

## Detection of Ectopic Intestinal Epithelium in an Ileocaecal Lymph Node from an Adult Crossbred Aberdeen Angus Cow

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### Abstract

The present report describes the accidental detection of an ectopic columnar epithelium with interspersed goblet-cells and a light smooth muscle layer in an ileocaecal lymph node, from an adult Aberdeen Angus crossbred cow, which was infected with *Mycobacterium bovis*. The morphological features reminded intestinal epithelium, and an intestinal choristoma was diagnosed.

**Keywords:** Cattle; Choristoma; Intestine; Lymph node; Diagnosis

### Introduction

The development of an ectopic-non neoplastic normal tissue in an abnormal location is named choristoma. These changes can affect different organs [1]. Clinical consequences may occur, which depends on the nature and location of choristoma. These pathological changes were described in different species such as horses, dogs, goats and guinea pigs [2-5]. In cattle, several cases have been described, including the development of stratified squamous epithelium in the jejunum, and the presence of respiratory epithelium and pancreatic tissue in mediastinal lymph nodes [6,7]. The occurrences of choristoma are described as very infrequent, [7]. The aim of this study was to report the presence of an ectopic epithelial tissue in a mesenteric lymph node, from an adult female cow.

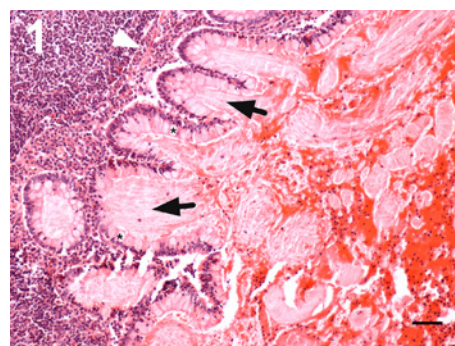
### Case Description

A 6 years old Aberdeen Angus crossbred cow was sacrificed because it was positive for bovine tuberculosis, by using the Tuberculin Skin Test (TST). At necropsy, lungs and liver presented in their parenchyma, scanty white-yellow masses (4-13 mm in size), filled by a yellow necrotic material and limited by a fibrous capsule. Two mediastinic, 1 hepatic and 1 ileocaecal Lymph Node (LN) were enlarged and contained few small necrotic foci (up to 5 mm in size), distributed through the cortex. Due to the fact that these changes were compatible with Bovine Tuberculosis (TB), two samples of these nodes, ileum, lungs and liver were collected. One of these was chilled and the other one preserved in buffered 10% formalin solution, for bacteriological and pathological studies, respectively. Culture was performed following previously described procedures, [8] and formalin fixed tissues were processed for histological examination. Paraffin sections, 3 µm thick, of each organ were stained with Hematoxylin and Eosin (HE) and Ziehl Nielsen staining, following routine procedures.

### Microscopic Findings

Microscopic changes found in liver, lung and their respective LN consisted of necrotic areas surrounded by epithelioid cells, lymphocytes and Langhans giant cells. Scanty acid-fast bacilli were detected in the necrotic material and within the cytoplasm of some giant cells. The morphologic diagnosis was granulomatous pneumonia, hepatitis and lymphadenitis, which were compatible with TB. Bovine tuberculosis was confirmed by the isolation of *Mycobacterium bovis* from samples of liver and lungs and their LNs. However, culture was negative in the ileocaecal LN and the changes found were not compatible with TB. Specifically, these changes consisted of a focus of eosinophilic necrotic

amorphous material located in deep cortex, with numerous toxic and viable neutrophils (Figure 1). At the external limit, a single columnar epithelial layer with numerous interspersed foamy-cytoplasm cells, resembling goblet cells was observed. Under the epithelium, a light eosinophilic material similar to a basal membrane was present, as well as an interrupted thin layer of smooth muscle. Other similar structures, smaller and without the necrotic exudates, were present in cortex of the lymph node. Characteristics of neoplasia as well as anaplasia or aberrant mitosis were absent in all structures. For a better understanding of the nature of the observed structures, Periodic acid-Schiff (PAS) and Masson's trichrome staining were performed, following routine procedures. The first showed that goblet cells secreted a PAS positive material (Figure 2). On the other hand, Masson staining revealed that



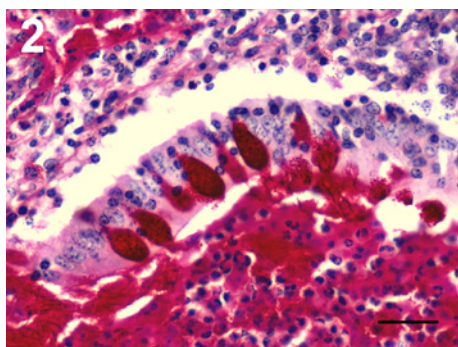
**Figure 1:** Mesenteric lymph node, deep cortex. A columnar epithelium with numerous interspersed goblet cells (\*) that secrete an eosinophilic material (black arrows) is present. At the right side of the image, a strong eosinophilic exudate with numerous neutrophils can be observed. A thin eosinophilic structure similar to a *muscularis mucosae* layer can be observed under the epithelium (white arrow). Hematoxylin/Eosin staining, Scale bar: 100 µm.

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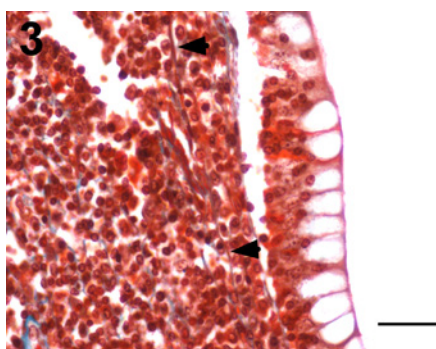
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**Figure 2:** Mesenteric lymph node, deep cortex. Amorphous PAS positive material is secreted by goblet cells. Numerous neutrophils can be observed in the centre of the atypical structure. Periodic acid-Schiff staining, scale bar: 50 µm.



**Figure 3:** Mesenteric lymph node, deep cortex. A thin layer of smooth muscle is detected in some areas under the columnar epithelium (arrows). Masson trichrome staining, scale bar: 50 µm.

smooth muscle similar to *muscularis mucosae* was present underlying the epithelial cells (Figure 3).

## Discussion

The atypical structures reminded the intestinal mucosa, which suggested a morphological diagnosis of intestinal choristoma, in an ileocaecal LN. Changes found could also be interpreted as a bronchial epithelium, but the morphological features of the epithelium, as well as the presence of a unique layer of cells, and the absence of cilia in the apical surface allowed us to discard a respiratory origin. The inflammatory exudate seemed to be a secondary change related to the eosinophilic material secreted by epithelial and goblet cells, since neutrophils always appeared where the strange material was, and the main epithelium or the smooth muscle-which were not in contact with the material-were not affected.

Even when pathologic changes suggested a clear morphological diagnosis, immunohistochemistry may confirm the nature of the epithelial cells. In a previous report, the origin of ectopic cells was determined based on the morphological features of the epithelium, and on the cytokeratin profile [7]. Unfortunately, the affected LN was consumed by the repetitions of the staining procedures performed. Because of this, immunohistochemistry could not be carried out.

In a previous report, it was described the presence of epithelioid cells (associated to metastatic carcinoma) in lymph nodes from healthy cattle, which were distributed as tubular or papillary structures in

dilated sinuses [9]. These changes could be considered similar to those described in the present report. However, there were important differences such as the presence of goblet cells, the PAS positive secreted material and the suppurative exudate, which indicated that it should be a different pathologic process.

Epithelial choristoma was previously diagnosed in a mesenteric LN from a goat, and in mediastinal LN from cattle [7,9]. In those cases, authors described the presence of the ectopic-non neoplastic epithelium, but the presence of secreted material by cells, as it occurred in the present case, was not referred. We can not determinate why the cells were able to release this material in this case and not in the others, but it was important, since it made the choristoma detectable grossly, and it was the most probably origin of the inflammatory response developed.

Pathogenesis of choristomas is poorly understood. However, at least three theories have been proposed for explaining the development of these disorders. One theory suggests that atypical structures are caused by embryological malformation [10]. Another theory describes that the embolization of cells from one organ to the LN may occur as a result of injury or inflammation [11]. The third one proposes that cellular metaplasia is originated in totipotent subcoelomic mesenchyme, which would be stimulated by chronic inflammation [12]. The present case could be explained by the first theory. The second may be also possible, since the abnormal epithelial formations found in subcapsular sinus could be originated by embolization of intestinal cells. However, it should be discarded because chronic enteritis was not diagnosed. Finally, the last theory was not considered because chronic inflammation was not detected in the affected lymph node.

All choristomas detected in LN were diagnosed in animals, which were positive for TB [7,9]. However, there has not been described a relationship between *M. bovis* infection and the development of choristoma. Probably, the microscopic evaluation of LN without grossly changes for pathological diagnosis of tuberculosis, allowed the detection of this infrequent change. In the present case, choristoma was detected and identified as a compatible change with TB at necropsy, and the final diagnosis was performed based on microscopic findings. Thus, a mistaken morphological diagnosis could have been performed, if TB would be only confirmed by the presence of grossly changes, and those were limited to the studied LN. Since histopathology was described as a useful tool for diagnosis of TB [13], microscopic studies of tissues with macroscopic changes should be always performed, in order to obtain a certain diagnostic of this disease.

## Conclusion

This report is to our knowledge, the first description of intestinal choristoma in cattle. Even when other cases were reported in different organs, the frequency of these disorders seems to be very low and pathologists should be alert for the detection of these changes. In addition, the results of the present report suggest that histopathology should be performed, in order to confirm a diagnostic based on macroscopic changes.

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