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Seroprevalence study of small ruminant lentivirus infection in Indian sheep and goats

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Abstract
The present study was aimed to determine the sero- monitoring of small ruminants lentivirus (SRLV) in the Indian slaughtered sheep and goats. A total of 400 sera samples collected from Bareilly (U.P), Delhi, Ganavarum (Andhra Pradesh) and Kangra (Himachal Pradesh) were screened for the presence of antibodies against SRLV antigen by cELISA, using commercially available SRLV antibody test kit (Small ruminants lentivirus Virus Antibody Test Kit, cELISA, VMRD, Inc, USA). Twenty-three goats and three sheep out of 400 were found seropositive to SRLV antibodies that constituted 6.50%. The results showed that SRLV antibodies are circulating in Indian sheep and goats and which warrant the implementation of control measures to prevent entrance of positive reactors and spread in the coming future.

Keywords: Small ruminants lentivirus, cELISA, sera

1. Introduction
Small ruminant lentiviruses (SRLVs), under the *Retroviridae* family, mostly cause maedi-visna (MVV) disease in sheep and caprine arthritis encephalitis (CAEV) disease in goats. The MVV and CAEV can infect either species both sheep and goats or some time an individual animal can be infected with 1 or more strains; therefore, these viruses are often referred to as the small ruminant lentivirus (SRLV) [1]. The SRLV infects blood monocytes but the virus transmitted to systemic circulation then virus rapidly multiply in macrophages, and causes chronic inflammation in tissues, such as the lungs, mammary glands, central nervous system, and joint synovial [2]. The clinical signs of SRLV infection include progressive weight loss, hard udders with reduced milk production, chronic respiratory disease in sheep, and enlarged joints with lameness in goats [2]. However, due to the long incubation period of SRLV, it can take months or years after infection for clinical signs of disease to come out. Transmission of the virus occurs mainly through the infected colostrums, milk from infected mother to the lamb, and/or insemination with the use of infected ram semen. Other routes of viral transmission from infected animals to healthy ones involve close contact, contaminated feed, water troughs, or milking machines. There are little authentic documentation on prevalence on SRLV in Indian sheep and goats, reporting [3-5]. The objective of the study was to determine the current status of SRLVs in Indian sheep and goats and to give confidence measures to prevent the entrance of positive reactors to small ruminants population for genetic improvement and rural development programs and continuous monitoring for sheep and goats and positive cases to prevent spread of SRLVs infection in India small ruminants.

2. Materials and methods
The study was undertaken on serum samples collected from sheep and goats. A total of 400 serum samples from 70 sheep and 330 goats were collected from different state 150, Bareilly (UP), 200 Delhi, 15 Ganavarum (AP), and 35 Kangra (H.P) During the period from August 2015 to April 2016. Serological tests Sera were evaluated for anti-SRLV antibodies using a commercially available SRLV antibody test kit (Small ruminants' lentivirus Antibody Test Kit, cELISA, VMRD, Inc, USA, Catalog. N. 289-2). All test procedures were applied according to the instructions of the manufacturer and the plate was read in ELISA Plate Reader (BIO-RAD) with optical density (OD) of 620 nm. The mean of the negative controls which gave an OD >0300 and positive controls of OD >35% inhibition were taken. Percent inhibition (% I) was calculated by using the formula: %I = 100" [1-(Sample OD÷Mean Negative Control OD)]. The test samples produced >35% inhibition, were considered as positive and <35% inhibition, were considered as negative (Figure 1).

3. Results and Discussion

This study reports twenty-six out of 400 were seropositive to SRLV antibodies that constituted 6.50% (26/400) in sheep and goats. Further prevalence of SRLV antibodies was 4.28 %(3/70) and 6.96% (23/330) reported in sheep and goats respectively.

In this study, overall seroprevalence of SRLV antibodies in sheep and goats was 6.50% which is relatively high compared to an earlier report of 3.33% Waseem *et al*[4] however Singh *et al* [3] reported 17.98% high prevalence compared to presents study. The low prevalence in the present study could be on account of relatively less number of animals tested in addition to stoppage of import of European breeds of goats from countries having high seroprevalence of SRLV and their inclusion in the local sheep and goats population, which have been considered as an important cause of the spread of SRLV between countries [6]. In the study, which involved animals exposed naturally to the virus, it is difficult to identify the source of infection and route of virus transmission and spread within the small ruminants population. Exposure to SRLV occurs mainly through ingestion of colostrum and milk from infected does [6].Although CAEV can be detected in semen, sexual contact does not appear to be a major route of transmission [7]. The pattern of distribution of seropositive reactors in organized herds, rural herds and animals of slaughter house reveals the fairly widespread distribution of SRLV in other small ruminants rearing areas of the country. Present slaughterhouse based studied sere-prevalence was 6.50% by SRLV infection, which is relatively low compared to an earlier report in organized sector was much higher 10.63% than 2.69% from unorganized sector and 1.11% from slaughterhouse group[4]. Its indicated intensive and semi-intensive rearing system in organized sector recording the higher seropositive reactors compared to pastoral or extensive rearing systems in unorganized sectors. It has been generally accepted that farm management practices and herd replacement policies could be the reason for higher seroprevalence of SRLV infection in small ruminants from organized sector, because enormous population of meat sheep and goats are sold out at an early age, allowing dairy type and selected animals to be kept for long-term purposes which increases the chance of transmission and persistence of infection within the herd [7]. The most likely time required for seroconversion and slow-growing nature of SRLV may be restrictions which maintain low seroprevalence rates of SRLV in early age culled slaughter house group animals.

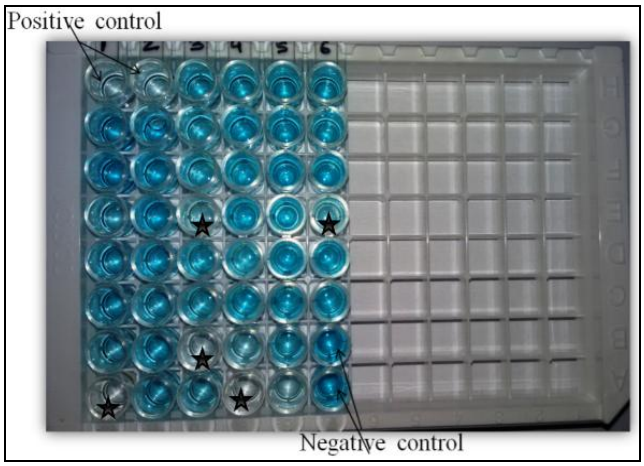

Fig 1: In ELISA plate positive samples (stars) showing colorless well.

4. Conclusion

The present study reported seroprevalence SRLV in sheep and goats population of the four states of India, adding to the previous limited epidemiological data on this disease from the country. Further explorative surveillance and epidemiological studies are suggested to find out the real impact of this economically important disease affecting sheep and goats population of India.

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