical biochemical investigations in internal diseases, particularly in suspicious cases, is essential to establish a definitive diagnosis and to control treatment.

We all know cute little Van cats. History of Van cats: The homeland is the homeland of Van. Turkey is a pure cat who grew up in Turkey. In 1969, pure blood was regarded as a blood sick. Compared to other cat

breeds, it is a natural cat. The spread of Van cats to the world: It was first taken to England by an English couple and produced there.( Fawcett, 2018)

The homeland of the Van cat, which has several and important characteristics compared to other breeds, is Buhtamara, Altai Mts. It is a medium-long-haired cat confined to Van, Turkey. It is also known as the odd-eyed cat in the region, that means it has one blue and one orange eye, white patches are scattered on its head, legs and tail (Odabasioglu and Ates, 2000).

Genetically, the breed has three eye colors blue, yellow, and green and they are frequently mismatched, giving Turkish Van cats that coveted David Bowie effect. These strange kitties evolved around Lake Van,

so they are predisposed to swimming. Modern Turkish Van cats probably won't leap into a random lake. But they just might jump into your pool. They're frighteningly good jumpers. Due to their large paws and strong musculature, Turkish Van cats can hop from your kitchen floor to the top of your fridge without thinking twice. They love to swim. These strange kitties evolved around Lake Van, so they are predisposed to swimming (Pomranz 2018).

The work of Van cats, which are an important cultural heritage and are under protection, has not been depleted, healthy survival and production have gained importance in recent years. We believe that the clinical biochemical parameters that we have identified will be vital for veterinarians, and that Van cats will collectively establish reference values in practice and scientific studies.

In this study, the blood of the Van cats in the blood of fasting (glucose), GPT (glutamate-pyruvate transaminase), GOT (glutamate-oxalacetate transaminase), CK (creatin kinase), ALP (Alkaline phosphatase), Che (Choline esterase), SDH (sorbitol dehydrogenase),  $\alpha$ -HBDH ( $\alpha$ -hydroxybutyrate dehydrogenase), LDH (lactate dehydrogenase),  $\gamma$ -GT (glutamyl transpeptidase) enzyme activities, total protein, total bilirubin, total lipid, total cholesterol, urea, creatinine quantities and serum protein fractions; It was aimed to determine albumin/globulin ratio and albumin,  $\alpha$ -1 globulin,  $\alpha$ -2 globulin,  $\beta$ -globulin and  $\gamma$ -globulin values.

## MATERIALS AND METHODS

In the study, 20 healthy individuals with good nutritional and hygiene conditions and two healthy eyes with different colors were found in the center of Van and in the central villages (Yeşilsu, Atmaca, Otluca villagers) blood sera taken from the so-called single-eye cats were used.

Blood samples were duly taken from vena cephalica antebrachii via Gr. 0.80x78 mm cannulas (Kraft and Dürr, 1985).

Test kits were tested with the control serum (Precinormi, Cat No. 171735, Boehringer-Mannheim) and the results were complete. After the sera are separated from the blood, the enzyme activities of SDH,  $\alpha$ -amylase, GPT (glutamate-pyruvate transaminase), GOT (glutamate-oxalacetate transaminase), CK (creatin kinase), ALP (Alkaline phosphatase), Che (Choline esterase), SDH (dehydrogenase)  $\alpha$ -HBDH (alpha-hydroxybutyrate dehydrogenase), LDH (lactate dehydrogenase),  $\gamma$ -GT (glutamyl transpeptidase) were executed on the same day. The following day total lipid, total cholesterol,

total protein, total bilirubin, creatinine, and urea were measured with a photometer from Boehringer-Mannheim. Blood sugar determination was done at the same time with the Refloflux S instrument as the blood was taken. Serum was also stored in sera (-21 C) for protein electrophoresis. The serum obtained from Beckman Company was made using the protein electrophoresis kit (Cat No: 655900) (Paragon 1992). The drying gel was assessed at 600 nm in Densitometer.

## RESULTS

The results are summarized in Table 1 and 2.

Blood parameters	n	X	Sx	Min	Max
$\alpha$ -Amylase U/L	20	991,80	$\pm$ 86,7	270	1552
GPT, U/L	20	19.72	$\pm$ 4.0	8	72
GOT, U/L	20	18.65	$\pm$ 14	9	59
CK, U/L	20	99	$\pm$ 13.6	18	161
ALP, U/L	20	51.05	$\pm$ 6.39	11.5	82
CHE, U/L	20	997.7	$\pm$ 164	474	3060
SDH. U/L	20	4.3	$\pm$ 0.85	1.6	12.8
$\alpha$ -HBDH. U/L	20	92.9	$\pm$ 9.20	49	164
LDH. U/L	20	221.2	$\pm$ 40.9	96	258
$\gamma$ GT, U/L	20	5.85	$\pm$ 0.35	3.0	8.4
Glucose,mg/dl	20	84.4	$\pm$ 4.89	44	143
Total protein, g/dl	20	7.99	$\pm$ 4.07	1.63	14.0
Total bilirubin, mg/dl	20	0.29	$\pm$ 0.006	0.1	1.0
Total lipid, mg/dl	20	385	$\pm$ 61.3	54	989
Total cholesterol, mg/dl	20	79.4	$\pm$ 5.1	42.6	120
Urea. mg/dl	20	32.3	$\pm$ 4.1	11.1	82
Creatinine. mg/dl	20	1.7	$\pm$ 0.22	0.4	3.3
Albumin. g/dl	20	4.74	$\pm$ 0.077	2.53	8.47
Globulin. g/dl	20	3.96	$\pm$ 0.97	2.62	5.47

Table 1. Biochemical parameters detected in blood and sera of Van cats.

Serum proteins	n	X	Sx	Min	Max
Albumin g/dl	10	4.74	±1.76	2.53	8.47
α-1 Globulin g/dl	10	0.25	±0.077	0.11	0.35
α-2 Globulin g/dl	10	1.24	±0.24	0.88	1.76
β-Globulin g/dl	10	0.79	±0.30	0.48	1.4
γ-Globulin g/dl	10	1.67	±0.68	0.79	2.79

Table 2. Serum protein values of Van cats.

## DISCUSSION

Turkish Van cats have a middle-size head. There are one or two black points between ears of kittens. Most of the kittens having two or more black spots are odd eye and these black spots are defined almost as stamp of odd eye cats. They are active animals that like to play with water. Cats have three types of hair length as long, medium and short hair. One of the properties that make Van cats attractive is the color of their eyes. They could either have color blue and amber on both eyes, or one blue and one amber eye (odd-eyed) (Ates, 2000, Odabasioğlu and Ates, 2000, Marcus, 2009). They have semi-long with a cashmere-like texture, and soft to the roots with no trace of undercoat. Due to the extremes in climate of their native region, the breed carries two distinctive coat lengths and allowances must be made for the seasonal coat. The summer coat is short, conveying the appearance of a shorthair; the winter coat is substantially longer and thicker. There is feathering on the ears, legs, feet and belly. Facial fur is short. A frontal neck ruff and full brush tail become more pronounced with age. The above description is that of an adult, allowances must be made for short coats and tail hair on kittens and young adults (Marcus, 2009, Çak, 2017).

As a result, consideration of changes in hematological parameters during the growth of Van cat kittens, will be important in improving the diagnosis of disease and treatment procedures. In addition, following the birth of a routine check on a monthly basis may change these hematological parameters. We conclude that would be useful to our colleague veterinarians whose will follow.

As for the susceptibility, prognosis, and treatment of various diseases and controls, the clinician's source of

reference is biochemical data in case of doubt.

Organ specific enzymes, which are quite accurate in recognizing specific organ damages, are considered as indicator enzymes. There are enzymes that play an important role especially in the differential diagnosis of liver diseases (Benjamin, 1978, Imren and Turan, 1985).

While the  $\alpha$ -amylase activity was 991.8±8.7 IU in the study, the normal activity amongst the cats in the literature was reported as 371-1800 IU (Kraft, 1984, Reflotron, 1989, The Merc, 1991). Serum GPT and GOT activities were 19.72±4.0 IU and 18.63±3.14, respectively, whereas GPT activity was reported as 1.7-72 IU and GOT activity 6.7-104 IU according to literature data.

While serum ALP activity was 51.05±6.39 IU in Van cats, ALP activity in cats was given as 0-77 IU in related literature results. The SDH activity in Van cats was 4.3±0.85 IU, whereas in the literature, SDH activity was reported as 1-7.7 IU in cats. The activity in Van cats was 997.7±164 IU, whereas in the literature, it was reported as 1000-3000 IU (Kraft, 1984).

LDH activity was measured as 221.2±40.9 IU and  $\alpha$ -HBDH activity was 92.9±9.20 IU in Van cats and LDH activity was reported as 35.1-224.9 IU and  $\alpha$ -HBDH as 86.3-95.8% of the LDH activity amongst other cats according to the literature data (Benjamin, 1978, Kraft, 1984, Schechter et al., 1973, Salle et al., 1990, The Merc, 1991).

Among Van cats, CK activity was 99±13.6 IU,  $\gamma$ -GT activity was 5.85±0.35 IU while values in other cats were reported as 0-195 IU for CK and 1.8-12 IU for  $\gamma$ -GT (Kraft, 1984, The Merc, 1991).

In the study, the level of blood glucose in Van cats was 84.4±4.89 mg/dl. According to the literature data, blood glucose level was reported as 70.8-136 mg/dl for cats (Reflotron, 1989, Kraft, 1984, Schechter et al., 1973).

Serum total protein level was 7.99±4.07 g/dl, albumin level was 4.74±1.76 g/dl, and globulin level was 3.96±0.97 g/dl in Van cats. Compared to the literature data, serum total protein level is 5.5-8.0 g/dl, albumin level is 2.45-3.75 g/dl and globulin level is 2.44-4.70 g/dl for cats (Kraft, 1984, Kraft and Dürr, 1985).

While in this study for Van cats, bilirubin level was 0.29±0.006 mg/100 ml; urea level was 32.3±4.1 mg/100 ml; creatinine level was 1.7±0.22 mg/100 ml, data results for other cats indicate as follows: bilirubin level 0.2-0.5 mg/dl, urea level 15.4-82 mg/100 ml, creatinine level 0.5-1.9 mg/100 ml (Reflotron, 1989, Kraft, 1984, Kraft and Dürr, 1985, The Merc, 1991).

Serum total lipid level was found to be 376±110

mmg/100ml and total cholesterol level was found to be 70-161 mg/dl for cats in the literature data; however, serum total lipid level was found to be 385+61.3 mg/100 ml and total cholesterol level was 79.4+5.1 mg/100 ml. (Reflotron, 1989, The Merc, 1991).

In order for Van cats that are an important cultural asset and protected rather not to become extinct but to provide them with healthy conditions for living and breeding, we believe that the values we identify will contribute to practice associated with Van cats and generate collective reference values in scientific studies and will help veterinary clinicians.

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## REFERENCES

- Ates CT. Investigation of morphological and physiological properties of the distribution of single-eye Van cat. (2000) Ph.D. thesis, Institute of Health Sciences, Van.
- Benjamin M.M. Outline of Veterinary Clinical Pathology. Third Ed. Colorado State University. USA. 1978.
- Cak B. Turkish Van cat and Turkish Angora cat: A Review. (2017) *Journal of Agricultural Science and Technology*, 151-159 doi: 10.17265/2161-6256/2017.03.002.
- Fawcett K. 7 facts about Turkish Van Cats. August 5, 2016 <http://mentalfloss.com/article/83400/7-facts-about-turkish-van-cats>, 2018
- İmren AH, Turan O. Klinik Tanıda Laboratuvar (Metodlar-Bulguların Değerlendirilmesi-Fonksiyon Testleri) Beta Basım Yayın, Ankara, 1985.
- Kraft W, Dürr UM. Katzenkrankheiten. Klinik und Therapie. Schaper, Germany, 1985.
- Kraft W. Kleintierkrankheiten Band 1. Innere Medizin. Germany, 1984.
- Marcus D. The Cat Fanciers' Association. 'Turkish Van Show Standard (Revised 2009)' The Cat Fanciers' Association, Inc. Accessed. Available at: <http://cfa.org/Portals/0/documents/breeds/standards/turkish-h-van.pdf>. June 6, 2017.
- Odabasioğlu F and Ateş CT. Van Cat. 1st edition, Selçuk University Printing House, Konya, Turkey, 2000.
- Paragon (SPE) Serum protein electrophoresis kit, P/N 655900. Beckman, Belgium; 1992.
- Pomranz K. What the eff is a rare Turkish Van cat and what is it doing in the pool? Available at: <http://www.bravotv.com/unleashed/turkish-van-cats-facts>, 2018.
- Reflotron. Systematic on the spot diagnosis veterinary medicine. Boehringer-Mannheim GmbH. Germany, 1989.
- Salle S, Rippel R, Hoffmann EW. Evaluation of an automated tabletop blood chemical analyzer for the veterinary clinical pathology. *JAVMA* 1990; 196(2), 307-312.
- Schechter RD, Schalm OW, Kaneko JJ. Heinz body hemolytic anemia associated with the use of urinary antiseptics containing methylene blue in the cat. *JAVMA* 1973; 162, 1, 1, 37-44.
- The Merc Veterinary Manual. Seven Ed. A Handbook of Diagnosis Therapy and Control for the Veterinarian. USA, 1991.