

## Serum erythropoietin level and some hematologic parameters in Turkish Van Cats

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**Abstract:** This study was performed to investigate serum erythropoietin level and some blood parameters in Turkish Van Cats. Twenty healthy cats in either sex, aged between 1-4 years old were used for this purpose. Red blood cell count (RBC), hemoglobin (Hb), and hematocrit (PCV) values were determined by Blood Cell Counter (Coulter, MAXM), and serum erythropoietin concentrations were determined by radioimmunoassay (DSL; Texas, USA). The mean red blood cell count was  $7.35 \pm 0.62 \text{ mm}^3$ , haemoglobin concentration was  $11.66 \pm 0.96 \text{ gr/dl}$ ; PCV was  $34.5 \pm 3.02\%$ ; and serum erythropoietin concentration was  $71.82 \pm 6.88 \text{ mU/ml}$ . Some blood parameters (RBC count, Hb value and PCV) were within range that before mentioned in healthy cats but serum erythropoietin level was higher in Turkish Van Cats compared to that in the other performed studies. These differences were probably due to high altitude or different assay methods used. Besides, there was not any effect on serum erythropoietin levels of the sex in this study.

**Key Words:** Erythropoietin, Hematologic values, Turkish Van Cat.

### Van kedilerinde serum eritropoietin seviyesi ve bazı hematolojik parametreler

**Özet:** Bu çalışmada, Van Kedilerinin serum eritropoietin düzeyleri ve bazı kan parametrelerinin seviyeleri araştırıldı. Bu amaçla yaşları 1-4 yıl arasında değişen, her iki cinsten toplam 20 adet sağlıklı Van kedisi kullanıldı. Eritrosit sayıları, hemoglobin miktarı ve hematokrit değerleri kan sayım cihazı (Coulter, MAXM) ile, serum eritropoietin değeri ise Radioimmunoassay (RIA) ile belirlendi. Van kedilerinin ortalama eritrosit sayıları  $7.35 \pm 0.62 \text{ mm}^3$ , hemoglobin miktarı  $11.66 \pm 0.96 \text{ gr/dl}$ ; hematokrit değeri  $34.5 \pm 3.03$  ve serum eritropoietin değeri  $71.82 \pm 6.88 \text{ mU/ml}$  olarak belirlendi. Sonuç olarak, Van kedilerinde eritrosit sayısı, hemoglobin miktarı ve hematokrit değerlerinin sağlıklı kedilerde daha önce bildirilen değerler arasında bulunduğu, serum eritropoietin değerlerinin ise diğer kedi ırklarından daha yüksek olduğu belirlendi. Bu farklılığın yüksek rakımdan ya da kullanılan ölçüm metodlarının farklılığından kaynaklanabileceği kanaatine varıldı. Ayrıca bu çalışmada cinsiyetin serum eritropoietin düzeyine bir etkisinin olmadığı belirlendi.

**Anahtar Kelimeler:** Eritropoietin, Hematolojik değerler, Van Kedisi.

### INTRODUCTION

Erythropoietin is a glycoprotein hormone which is principally secreted by the kidney (1, 3). The hormone is 34,000 dalton molecular weight, has 200,000 IU/ml specific activity and 166 amino acid (3, 5, 6). Although the liver is the primary site of erythropoietin in the fetus, the specific site of production is not known (1). The production of erythropoietin is regulated from a gene localized on the 7<sup>th</sup> chromosome in human and some animals (4).

As in the other kinds, erythropoietin controls the erythropoiesis by activating reproduction and differentiation of erythroid precursor cells in the cats as

well (1, 11, 12). In hypoxia, erythropoietin production is activated and then erythrocyte production rate is increased. Erythropoietin effects the specific receptors on the surface of BFU-E (burst forming unit-erythroid) and CFU-E (colony forming unit-erythroid) cells that are precursor cells of erythroid series in the bone marrow, consequently increase these cells and differentiate CFU-E to proerythroblast. By increasing of the proerythroblast and basophilic erythroblast proliferation, in the next step produced proerythroblasts differentiate to mature normoblasts more than 4 days, later reticulocytes are produced (7-9). Ikeda et al (2) were reported that erythropoietin level was  $39.4 \pm 5.4 \text{ mU/ml}$  in domestic cats.

This study was performed to investigate erythropoietin level of Turkish Van Cats which is living cultural wealth of Turkey.

## MATERIAL AND METHOD

In this study, 20 healthy Turkish Van Cats in either sex, aged between 1-4 years old were used as materials. Blood was drawn from ramus dorsalis of vena saphalica parva by the rutin methods. The serums for erythropoietin levels were obtained with cooler santrifuge (Nüve N1000R). The serums were stored at -20 °C, stored at room temperature for 30 minutes. Erythropoietin levels of serums were determined by using RIA (Radioimmunoassay) kit (DSL, Texas, USA). To determine blood parameter, samples were transferred in tubes with EDTA. Erythrocyte count, hemoglobin levels and hematocrit values were measured by the boold counter (Coulter MAXM).

## RESULTS

The mean erythrocyte counts, hemoglobin levels, hematocrit values and erythropoietin levels were  $7.35 \pm 0.62 \text{ mm}^3$ ,  $11.66 \pm 0.96 \text{ gr/dl}$ ,  $34.5 \pm 3.02\%$  and  $71.82 \pm 6.88 \text{ mU/ml}$  respectively in Turkish Van Cats used in this study.

## DISCUSSION

Some researchers (10, 13-15) reported that erythrocyte level was  $5-10 \times 10^6 \text{ mm}^3$ ; hemoglobin level was 8-15 gr/dl; and hematocrit value was 24-45% in healthy domestic cats. In this study, it was established that the mean erythrocyte counts ( $7.35 \pm 0.62 \text{ mm}^3$ ), hemoglobin levels ( $11.66 \pm 0.96 \text{ gr/dl}$ ), hematocrit values ( $34.5 \pm 3.02\%$ ) of the Turkish Van Cats were within range in healthy cats (10, 13, 14).

Erythropoietin level was found to be  $39.4 \pm 5.4 \text{ mU/ml}$  in a study performed by Ikeda et al using the mouse spleen cell method (2) in Japan. This level is about half of our finding ( $71.82 \pm 6.88 \text{ mU/ml}$ ). In order to supply enough oxygen at high altitute, excess amount of erythropietin was secreted (3, 5, 8). It is thought that the high level of serum erythropoietin in Turkish Van Cats was due to high altitute of Van or to the difference of the assay methods used.

As a conclusion, although erythrocyte count, hemoglobin level, and hematocrit value of Turkish Van Cats was within range that before mentioned in healthy

cats, serum erythropoietin level was higher than normal value obtained from other studies (2). It is considered that this difference was probably due to high altitute or different assay methods. Besides, there was not any effect of the sex on serum erythropoietin levels in this study.

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