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Blood groups and haematology in Istrian pointers

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ABSTRACT

The research involved 30 pure breed Istrian pointers, 12 females and 18 males in age groups from 3 months to 8 years. Blood samples were taken from all animals in order to determine blood group DEA 1.1. and standard haemogram. Of the total of 30 tested dogs 20 (66.7%) had blood group DEA 1.1., which is a higher percentage in comparison with data provided in the literature to date. Average values of haematological indicators are within physiological standards.

Key words: blood groups, haemogram, Istrian pointers

Introduction

Mention of the Istrian pointer as a breed dates back to texts and drawings dating from the 14th century, but proof of its existence on the territory of Istria indirectly exists from as early as the 9th century. A snow-white Istrian pointer with sparse orange tinges, mostly on its head and flanks, can be seen in various frescoes, as well as in one of

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Titian's famous paintings. In the first photographs, taken in the 1890s, it is depicted as an Austrian pointer (VON BYLANDT, 1942).

The first description of the Istrian pointer's phenotype dates from 1337 in the documents of Bishop Petar of Đakovo. A similar description was repeated in the 18th century. The dog was first presented at an exhibition in Vienna in 1866, while the first kinological standard was written in 1905. The presently valid standard was registered by the Fédération Cinologique Internationale (FCI) in 1948. The Istrian pointer is seen in two breed types: short-haired and wire-haired. Kynology regards them as separate breeds, although the only visible morphological difference is in the quality of hair.

Today, blood groups in dogs are defined through the DEA (Dog Erythrocyte Antigen) system from DEA 1 to DEA 8 (KOHN et al., 1998; FELDMAN, 1993). Blood group DEA 1 has two subgroups: DEA 1.1. and DEA 1.2. (KOHN et al., 1998). Clinically significant blood groups in dogs are DEA 1.1., DEA 1.2. and DEA 7. Among those, blood group DEA 1.1. is dominant with regard to antigenic properties, and clinically the most significant. In other words, when given a transfusion of DEA 1.1. positive blood, a dog which is DEA 1.1. negative reacts by producing antibodies which can persist for life and can, during a further transfusion, provoke a transfusion reaction. DEA 1.1. positive dogs are therefore universal recipients, although they can give blood only to DEA 1.1. positive dogs (BEDRICA et al., 2003; GRAČNER et al. 2004).

Research on DEA 1.1. blood group in dogs has been carried out only by a few authors. SWISHER and YOUNG (1961) focused on establishing the representation of DEA 1.1. blood group among 332 mongrels, finding it to be 44.6%. SWISHER et al. (1973) found that 40% of tested animals had blood group DEA 1.1. SUZUKI et al. (1975) tested 61 dogs and established DEA 1.1. blood group in 36% of animals. The share of DEA 1.1. blood group in animals tested by WRIESENDORP et al. (1976) was found to be 36% in mongrels, 43% in beagles, and 29% in retrievers. Of the 224 dogs tested for blood group by EJIMA et al. (1986), two-thirds of which were mongrels, the same group was found in 33% of animals. KOHN et al. (1998) tested for DEA 1.1. blood group in 88 animals, which he established in 52% of dogs.

GIGER et al. (1995) and KOHN et al. (1998) offer an interesting thesis, whereby the frequency of DEA 1.1. blood group could be linked to geographical differences.

The majority of research involving blood groups and biochemical parameters in blood serum of dogs has been carried out with no consideration for breed (MEINKOTH and CLINKENBEARD, 2000). The existing literature does not provide data on the differences in haematological values in blood between different breeds of dog. It is only recently that such data has been systematically analyzed in the course of the standardization process of individual pure breeds of dog. Results obtained through such research regularly show

narrower physiological frameworks than those yielded by research dealing with dogs as a zoological species.

Materials and methods

This research involved 30 pure breed Istrian pointers, 12 females and 18 males, between the ages of 3 months and 8 years. Blood samples from v. cephalica antebrachii were taken from all dogs into test tubes under pressure containing the EDTA anticoagulant in order to establish a complete blood test. Haematological indicators were obtained through the Coulter Counter haematological counter, while DEA 1.1. blood group was determined on the basis of the serological test of agglutination RapidVet®-H (canine DEA 1.1.) (Agrolabo products, Switzerland) serological agglutination test. In the course of establishing the blood group the reaction of autoagglutination and the intensity of agglutination reaction were also determined.

Results of research were analysed by the ANOVA statistic method (StatSoft, Statistica 7.0, 1984.-2005) i Tukey HSD with post-hoc analysing tests.

Results

Of the 30 Istrian pointers tested, 10 (33.3%) were DEA 1.1. negative, while the remaining 20 (66.7%) were DEA 1.1. positive (Table 1)

Table 1. Range of blood group DEA 1.1., shown in percentages

	DEA 1.1. negative	DEA 1.1. positive	Total
Number of dogs	10 (33.3%)	20 (66.7%)	30 (100%)

Table 2. Range of intensity of positive reaction to blood group DEA 1.1.

Intensity of positive reaction	1+	2+	3+	Total
Number of dogs	3 (15%)	7 (35%)	10 (50%)	20 (100%)

Table 2. clearly shows that of the 20 Istrian pointers that reacted positively to blood group DEA 1.1., 3 demonstrated a low reaction intensity (1+), 7 dogs (35%) had a medium-strong reaction intensity (2+), and in 10 animals (50%), reaction intensity was 3+.

Average values of all haematological indicators were found to be within the given physiological values (Table 3)

Table 3. Results of statistical processing of all haematological indicators (n = 30)

	Mean	SD	Min	Max	Median
Erythrocytes 10^{12}/L	5.70	1.01	3.76	9.52	5.54
Haemoglobin g/L	146.73	28.69	97.0	186.0	150.50
Haematocrit (PCV)	46.27	6.37	31.60	59.0	47.40
MCV fL	77.30	4.37	62.00	83.00	79.00
Leukocytes 10^{9}/L	13.85	2.70	8.69	19.06	13.33
- eosinophils	0.08	0.07	0.00	0.28	0.08
- non segmented neutrophils	0.04	0.03	0.00	0.16	0.04
- segmented neutrophils	0.55	0.12	0.24	0.72	0.58
- lymphocytes	0.29	0.09	0.10	0.54	0.26
- monocytes	0.04	0.02	0.00	0.08	0.04
Sed 1 (15 min)	1.00	0.00	1.00	1.00	1.00
Sed 2 (30 min)	2.33	0.66	1.00	4.00	2.00
Sed 3 (60 min)	3.97	1.22	2.00	7.00	4.00
Sed 4 (120 min)	5.93	1.34	4.00	9.00	6.00

Table 4. Statistically analysed indicators of male haemograms (n = 18)

	Mean	SD	Min	Max	Median
Erythrocytes 10^{12}/L	5.65	1.26	3.76	9.52	5.40
Haemoglobin g/L	144.00	27.85	97.00	186.00	149.50
Haematocrit (PCV)	45.00	7.48	31.60	59.00	45.70
MCV fL	76.61	4.92	62.00	81.00	79.00
Leukocytes 10^{9}/L	13.98	2.40	10.71	18.00	13.33
- eosinophils	0.66	0.06	0.00	0.28	0.05
- non segmented neutrophils	0.04	0.03	0.00	0.160	0.04
- segmented neutrophils	0.55	0.12	0.24	0.68	0.59
- lymphocytes	0.29	0.10	0.16	0.54	0.36
- monocytes	0.03	0.02	0.00	0.06	0.04
Sed 1 (15 min)	1.00	0.00	1.00	1.00	1.00
Sed 2 (30 min)	2.50	0.62	2.00	4.00	2.00
Sed 3 (60 min)	4.06	1.30	3.00	7.00	4.00
Sed 4 (120 min)	6.17	1.30	4.00	9.00	6.00

Table 5. Statistically analysed indicators of female haemograms (n = 12)

	Mean	SD	Min	Max	Median
Erythrocytes 10^{12}/L	5.77	0.47	4.92	6.52	5.74
Haemoglobin g/L	150.83	12.01	130.00	165.00	150.50
Haematocrit (PCV)	48.18	3.74	41.20	56.60	48.10
MCV fL	78.33	3.31	72.00	83.00	79.00
Leukocytes 10^{9}/L	13.67	3.20	8.70	19.06	13.74
- eosinophils	0.11	0.06	0.02	0.22	0.10
- non segmented neutrophils	0.04	0.02	0.02	0.08	0.04
- segmented neutrophils	0.54	0.13	0.32	0.72	0.53
- lymphocytes	0.28	0.09	0.10	0.40	0.27
- monocytes	0.04	0.03	0	0.08	0.04
Sed 1 (15 min)	1.00	0	1.00	1.00	1.00
Sed 2 (30 min)	2.08	0.67	1.00	3.00	2.00
Sed 3 (60 min)	3.83	1.11	2.00	5.00	3.50
Sed 4 (120 min)	5.58	1.38	4.00	8.00	5.00

Of 30 Istrian pointers, 12 females and 18 males were under research. Comparing the values between Tables 4 and 5, no statistically significant differences were determined between mean values for individual parameters of haemograms. However, the mean value of eosinophilic leukocytes was almost two times higher in females. Somewhat larger differences exist between the lowest and highest value of erythrocytes in males, in haemoglobin concentration in females, and in haematocrit values in males. Total number leukocyte span is also higher in females. Despite small differences all values are within physiological boundaries. Statistically, no significant differences were determined between these two groups of dogs ($P>0.05$).

Statistical analysis of haematologic indicators based on sex was carried out separately (Tables 4 and 5).

Of 30 Istrian pointers, 10 were younger than one year, and 20 were older than one year. Comparing the values from Tables 6 and 7 it can be seen that the mean values of haemogram indicators were approximately the same, regardless of the age of animals. However, the number of eosinophilic granulocytes was somewhat higher in younger dogs. Statistically, no significant differences were determined between these two groups of dogs ($P>0.05$).

Table 6. Statistically analysed indicators of haemograms in dogs younger than one year (n = 10)

	Mean	SD	Min	Max	Median
Erythrocytes 10^{12}/L	5.70	1.52	3.76	9.51	5.43
Haemoglobin g/L	139.50	20.23	115.00	165.00	145.50
Haematocrit (PCV)	44.22	6.52	31.60	52.00	46.00
MCV fL	78.60	3.47	70.00	83.00	79.50
Leukocytes 10^{9}/L	13.56	3.23	8.70	17.57	14.03
- eosinophils	0.11	0.09	0	0.28	0.10
- non segmented neutrophils	0.05	0.03	0.02	0.12	0.04
- segmented neutrophils	0.54	0.13	0.32	0.72	0.53
- lymphocytes	0.27	0.09	0.10	0.40	0.28
- monocytes	0.03	0.02	0	0.06	0.02
Sed 1 (15 min)	1.00	0	1.00	1.00	1.00
Sed 2 (30 min)	2.20	0.79	1.00	3.00	2.00
Sed 3 (60 min)	3.90	1.00	3.00	5.00	3.50
Sed 4 (120 min)	5.80	1.23	4.00	7.00	6.00

Table 7. Statistically analysed indicators of haemograms in dogs older than one year (n = 20)

	Mean	SD	Min	Max	Median
Erythrocytes 10^{12}/L	5.70	0.68	4.20	6.67	5.60
Haemoglobin g/L	150.35	23.66	97.00	186.00	156.00
Haematocrit (PCV)	47.30	6.21	35.10	59.00	48.10
MCV fL	76.65	4.70	62.00	81.00	79.00
Leukocytes 10^{9}/L	14.00	2.47	10.71	19.06	13.33
- eosinophils	0.07	0.05	0.00	0.16	0.07
- non segmented neutrophils	0.04	0.03	0.00	0.18	0.03
- segmented neutrophils	0.56	0.12	0.24	0.68	0.59
- lymphocytes	0.29	0.10	0.20	0.54	0.26
- monocytes	0.04	0.02	0.00	0.08	0.04
Sed 1 (15 min)	1.00	0.00	1.00	1.00	1.00
Sed 2 (30 min)	2.40	0.60	2.00	4.00	2.00
Sed 3 (60 min)	4.00	1.34	2.00	7.00	4.00
Sed 4 (120 min)	6.00	1.41	4.00	9.00	6.00

Discussion

Of the total of 30 tested blood samples of Istrian pointers, in 20 (66.7%) blood group DEA 1.1. was established. The given percentage of presence of this blood group is somewhat higher in comparison with the data provided in the literature to date. A relatively small number of authors have investigated the frequency of presence of DEA 1.1. blood group in dogs, and results published to date are relatively mixed. SWISHER and YOUNG (1961), for instance, investigated the frequency of DEA 1.1. blood group in 332 dogs of different breeds, and established it in 44.6% of animals. SUZUKI et al., (1975) tested the blood of 61 dogs and found that 36% of them had blood group DEA 1.1.

A still smaller number of authors have researched the frequency of the DEA 1.1. blood group within specific breeds of dog. WRIESENDORP et al. (1976) found that 43.4% of beagles, 29% of retrievers and 37% of mongrels had the DEA 1.1. blood group. GIGER (1991) and KOHN et al. (1998) mention that DEA 1.1. blood group frequency can be influenced by the selection process within individual breeds, or rather, by possible inter-breeding, as well as by the number of tested dogs.

VAN DE MERWE et al. (2002) have established the existence of significant differences between individual breeds of dog. The highest percentage of DEA 1.1. blood group presence (78%) was found in Rottweilers, and the lowest in hounds (0%).

In comparing the mean values of haematological indicators in blood of Istrian pointers with referential parameters, no deviations were observed. Maximum values of certain indicators are above physiological values, which can be attributed to local infections of the frontal respiratory tract, since the research was carried out during winter months. Also, we determined that there are no significant alterations in haemogram indicators in relation to sex or age of animals.

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SAŽETAK

Istraženo je ukupno 30 čistokrvnih istarskih goniča, 12 ženki i 18 mužjaka u dobi od 3 mjeseca do 8 godina. Životinjama je uzeta krv za određivanje krvne grupe DEA 1.1. i standardni hemogram. Od 30 pretraženih pasa njih 20 (66.7%) imalo je krvnu grupu DEA 1.1., što je veći postotak s obzirom na do sada poznate podatke. Prosječne vrijednosti hematoloških parametara bile su unutar fizioloških vrijednosti.

Ključne riječi: krvne grupe, hemogram, istarski gonič