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# A rare case of pulmonary adenocarcinoma in goat

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**Abstract**
The present study was aimed to monitor the lung lesions with special emphasis on pulmonary adenocarcinoma caused by Jaagsiekte Sheep Retrovirus (JSRV) in sheep and goats, as lung tumors occur mainly in sheep but goats are affected rarely. In present case, the goat lung grossly showed multifocal nodular areas and the tissue sample was collected in 10% neutral buffered formalin. Then tissue sample was processed for histopathology and examined. The lung tissues microscopically showed typical lesions of OPA viz. proliferated pneumocytes forming adenoid pattern and papillary projections in the lumen. Bronchial epithelial lining cells were also showing hyperplastic change and papillary growths in the lumen. It can be concluded that OPA is prevalent in goat population but a targeted study is required to know its prevalence in goats.

**Keywords:** Lungs, goat, pulmonary adenocarcinoma, sheep

## 1. Introduction
Pulmonary adenocarcinoma (OPA) in the small ruminants caused by jaagsiekte sheep retrovirus (JSRV) and sheep is the main target species infected and the disease is well reported in sheep worldwide [1, 2]. Other species of small ruminant populations like goats and mouflon also occasionally showed the lesions of this disease [3]. Reports of the neoplastic conditions in the goats are very few and it is reported that incidence of neoplasms in goats range from 0.8 to 7.6% of the total recorded tumours in domestic animals [4]. The diagnosis is possible during necropsy and on histopathological evaluation [5] by observing characteristics neoplastic transformation of the alveolar and bronchiolar secretory epithelial cells [6, 7]. The aim of the present study was to monitor the different pathological affections present in the lungs of goats.

## 2. Materials and methods
The lung affections were studied for period of six months from September 2017 to February 2018 at Municipal Corporation slaughterhouse, Shimla, Himachal Pradesh grossly and one lung showed the multifocal nodular growths. Sampling was done from the affected lung and 0.5 cm thick lung tissues were collected in 10% NBF. After proper fixation of the tissues they were shifted to fresh 10% NBF. For histopathological processing, the tissue samples were given overnight washing in tap water and dehydrated in increasing grades of ethyl alcohol, cleared in xylene and embedded in paraffin. From paraffin embedded tissue blocks, 4-5µm thick tissue sections were cut on clean, grease free glass slides and haematoxylin and eosin staining was done. Then sections were examined under the light microscope for histopathological evaluation of tissue.

## 3. Results and Discussion
Lungs revealed presence of the variable sized firm nodules on the right apical and diaphragmatic lobe. Microscopic examination of the lung sections revealed the presence of the areas showing lepidic pattern of proliferated pneumocytes in the alveoli forming small papillary projections (Fig.1 & 2). The neoplastic cells were cuboidal to columnar in shape and showed moderate degree of pleomorphism. Proliferation of lining epithelial cells of few bronchi was also present. Interstitial tissue had infiltration of macrophages and lymphocytes. Similar histological features were reported in the ovine pulmonary adenocarcinoma (OPA) cases of sheep by earlier researchers [1, 2, 8, 9]. In goats, showing lesions of adenomatosis infected naturally with jaagsiekte showed few multifocal consolidated slightly elevated gray to white masses and histology revealed proliferation of mainly type II pneumocytes, clara cells

and epithelial cells of bronchioles with cuboidal or columnar tumor cells giving acinar or papilliform growths that project into the alveoli [10-12]. A prominent feature is the accumulation of large numbers of alveolar macrophages in the alveoli adjacent to the neoplastic lesions [13]. Experimental infection of goats with sheep adenomatosis virus also showed multiple, small, well circumscribed nodules consisting of typical papilliform proliferations of neoplastic Type II epithelial cells with mild interstitial pneumonia [14, 15].

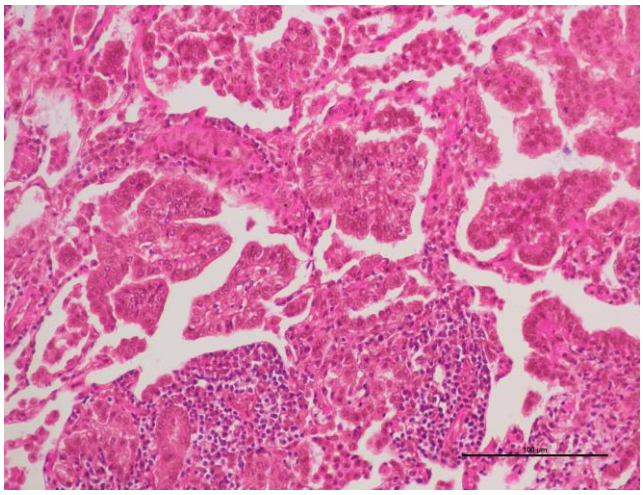

**Fig 1:** Goat lung: Proliferated pneumocytes showing lepidic pattern and papillary growths in the lumen of alveoli with MNCs infiltration in interstitium. H & E, 200X

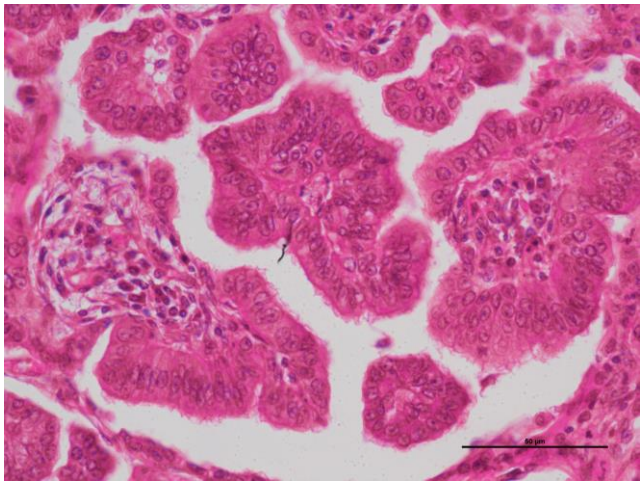

**Fig 2:** Goat lung: Cuboidal to columanr shaped pneumocytes with moderated pleomorphism forming papillary projection in lumen. H & E, 400X

## 4. Conclusion

From the present study, it can be concluded that goats are susceptible to JSRV infection, although reports of pulmonary adenocarcinoma in goat are very rare. The susceptibility of goats to JSRV infection could be due to rearing of goats mostly along with sheep. Further, it may be possible that the JSRV circulating in goat population differ from the one circulating in sheep, but to confirm that whole genome sequencing of the JSRV genome from goat needs to be done.

## 5. Acknowledgments

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