ALLELE FREQUENCY SURVEY OF BOVINE LEUKOCYTE ADHESION DEFICIENCY (BLAD) IN DAIRY CATTLE IN HO CHI MINH CITY

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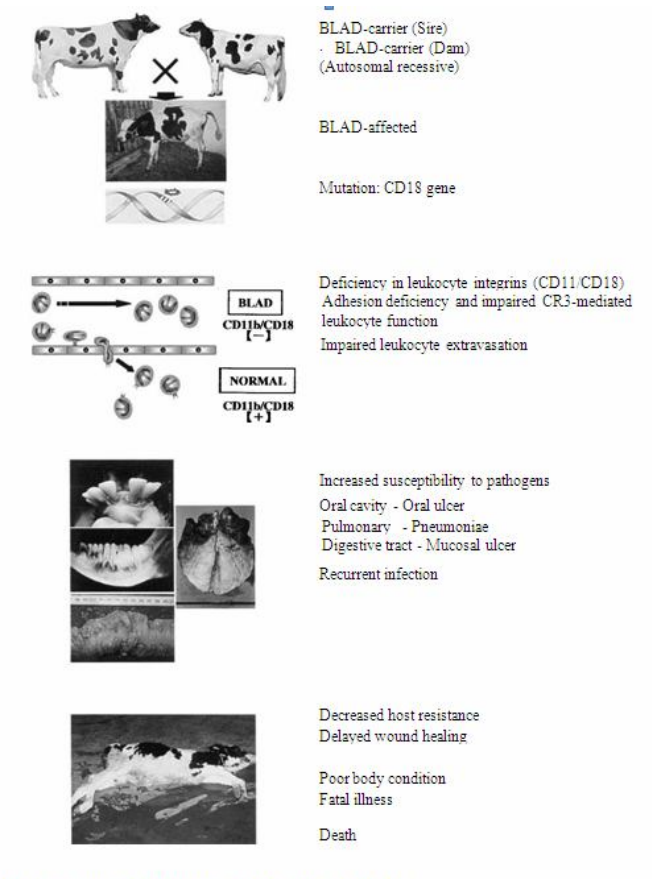
Bovine leukocyte adhesion deficiency (**BLAD**) is the specific syndrome in Holstein Friesian (**HF**) cattle. It is considered as an autosomal-recessive congenital disease showed by recurrent bacterial infections. It results in the delay of wound healing, stunted growth and also associated with persistent marked neutrophilia. In cattle with BLAD, there is a deficiency in β2 integrin of leukocytes and serious reduction for neutrophil functions. It is likely that the gene encoding defective CD18 on leukocytes is widespread in Holstein dairy cattle. The BLAD in Holstein cattle was reported in many countries like United State (Shuster et al. , 1992), Denmark (Jorgensen et al. , 1993), Argentina (Poli et al., 1996), Germany (Tammen et al, 1996; Schutz et al, 2008), Japan (Nagahata et al. , 1997), Brazil (Ribeiro et al. , 2000), Taiwan (Huang et al. , 2001), Chile (Felmer et al. , 2001), Iran (Norouzy et al. , 2005), China (Ma et al. , 2006), Turkey (Akyuz and Ertugrul , 2006), Poland (Czarnik et al, 2007), India (Patel et al. , 2007), Canada (Van Doormaal, 2008), and Pakistan (Fozia Nasreen et al. , 2009). It is important to know the prevalence of the gene encoding impaired CD18 for BLAD in order to evaluate the control program for the BLAD-associated gene in Holstein cattle. In Vietnam, the prevalence of BLAD carriers and the gene frequency of BLAD in HF crossbred cattle are not yet clarified. In current study, blood samples, milk samples from dairy crossbred cattle with difference proportions of Holstein blood and frozen semen doses from pure Holstein bulls were tested to determine whether they were BLAD-free, BLAD carriers or BLAD-affected, by use of the DNA-polymerase chain reaction (PCR-RFLP) test. The aim of this study was to describe the BLAD-carrier prevalence, the distribution of BLAD carriers in ages and groups of HF crossbred, and the related gene frequency in dairy cattle at Ho Chi Minh City.



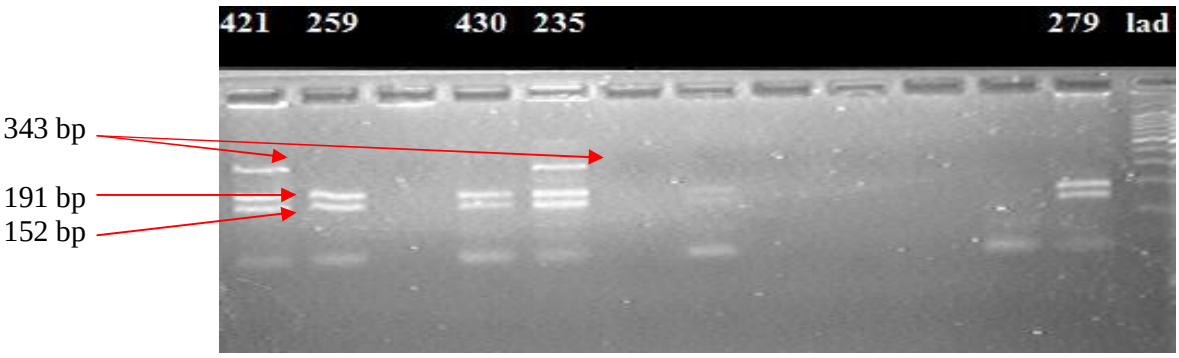
Pathobiology of bovine leukocyte adhesion deficiency (BLAD) *source: Hajime NAGAHATA 2004*

Total of 452 blood samples from 30 dairy farms, 500 milk samples from 64 dairy farms and 18 frozen semen doses of domestic and exotic pure HF bulls were collected for this study. DNA was extracted by suitable method for every type of sample (Laura-Lee Boodram protocol for blood sample, F. d'Angelo protocol for milk sample and Luciana A. Ribeiro protocol for frozen semen). PCR-RFLP was followed by procedure of Kriegesmann et al (1997). The gene frequencies in BLAD-free cattle, BLAD carriers and BLAD-affected cattle were calculated based on the Hardy-Weinberg law.

$$q = \frac{2(aa) + (Aa)}{2N} \qquad p = 1 - q \qquad \text{or} \qquad p = \frac{2(AA) + (Aa)}{2N} \qquad q = 1 - p$$

where *p*=the gene frequency of BLAD-free normal,
q=the gene frequency of BLAD-carriers,
N=the total number of cattle tested
AA=the number of BLAD-free cattle,
Aa=the number of BLAD carriers,
aa=the number of cattle with BLAD-affected.

Results showed that no BLAD homozygote genotype was found in 952 HF crossbred cattle and 18 pure HF bulls in current study. There were only 2 HF crossbred cattle with heterozygote genotype of BLAD. The mean of BLAD-carrier ratio was 0.21 percent in all dairy herds, ranged from 4.0-8.3% based on dairy herds detected by PCR-RFLP for BLAD. The gene frequency of BLAD was 0.0010 in both blood and milk samples. Fortunately, no semen was positive with BLAD in 18 collected frozen semen.



Interpretation of PCR-RFLP results as follows:

Normal case with 2 bands 191bp and 152bp

BLAD-carrier case with 3 bands 343bp, 191bp and 152bp (heterozygote)

BLAD-carrier case with 1 bands 343bp (homozygote)

Results of the age distribution of BLAD-carrier showed that one calf and one heifer were detected. Therefore, the ratio of BLAD-carrier was 1.06 percent (1/94) in surveyed calves and 0.28 percent (1/357) in surveyed heifers. The gene frequency of BLAD was 0.0053 in surveyed calves and 0.0014 in surveyed heifers.

Survey on the HF crossbred groups showed that dairy cattle with 87.5 percent of HF blood were BLAD-carriers, equal to the ratio of 0.29 percent and the gene frequency of 0.0015. Meanwhile, no BLAD-carrier was detected in dairy herd with 50 and 75 percent of HF blood.

In Ho Chi Minh City, however, most of dairy cattle are HF crossbred cattle with more 75 percent of HF blood.

Based on effect of BLAD, the further study should be done widely in all HF crossbred herds in whole country. This will help to detect all BLAD-carriers and to avoid some unfavourite recombinations in breeding which can lead to expression of BLAD in dairy herds.

Acknowledgement

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