

## SOME PATHOLOGICAL FINDINGS IN SHEEP EXPERIMENTALLY INFECTED WITH PARAPOXVIRUS

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### ABSTRACT

*We have investigated patho-morphologic findings in some parenchymal and immune organs of sheep infected with high virulent strain "Stavropoliskii" of parapoxvirus by a common method (MNS 5451:2005). By means of the microscope were found desquamation of some epithelium of epidermis, eosinophil and lymphocyte infiltration and vacuolization in the derma, and also edema and hyperemia in lung alveoli. Germinal center of lymph nodes was reduced and the number of plasma cells was decreased.*

**KEY WORDS:** "Stavropoliskii" strain of parapoxvirus, inclusion body, sheep pox

### INTRODUCTION

Tendency of emergence and re-emergence of animal and livestock infectious diseases has activated starting from 2000 (last decade). Sheep pox resurgence has occurred several times from December 2006 to April 2007 in areas of Sukhbaatar, Khentii, Tuw, Gobisumber aimags and Nalaikh district of Ulaanbaatar city which was silent for almost 30 years from 1977. Incidences also occurred in Kherlen soum of Dornot aimag in 2008 and in Khatanbulag soum of Dornogobi aimag and Bayntumen soum of Dornot aimag in February and March, respectively. The latest sheep pox was documented 30 years before and Mongolia was considered free from the disease for three decades, now days the disease is considered free as one of the emerging infectious diseases and it is crucial to conduct a study on activity of vaccine for the prevention of sheep pox in histo-morphological level, which used as key measure in the case of occurrence [2].

Sheep-pox is prevalent in parts of north Africa, Asia and Southern Europe, but is not known to occur in the United States. It is a serious disease with cutaneous lesions appearing particularly in areas devoid of wool, such as the cheeks, lips and nostrils. Ulcerative lesions on the tongue, gums, and cheeks are common. The lesions in the epidermis are similar to those of other poxviruses, with localized acanthosis and hyperplasia following by vesiculation, starting in the middle layers of epithelium [4], [5], [7].

Some cell are fusiform with the appearance of fibroblasts. The cytoplasm of most of these cells contains eosinophilic inclusion bodies [7].

## MATERIALS AND METHODS

This study was performed in the State laboratory of veterinary medicine evaluation and validation (SLVMEV) and laboratory of pathology, Institute of veterinary medicine. Purpose of this study was to investigate the patho-morphological changes in some parenchymal and immune organs of sheep infected with high virulent virus of Stavropoliskii strains of sheep pox with the common method (MNS 5451:2005). For this, unvaccinated mature strains of sheep were experimentally

infected with diluted and prepared sheep pox virus strains by subcutaneous inoculation in 20 spots (points). After 9 days of infection necropsy and histopathology were performed according to the method (MNS 5451:2005). Samples were fixed in 10% neutral buffered formalin, paraffin embedded, and sectioned with 3-5  $\mu$ m, stained by Hematoxylin and Eosin (HE) and examined by means of the light microscope.

## RESULTS

Body /rectal/ temperature changes:

We have challenged sheep /experimental infection/ by virulent virus strain “Stavropoliskii” and body /rectal/ temperatures were measured daily in the morning and evening. From the 1<sup>st</sup> day the body

/rectal/temperature had increased by 1-2<sup>o</sup>C. By clinical examination papules and rash were spotted on thin skin such as groin and perineum. On 4<sup>th</sup> day the



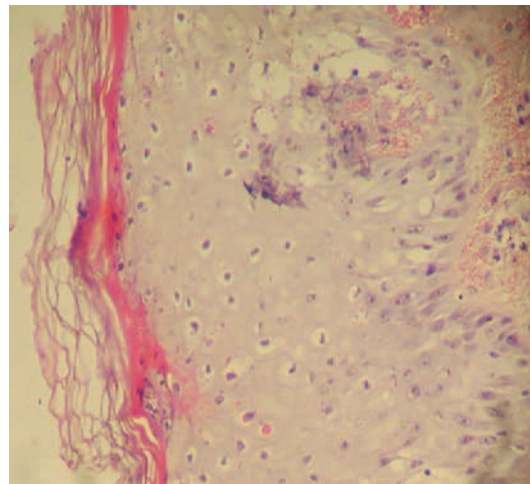
Picture 1. Skin rash and blisters of the experimentally infected sheep with parapoxvirus



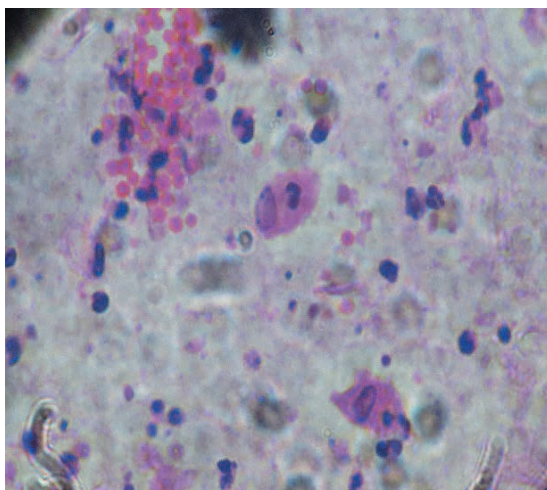
Picture 3. Skin lesions of epidermis of the experimentally infected sheep with parapoxvirus



Picture 2. Normal skin of healthy sheep



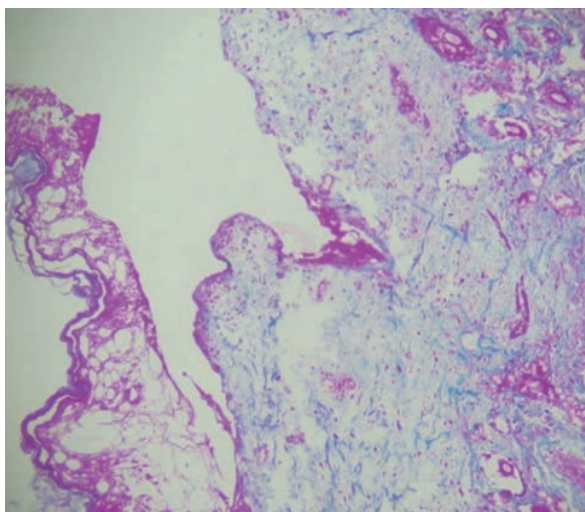
Picture 4. Normal tail skin of healthy sheep  
HE, x100



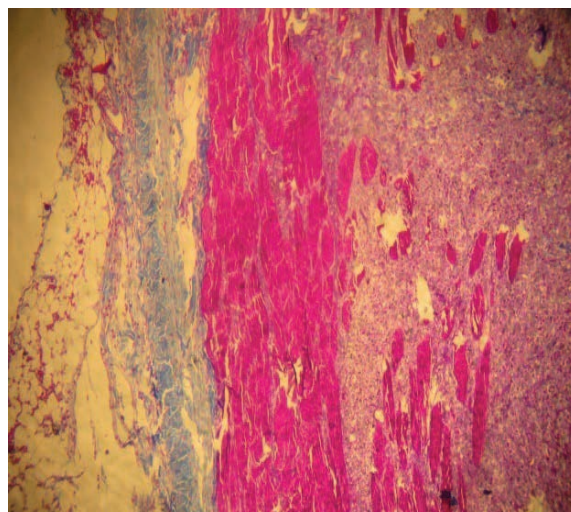
Picture 5. cytoplasmic eosinophilic inclusion body in the epithelial cell of the skin(HE, x400) of the experimentally infected sheep with parapoxvirus

The body /rectal/temperature was about 41.2<sup>0</sup>C and later it (Table 1) was decreased gradually. When 9<sup>th</sup> day the animal body /rectal/ temperature was 37<sup>0</sup>C,

ethanasia and pathological examination were performed by common method (MNS 5451:2005) . Gross findings results



Picture 6. Desquamation of some epithelium of epidermis of the experimentally infected sheep with parapoxvirus. Massontrichrome, x100

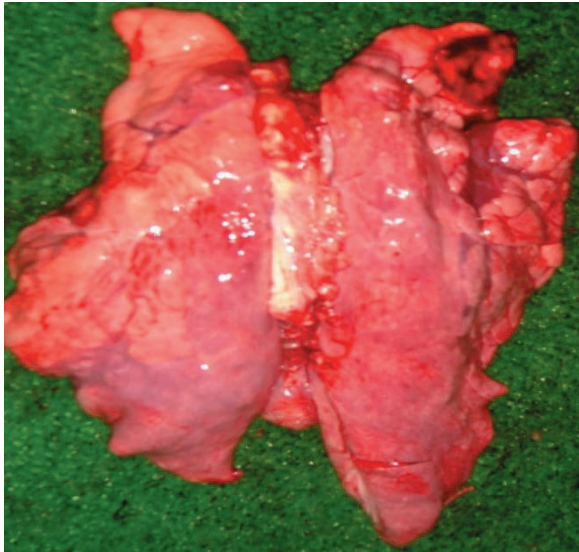


Picture 7. Fibrous connective tissue extendin the epidermis of the experimentally infected sheep with parapoxvirus (Masson trichrome, x100)

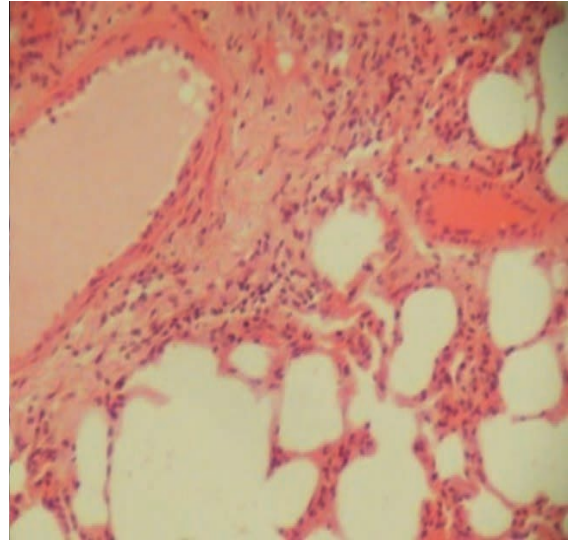
Macules and papules were observed on the skin of the challenged part of experimentally infected sheep. The normal tail skin (Image 1), skin rash and blisters of the infected (Image 2) sheep. Normal skin of the healthy (Image 3) sheep. The lesions in the epidermis (Image 4) are degeneration of stratum corneum and stratum granulosum, papules started to become necrotic and easy to desquamate and

susceptible to fly strike, and moist skin ulceration was observed after remove thin layer. Skin and some immune organs samples were analyzed by staining both Hematoxylin-Eosin(HE) and Masson Trichrome as a specific method and observed by means of the light microscope.

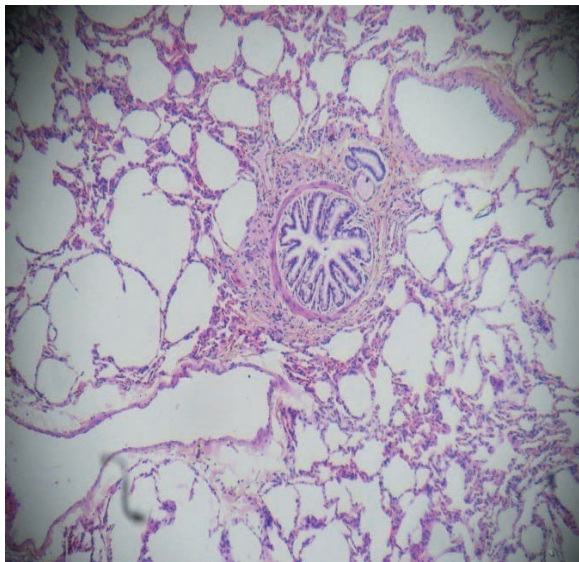




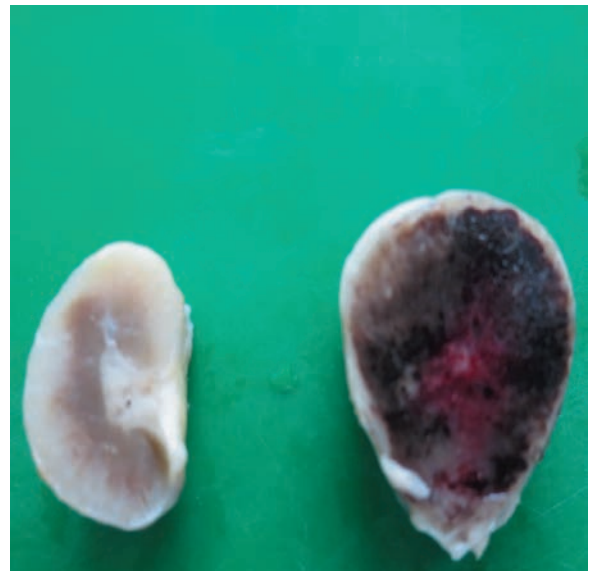
Picture 8. Edema and hyperemia of lung alveoli of the infected sheep



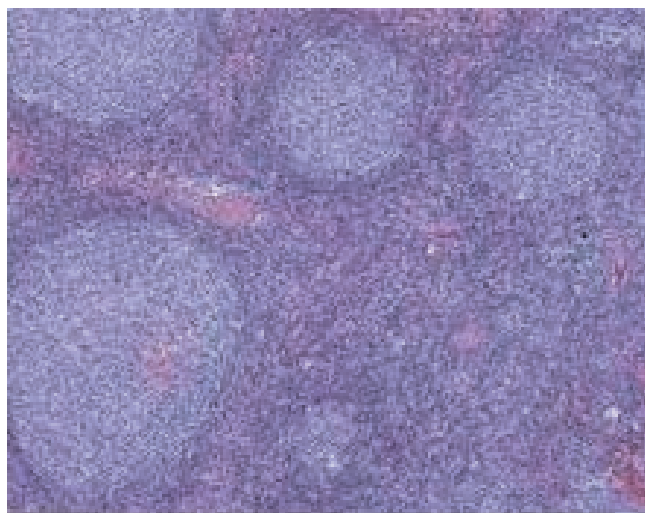
Picture 10. Pulmonary alveoli wall was thickened (HE, x200)



Picture 9. Normal lung. HE, x100



Picture 11. Lymph node change /right/

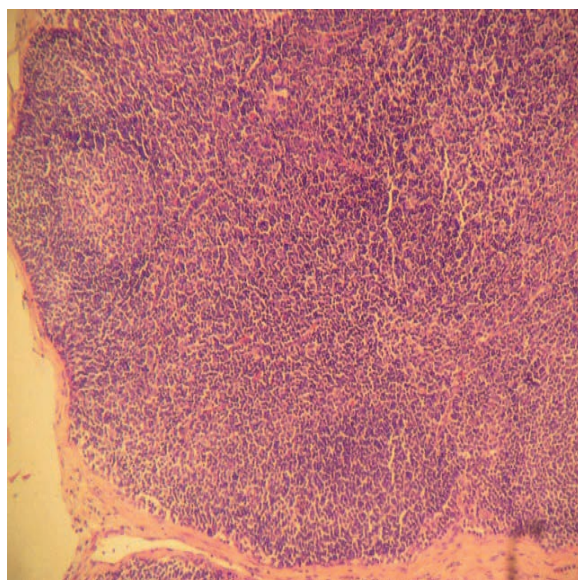


Picture 12. Normal lymph node germinal center (HE, x100)

Normal tail skin of healthy (Image 5) sheep and eosinophilic cytoplasmic inclusion bodies in epithelial cells of (Image 6) the skin. Connective tissue cells were observed on skin epidermis (Image 7) layers. Fibrous connective tissue extend in the epidermis (Image 8), (Masson trichrome).

It is not only harming the skin. Also harming parenchymal organs. Normal lung and edema and

hyperemia of lung of infected sheep alveoli. Microscopic challenge of the normal lung, the pulmonary alveolar wall was (Image 11, 12) thickened. Lymph node changes /right/ were observed (Image 13), , germinal center of the lymph node of the sheep infected with parapoxvirus was (Image 14, 15) reduced.



Picture 13. Germinal center of the lymph node was reduced (HE, x100)

## DISCUSSION

The incubation period was 7 days when we infected sheep with virulent virus strain "Stavropoliskii" by subcutaneous inoculation and in the following 7-9 days typical pox lesions were observed in the thin skin with less wool. Gross findings such as various papules in the skin, blunt edge and hyperemia of the lungs, enlargement of regional lymph nodes , desquamation of epidermis, eosinophilic and lymphocyte infiltration, vacuole formation, edema and hyperemia in the lungs, reduction of germinal

centers and plasma cells in lymph nodes and inflammatory cell infiltration were observed.

This study confirms that the parapoxvirus strain "Stavropoliskii" from the SLVMEV causes pox with clinical symptoms and pathological changes in experimentally infected sheep and it can be used for further research investigations

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