

Prevalence of DEA 1.1. blood group in Croatian indigenous breeds of dogs: Posavaz Hound and Tornjak Hound

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ABSTRACT

The study included 60 clinically healthy dogs of two Croatian indigenous breeds: the Posavaz Hound and the Tornjak Hound. Their ages ranged from 2 months to 8 years. Determination of blood group DEA 1.1. (Dog Erythrocyte Antigen) was performed using tests based on serological agglutination reaction. The blood of dogs that showed a positive reaction to the blood group DEA 1.1., intensity of agglutination (low, medium and strong) was determined. The Posavaz Hound breed showed 60% of dogs positive for DEA 1.1. group, and the Tornjak Hound breed showed 53.3% positive. In the Tornjak Hounds the strongest positive reaction was found for the largest number of individuals (56.3%), while in the Posavaz Hound breed for most individuals the lowest positive response was determined (55.6%). The strongest intensity of reaction was found in Tornjak Hound females and the lowest in Posavaz Hound males. Using Kruskal-Wallis and Chi-square tests no statistical difference was determined between the positive reaction intensity of Posavaz and Tornjak Hound DEA 1.1. blood groups.

Key words: canine DEA 1.1., Posavaz Hound, Tornjak Hound, Croatia

Introduction

According to the Federation Cynologique International (FCI), the Posavaz Hound is a hunting breed of dog that belongs to the 6th group (Scent hounds), while the Tornjak

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Hound is a mountain shepherd dog provisionally placed in the 2nd FCI group. Both are Croatian indigenous breeds of dog (the Tornjak is also native to Bosnia and Herzegovina), so we believe that research and knowledge about them is very important for both the Croatian and the international scientific community.

Canine blood groups consist of five groups composed of seven antigenic determinants, recognized by monospecific sera raised by deliberate isoimmunisation. They are: the DEA (Dog Erythrocyte Antigen) system: DEA 1 (1.1, 1.2 and 1.3 subgroups); DEA 3; DEA 4; DEA 5 and DEA 7 (FELDMAN, 1993; KOHN et al., 1998). The blood group DEA 1 is comprised of three subgroups: DEA 1.1., DEA 1.2. (KOHN et al., 1998) and DEA 1.3. (HALE, 1995). The clinically significant blood groups in dogs are DEA 1.1., DEA 1.2. and DEA 7. There is universal agreement that the DEA 1.1 blood type can cause significant transfusion reactions (BEDRICA et al., 2003; DELUCA et al., 2006).

We investigated the prevalence of blood group DEA 1.1., because most authors (PICHLER and TURNWALD, 1985; AUTHEMENT and WOLFSHEIMER 1987; FELDMAN, 1993) state that it is antigenically the strongest and is of particular clinical importance, because of the possible adverse reactions with other dogs providing transfusion of blood groups. So far, the presence of blood groups in the Croatian native breeds of dogs has been studied by GRACNER et al. (2007 and 2011) in Istrian pointers and Dalmatians, and by ŽUBČIĆ et al. (2008) in the Croatian Sheepdog. Our studies complement the knowledge of blood groups in all Croatian native breeds of dogs. GIGER et al. (1995) and KOHN et al. (1998) offer an interesting thesis, whereby the prevalence of the DEA 1.1. blood group could be linked to geographical differences. The aim of this study was to determine the efficiency of the RapidVet[®]-H (Canine DEA 1.1., dms/Agrolaboproducts ag Neuhausen am Rheinfall, Switzerland) test for determination of DEA 1.1. blood groups in Posavaz and Tornjak hounds.

Materials and methods

The study included 60 clinically healthy dogs of two indigenous Croatian breeds: Posavaz Hound (15 females and 15 males, aged from 7 months to 8 years) and Tornjak Hound (18 females and 12 males, aged from 2 months to 7 years). The blood samples were obtained from v. cephalica in the EDTA anticoagulant test tubes (Vacutainer Systems, Belliver Industrial Estate, Plymouth, UK). Using blood samples, the possible reaction of agglutination was determined. All samples were negative. Blood group DEA 1.1. determination was performed using a serological test based on serological agglutination reaction, RapidVet[®]-H (Canine DEA 1.1., dms/Agrolaboproducts ag Neuhausen am Rheinfall, Switzerland). It appears when the erythrocytes of dogs that contain DEA 1.1. antigens come into contact with mouse monoclonal antibodies. Positive reactions were divided according to the intensity of agglutination (low 1+, medium 2+ and strong 3+).

Nonparametric tests do not require continuous data and no assumption about distribution should be made, so we used a nonparametric Kruskal-Wallis and Chi-square test to determine the significance of differences between the groups.

Results

Immediately after blood sampling, the possible reaction of autoagglutination was determined. It was negative for all dogs. This made the process of determination of the blood group DEA 1.1. faster and easier, and the results are shown in Table 1.

Table 1. Prevalence of the blood group DEA 1.1. in Posavaz and Tornjak hounds

Breed	Sex	DEA 1.1. positive	DEA 1.1. negative	Total
Posavaz hound	Male	6 (20.0%)	9 (30.0%)	15 (50.0%)
	Female	12 (40.0%)	3 (10.0%)	15 (50.0%)
	Total	18 (60.0%)	12 (40.0%)	30 (100.0%)
Tornjak hound	Male	7 (23.3%)	5 (16.7%)	12 (40.0%)
	Female	9 (30.0%)	9 (30.0%)	18 (60.0%)
	Total	16 (53.3%)	14 (46.7%)	30 (100.0%)

Table 2 shows the agglutination intensity, which we defined as low, medium and strong.

Table 2. Intensity range of positive reactions to blood group DEA 1.1.

Breed	Sex	Intensity of positive reaction						Total	
		Low (1+)		Medium (2+)		Strong (3+)		n	%
		n	%	n	%	n	%		
Posavaz hound	Male	5		1		0		6	
	Female	5		4		3		12	
	Total	10	55.6	5	27.8	3	16.6	18	100.00
Tornjak hound	Male	3		2		2		7	
	Female	1		1		7		9	
	Total	4	25	3	18.7	9	56.3	16	100.00

Table 3 shows the intensity median, mode and frequency of mode of the positive reactions to blood group DEA 1.1. according to breed and gender.

Table 3. Intensity of positive reactions to blood group DEA 1.1. according to breed and gender.

Breed			
Posavaz hound		Tornjak hound	
Male	Female	Male	Female
Median (Mode, frequency of Mode)	Median (Mode, frequency of Mode)	Median (Mode, frequency of Mode)	Median (Mode, frequency of Mode)
1 (1, 5)	2 (1, 5)	2 (1, 3)	3 (3, 7)

Using Kruskal-Wallis and Chi-square tests, no statistical difference was determined between the positive reaction intensity of the Posavaz and Tornjak Hound DEA 1.1. blood groups. Although no statistical difference was determined, the frequency of the strong positive reaction for the DEA 1.1. blood group in the Tornjak breed was higher than for the the Posavaz hound.

Discussion

We determined the negative reaction of auto-agglutination in all dogs. The same results were obtained by GRAČNER et al. (2011) dealing with Dalmatian dogs, while ANDREWS et al. (1992) suggested that this reaction had been identified in 6% of dog blood samples. According to the prevalence of the blood group DEA 1.1. (Table 1) it can be seen that out of 30 tested Posavaz Hound dogs, 18 of them (60%) were determined to have blood group DEA 1.1. It was very similar to the Tornjak breed (n = 30) in which this blood type was determined in 16 of them (53.3%). Our results differ from studies by other authors. SWISHER et al. (1973) found blood group DEA 1.1. in 40% of blood samples. SUZUKI et al. (1975) examined the blood of 61 dogs and found that 36% had blood group DEA 1.1. GIGER et al. (1995) found that out of 224 dogs (two thirds were pure-bred dogs and one third cross-breeds) 33% of them were positive for blood group DEA 1.1. KOHN et al. (1998) found a slightly higher prevalence (52% of examined species) of blood group DEA 1.1. in dogs of various breeds and crossbreeds in Pennsylvania state. KOHN et al., 1998 found the prevalence of blood group DEA 1.1 in 60% of tested dogs in Germany, in the city of Berlin. WRIESENDORP et al. (1976) found blood group DEA 1.1. in 43.4% of beagles, 29% of retrievers and 37% of crossbreeds. While EJIMA et al. (1986) were examining 545 rare Japanese dog breeds, they found that 44% of dogs had blood group DEA 1.1. Exploring the prevalence of blood group DEA 1.1. in our native breeds of dogs, GRAČNER et al. (2007) found, similar to our research, that out of the 30 dogs of the Istrian pointer breed, 66.7% had blood group DEA 1.1. ŽUBČIĆ et al. (2008) found 90% (n = 30) of dogs of this blood group in Croatian sheepdog breeds, and GRAČNER et al. (2011) proved this blood group in 95% (n = 40) of the Dalmatian dog breed. GIGER et al. (1995), and KOHN et al. (1998) state that the incidence of blood group DEA 1.1. may be affected

by the insufficient number of examined dogs, the effect of selection in some breeds, which means kinship, and probably the long-term effects of some exogenous factors such as geographic location, climate, holding and feeding.

The intensity of positive reactions to the blood group DEA 1.1. was different in the two breeds examined. The strongest positive 3+ reaction was determined in the largest number of individuals (56.3%) in the Tornjak hounds. These results are similar to studies of other Croatian native dog breeds, 53.0% for Dalmatians (GRAČNER et al., 2011), 50.0% for Istrian pointers (GRAČNER et al., 2007) and 70.37 % for the Croatian shepherd (ŽUBČIĆ et al., 2008). The strongest positive reaction (3+) was found in only 16.6% of individuals of the Posavaz Hound breed, while 55.6% had 1+ positive reaction. The high prevalence of strong intensity positive agglutination reaction shows the good detection of DEA 1.1. by the RapidVet® H-test (Canine DEA 1.1., Agrolabo, Switzerland) for the Tornjak breed. On the other hand, there was a relatively high share of weak intensity of positive reaction in the Posavaz hound, which suggests caution when using this test prior to blood transfusion in this breed.

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SAŽETAK

Istraživanjem je bilo obuhvaćeno 60 klinički zdravih pasa dviju hrvatskih autohtonih pasmina: posavski gonič (15 ženki i 15 mužjaka u dobi od 7 mjeseci do 8 godina) i tornjak (18 ženki i 12 mužjaka u dobi od 2 mjeseca do 7 godina). Uzorak krvi uzet je iz krvne žile v. cephalica u epruvete s EDTA antikoagulansom. Nakon vađenja krvi određena je moguća reakcija autoaglutinacije, koja je u svim uzorcima bila negativna. Određivanje krvne grupe DEA 1.1. (Dog Erythrocyte Antigen) obavljeno je pomoću serološkog testa RAPIDVET®-H (Canine DEA 1.1., dms/agrolabo products ag Neuhausen am Rheinfalt, Switzerland), temeljenog na serološkoj reakciji aglutinacije koja nastupa kada eritrociti pasa koji sadrže DEA 1.1. antigen dođu u dodir s mišjim monoklonskim protutijelima. U krvi pasa koji su pokazali pozitivnu reakciju na krvnu grupu DEA 1.1., određena je jakost aglutinacije (slaba, srednja jak i jaka). Utvrđeno je 60% pozitivnih pasa na DEA 1.1. grupu u posavskog goniča, a 53,3% u tornjaka. Jaka reakcija zabilježen je u 56,3% pasa pasmine tornjak, dok je većina pozitivnih pasa pasmine posavski gonič imala slabu reakciju (55,6%). Najjača reakcija utvrđena je u ženki tornjaka, a najslabija u mužjaka posavskog goniča. Primjenom Kruskal-Wallis i Hi kvadrat testa nije utvrđena statistički značajna razlika.

Ključne riječi: DEA 1.1 krvne grupe, posavski gonič, tornjak
