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Author(s)	CHOI, Won-Pil; IZAWA, Hisao; ONUMA, Misao; KODAMA, Hiroshi; MIKAMI, Takeshi; OHNUMA, Takanori; HASHIGUCHI, Yuji
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BRIEF COMMUNICATION

PRELIMINARY SURVEY FOR ANTIBODIES AGAINST  
FIVE BOVINE VIRUSES IN CATTLE IN KOREA

Won-Pil CHOI\*<sup>1</sup>, Hisao IZAWA, Misao ONUMA, Hiroshi KODAMA  
Takeshi MIKAMI, Takanori OHNUMA\*<sup>2</sup>  
and Yuji HASHIGUCHI\*<sup>3</sup>

*Department of Epizootiology,  
Faculty of Veterinary Medicine,  
Hokkaido University, Sapporo 060, Japan*

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The occurrence of viral diseases in Korean cattle including several respiratory diseases, bovine leukemia and possible Akabane disease has been reported<sup>1,2,9,10</sup>; however, the conditions leading to the infections have not been well studied. Utilizing the opportunity to examine serum samples of Korean cattle, we conducted surveys in order to find antibodies against the viruses which are common in the cattle population examined. This paper describes the preliminary results of a serological survey conducted on cases of bovine leukemia virus (BLV), infectious bovine rhinotracheitis virus (IBRV), adenovirus type 7 (AdV-7), Akabane virus and parainfluenza 3 virus (PIV-3) in dairy and beef cattle in an agricultural district of Korea.

Serum samples were collected randomly from 106 dairy cattle (Holstein) of 13 herds in the Kyungpook area. Age of these cattle was unknown. Serum samples were also collected randomly from 699 native Korean beef cattle which were over 2-year-old from a slaughter house in Taegu City.

The immunodiffusion test for detection of antibodies against glycoprotein antigen of BLV was performed as previously described<sup>10</sup>. For detection of antibodies to AdV-7 and PIV-3, the hemagglutination inhibition (HI) test was performed as previously described<sup>7,8</sup>. In the HI tests, 4 units of Fukuroi strain of AdV-7 and BNI-1 strain of PIV-3 were used. Antibodies against IBRV and Akabane virus were detected by the neutralization test using Los Angeles strain of IBRV and OBE-1 strain of Akabane virus respectively, as previously described<sup>8,15</sup>. The results of the neutralization test were

\*1 Dr. W.-P. CHOI is a visiting professor from the Department of Veterinary Medicine, Kyungpook National University, Taegu 635, Korea, who is supported by the Association of International Education, Japan.

\*2 Ishikari Branch, Hokkaido Livestock Hygiene Service, Sapporo 061-01, Japan

\*3 Hokkaido Branch Laboratory, National Institute of Animal Health, Sapporo 061-1, Japan

TABLE 1 *Reactors for antibody survey against five viruses in dairy and beef cattle in Kyungpook area in Korea*

	RATE OF REACTORS AGAINST				
	BLV	IBRV	Akabane	AdV-7	PIV-3
Dairy cattle	30/106 <sup>1)</sup> (28.3) <sup>2)</sup>	69/73 (94.5)	1/8 (12.5)	42/73 (57.5)	63/73 (86.3)
Beef cattle	17/699 ( 2.4)	151/246 (61.4)	45/115 (39.1)	155/272 (57.0)	145/272 (53.3)
Total percentage	5.8	69.0	34.4	57.1	60.3

1) Reactors /No. tested

2) Percentage

expressed as positive when 1:4 dilution of the test serum inhibited cytopathic effect in the three test tubes used. The reactors for the antibody survey against these 5 viruses are listed in Table 1. For the antibodies against BLV, 28.3% of the 106 dairy cattle and 2.4% of the 699 native Korean beef cattle were positive. The reactors of the dairy cattle varied from 0% to 57.1% among the 13 herds. According to a recent seroepidemiological survey of BLV in dairy cattle in other areas of Korea, the positive rate varies from 24.1% to 37.9%<sup>10)</sup>. The present results agreed well with these values. When compared to the rate recorded for dairy cattle in Japan in which the BLV antibody carrier was less than 10%<sup>4)</sup>, the positive rate in the Korean dairy cattle was very high, and it was similar to the level of North American cattle<sup>5)</sup>. On the other hand, the positive rate of native Korean beef cattle (2.4%) was very low as compared to that (30%-50%) of Japanese beef cattle<sup>12)</sup>.

Infectious bovine rhinotracheitis is a highly infectious respiratory disease which has caused a major economic problem in the cattle industry of Korea since 1971<sup>14)</sup>. Although the formalin-inactivated IBRV vaccine is commonly administered to dairy cattle, it has not ever been given to native Korean beef cattle. Therefore, the positive reaction of beef cattle (61.4%) seemed to reflect natural infection of the cattle with IBRV.

Outbreaks of abnormal deliveries, referred to as congenital arthrogryposis-hydranencephaly (AH) syndrome, were observed among Japanese cattle, especially in the southern part of Japan, from the summer to the winter seasons of the year 1972 to 1975<sup>8)</sup>. From the results of seroepidemiological surveys and isolation of the virus from bovine fetuses, it was clarified that this syndrome was caused by infection with Akabane virus, a member of the Simbu group of the Bunyaviridae. In Korea, many cases of abortion among cows occurred from November 1978 to April 1979. Histological and gross observations of 6 aborted fetuses suggested the presence of Akabane virus infection, and its antibody was detected in the precolostral blood of one calf with AH syndrome<sup>1)</sup>.

The present results showed that about 40% of native Korean beef cattle had antibodies against Akabane virus, indicating the spread of Akabane virus infection in beef cattle located in the southern part of Korea.

The present serological survey for antibodies against AdV-7 is the first of its kind in Korea. In both the dairy and beef cattle, over 50% of the cattle had antibodies against AdV-7, indicating the presence of the infection in this country. A survey for PIV-3 antibody in native Korean beef cattle performed in 1969 showed that 42 out of 78 sera (54%) were positive by the HI test<sup>11)</sup>. A similar percentage of reactors was obtained in the present survey; 53.3% of the native Korean beef cattle and 86.3% of the dairy cattle were positive for the antibody.

Although the present survey was performed on a small number of serum samples from a limited area, the results showed the occurrence of heavy infection of various viruses in cattle of the Kyungpook area. A nation wide survey on antibodies against these viruses and others is desirable for prevention of infections by these viruses.

#### REFERENCES

- 1) BAK, U. B., LIM, C. H., CHEONG, C. K., HWANG, W. S. & CHO, M. R. (1980): Outbreaks of Akabane disease of cattle in Korea *Korean J. Vet. Res.*, **20**, 65
- 2) BAK, U. B., LIM, C. H. & CHUNG, C. K. (1981): Clinical outbreak of Akabane disease in dairy cattle in Korea *J. Korean Vet. Med. Assoc.* **17**, 45-51
- 3) HASHIGUCHI, Y., NANBA, K. & KUMAGAI, T. (1979): Congenital abnormalities in newborn lambs following Akabane virus infection in pregnant ewes *Nat. Inst. Anim. Health Q (Jpn.)*, **19**, 1-11
- 4) HONMA, T., ONUMA, M., MIKAMI, T. & IZAWA, H. (1980): Bovine leukemia virus infection in Japan: Antibody and virus detection in cattle *Jpn. J. Vet. Sci.*, **42**, 5-8
- 5) HOUSE, C., HOUSE, J. A. & GLOVER, F. L. (1977): Antibodies to the glycoprotein antigen of bovine leukemia virus in the cattle population of five states *Cornell Vet.* **67**, 510-522
- 6) INABA, Y. (1979): Akabane disease: Epidemic congenital arthrogryposis-hydranencephaly syndrome in cattle, sheep and goats caused by Akabane virus *Jpn. Agr. Res. Quart.*, 123-133
- 7) INABA, Y., OMORI, T., KONO, M. & MATUMOTO, M. (1963): Parainfluenza 3 virus isolated from Japanese cattle. I. Isolation and identification *Jap. J. exp. Med.*, **33**, 313-329
- 8) INABA, Y., TANAKA, Y., SATO, K., ITO, H., ITO, Y., OMORI, T. & MATSUMOTO, M. (1968): Bovine Adenovirus II. A serotype, Fukuroi, recovered from Japanese cattle *Jap. J. Microbiol.*, **12**, 219-229
- 9) JOO, H. S., HA, M. S., KANG, B. J., HUR, W. & KWOU, H. J. (1975): Antibody survey of infectious bovine rhinotracheitis (IBR) virus in Korean native cattle *The Research Reports of the Office of Rural Development*, **17**, 57-60
- 10) JUN, M. H. (1981): Epizootiological aspects of bovine leukosis in Korea. Reports of seminar on animal health problems in the Asian and Pacific Region, Suweon. Korea.
- 11) KANG, B. J. & SONG, K. C. (1967): Studies on vaccine of bovine parainfluenza *The Research Reports of the Office of Rural Development*, **10**, 80
- 12) ONUMA, M., ISHIHARA, K., OHTANI, T., HONMA, T., MIKAMI, T. & IZAWA, H. (1979): Seroepi-

zootiological survey on antibodies against bovine leukemia virus in Japanese Black cattle *Jpn. J. Vet. Sci.*, **41**, 601-605 13) ONUMA, M., OLSON, C., BAUMGARTENER, L. E. & PEARSON, L. D. (1975): An ether-sensitive antigen associated with bovine leukemia virus infection *J. Natl. Cancer Inst.*, **55**, 1155-1158 14) PARK, J. M., HOUNG, M. P., CHUNG, U. I. & LIM, C. H. (1973): Infectious bovine rhinotracheitis virus isolated from dairy cattle in Korea *The Research Reports of the Office of Rural Development*, **15**, 39-44 15) SHIMIZU, Y., NAKANO, K., INUI, S. & MURASE, N. (1972): Isolation of a strain of infectious bovine rhinotracheitis virus from aborted fetuses *Nat. Inst. Anim. Health Q (Jpn)*, **12**, 110-111