BRIEF NOTE

Frequencies of D, L and M Blood Groups of Beagles Bred in Japan

Shigenori IKEMOTO, Yukio SAKURAI and Yoshihiko WATANABE

*Department of Legal Medicine, Jichi Medical School,
Minami Kawachi-machi, Tochigi 329-04*

Hiroyasu EJIMA

*Department of Veterinary Surgery, Nippon Veterinary and
Zootechnical College, Musashino-shi, Tokyo 180*

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Studies have been made by many researchers on the genetic polymorphism of typical antigenicity on red cell membrane [5, 7, 10, 11], isoenzymes [1, 9], plasma proteins [3, 9], hemoglobin [9] and lymphocytes [8] in dogs. The authors have previously studied the same subject in the beagle by the aid of isohemagglutinin [6]. The present experiment was carried out further to define the blood grouping and gene frequencies in beagles bred in Japan, by using heterogeneous (D system) and homogeneous (L and M systems) immune hemagglutinin.

Materials and methods: Venous blood samples were collected from 100 beagles bred in Japan. Red cells harvested from them were washed three times and made to 2% suspension in physiological saline. Anti-D₁ and -D₂ sera were heterogeneous antisera prepared from rabbits immunized to mongrel red cells. Anti-L and -M sera were homogeneous antisera prepared from mongrels immunized to homogeneous red

cells [4]. Serological tests were carried out by the techniques described by Compabel et al. [2].

Frequencies: In the D system, all the 100 samples were proved to be of D₂ type. No allelic gene was found. When those samples were examined with the L system, the frequencies of L(+) and L(-) types were 41 and 59% respectively. When the same samples were examined with the M system, the frequencies of M(+) and M(-) types were 89 and 11%, respectively. M positive antigens, however, were contained in samples with strong or weak antigenicity.

Genetics: L(+)×L(+) and L(+)×L(-) mating gave rise to both L(+) and L(-) offsprings, but L(-)×L(-) mating to no L(+) offspring. Similarly, M(+)×M(+) and M(+)×M(-) mating produced both M(+) and M(-) offsprings, but M(-)×M(-) mating no M(+) offspring. Therefore, the genotype of L(+) and M(+) phenotypes seems to have homozygous or heterozygous types. These results are assumed to be con-

Table 1. Phenotype and gene frequency of D, L and M blood systems in red cells of beagles bred in Japan

Systems	Phenotypes	Number observed	Number expected	Frequencies (%)
D system	D ₁	0		0
	D ₂	100		100
	D ₁ .D ₂	0		0
	Total	100		100
L system	L (+)	41	40.7	41
	L (—)	59	59.3	59
	Total	100	100	100
M system	M (+)	89	89.1	89
	M (—)	11	10.9	11
	Total	100	100	100

Gene frequencies*	
D ¹	: 0.00
D ²	: 1.00
L ⁺	: 0.23±0.03
L [—]	: 0.77±0.03
M ⁺	: 0.67±0.05
M [—]	: 0.33±0.05

Remarks.

*: Since all the beagles were produced by inbreeding, it is unknown whether this gene frequency is for the D, L or M blood group of beagles.

sistent with a simple pattern of inheritance with a dominant allele at an autosomal locus. Based on this assumption the L⁺ and M⁺ allelic frequencies were estimated to be 0.23±0.03 and 0.67±0.05, respectively.

In conclusion, homogeneous and heterogeneous antisera serving as genetic markers in the cell membrane of beagles red blood cell were further classified by the D, L and M blood group systems. These results provided useful information for the genetic investigation of beagles. They also

suggested that a histocompatibility test might be necessary for the evaluation of blood transfusion or transplantation in veterinary clinical and medical experiments.

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