



Histological Study of Lung Parenchyma of the One-humped Camel (*Camelus dromedarius*)

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Abstract

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Histology of lung parenchyma of camel (Camelus dromedarius) was studied by using light microscopy. Intrapulmonary bronchi in lung of camel were lined by a respiratory epithelium. The tela submucosa of bronchi of camel was loose connective tissue with many elastic fibers, smooth muscle and cartilage. No cartilage and gland were present in bronchioles of camel. Respiratory bronchioles were absent in camel. Pores of kohn were found in alveolar wall in camel. The visceral pleura completely covered both lungs. It consisted of squamous mesothelial cells with varying amounts of elastic fibers and dense irregular connective tissue.

Key words: Histology, camel, lung parenchyma.

Introduction

The lung's only known essential function is to provide sufficient gas-exchange surface to satisfy the organism's need for oxygen and elimination of carbon dioxide. The histological description of the lung parenchyma of the mammals has been documented (Dellman, 1998), however, the lung parenchyma of the one-humped camel does not appear to have been investigated, hence this present study.

Materials and Methods

Lung of 7 adult camels (*Camelus dromedarius*) mixed sexes were used for this study. The camels were checked for health,

slaughtered, then the bronchi, bronchioles and lung parenchyma were dissected free and flushed with normal saline. Samples were fixed in 10% formalin for 72 h. Tissue samples were dehydrated, cleared and embedded in paraffin. Paraffin embedded sections were cut at 6 μ m with a Leica Rotary Microtome, mounted on a glass slide and stained with haematoxylin and eosin, Masson's trichrom (MT) and Vangiesson (VG) stains for collagen fibers, Verhof for elastic fiber, Alcian blue and periodic acid shiff (PAS), PAS+VG and PAS+MT. Then all samples were studied under light microscope (Olympus).

Results and Discussion

Intrapulmonary bronchi of camel were lined by a respiratory epithelium composed primarily of ciliated, secretory cells (goblet

cell), and basal cells. The tela submucosa of bronchi of camel was loose connective tissue containing many elastic fibers and mixed submucosal glands (Fig. 1; 2) similar to that of carnivores and ruminants (cow, sheep), the horse and the pig (Dellman, 1998). The

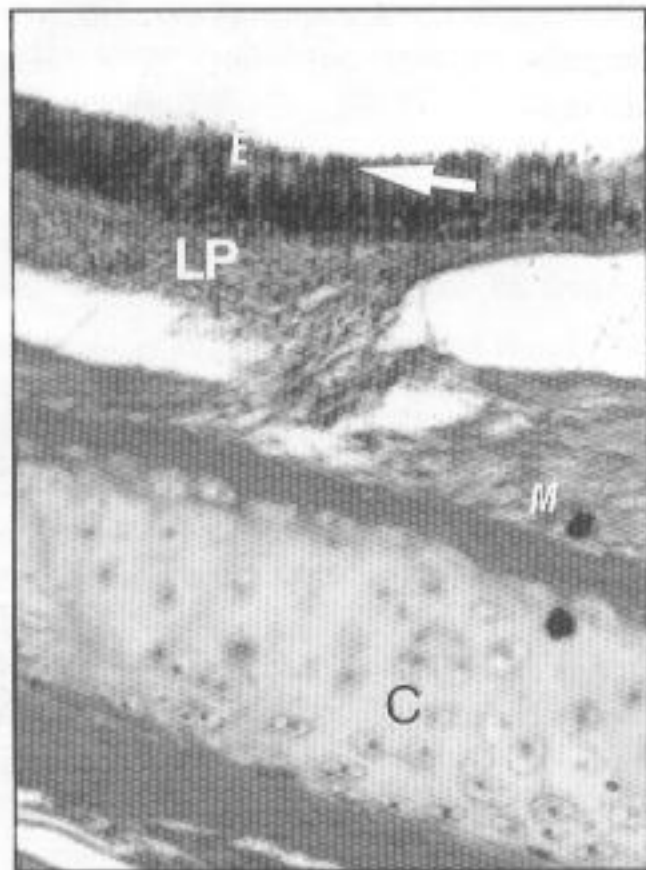


Fig. 1. Microphotograph of the bronchi in the lung of camels showing epithelium (E), goblet cell (arrow head), muscular layer (M), cartilage (C), lamina propria (LP), (Alcian blue staining, x320).

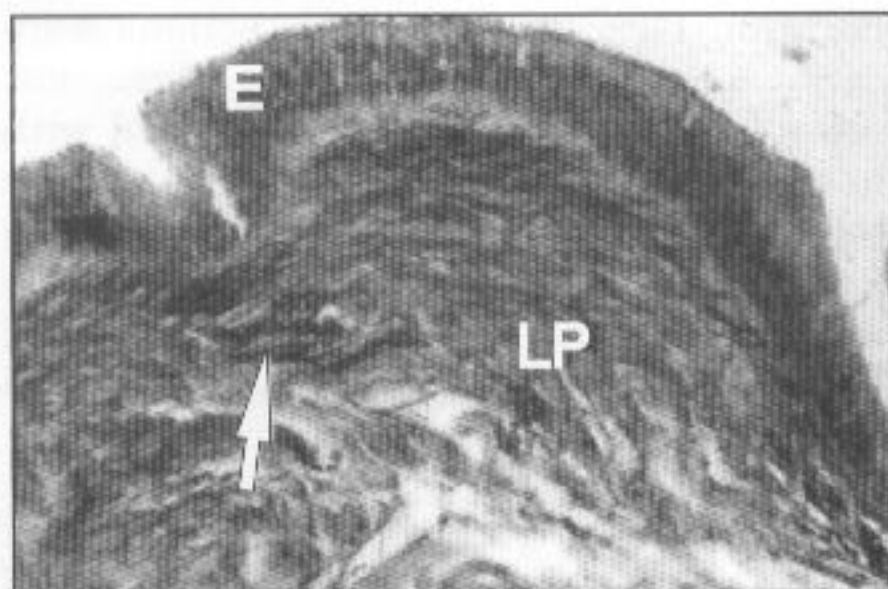


Fig. 2. Microphotograph of the bronchioles in the lung of camels showing epithelium (E), elastic fiber (arrow head), lamina propria (LP), (Verhofs staining, x320).

hyaline cartilage of the bronchi of camel was in the form of irregular plates.

Tunica mucosa of bronchioles of camel was simple cuboidal or columnar and devoid of goblet cell, its epithelium composed of ciliated and bronchiolar exocrine cells (Clara cell). No cartilage and gland were present in bronchioles of camels that it is similar to other mammals (Fig.3). Respiratory bronchioles were absent in camels, respiratory bronchioles were infrequently observed in ruminant and swine, poorly developed in horses and humans (William, 1990). The propria submucosa of bronchioles was loose connective tissue with elastic fibers. The epithelium of terminal bronchioles of guinea pig was comprised of two cell types, ciliated cells were cuboidal and contained long thin microvilli, ellipsoid mitochondria, both rough and smooth endoplasmic reticulum and conciliated (Clara) cell were dome-shaped and usually protruded into the bronchioles lumen (Davies, 1984).

As in other mammalian species (Plopper, 1989) submucosal glands were not observed in the bronchiolar tree of the camel. The absence of mucus-producing cells distal to the terminal bronchioles has previously been observed in other mammalian species



Fig. 3. Microphotograph of the terminal bronchioles (arrow head) in the lung of camels showing epithelium (E), muscular layer (M), alveolar sac (AS), (H&E staining, x 320).

including ox (Loveannitti, 1985) and horse (Pirie, 1990), but these cells have been seen in the Rhesus monkey (Plopper, 1989) where individual mucus-producing cells, producing acidic to neutral mucosubstances have been observed within the epithelial lining of the distal airway.

The alveolar membrane was thin and attenuated. At the level of the light microscope two cell types were identified, the cuboidal alveolar type II and the alveolar type I cell with its long cytoplasmic processes (Fig.4). At this level no mucosubstances were detected by the AB and PAS staining procedure. Mucosubstances were absent in the lining epithelium in the alveolar membrane of the goat (Kahwa, 1996), sheep and buffalo (Atwal, 1979).

Pore of kohn were found in alveolar walls in camel that was similar to other mammalian species. In bovine lung alveolar pores of kohn were small and extremely rare (Mariassy, 1975). The quantification of the pores of kohn in various species shows great variation according to the fixation technique, animal age and site to alveoli in the lung and lobules, the size of these apertures also depends on species, varying from 0.8 to 15

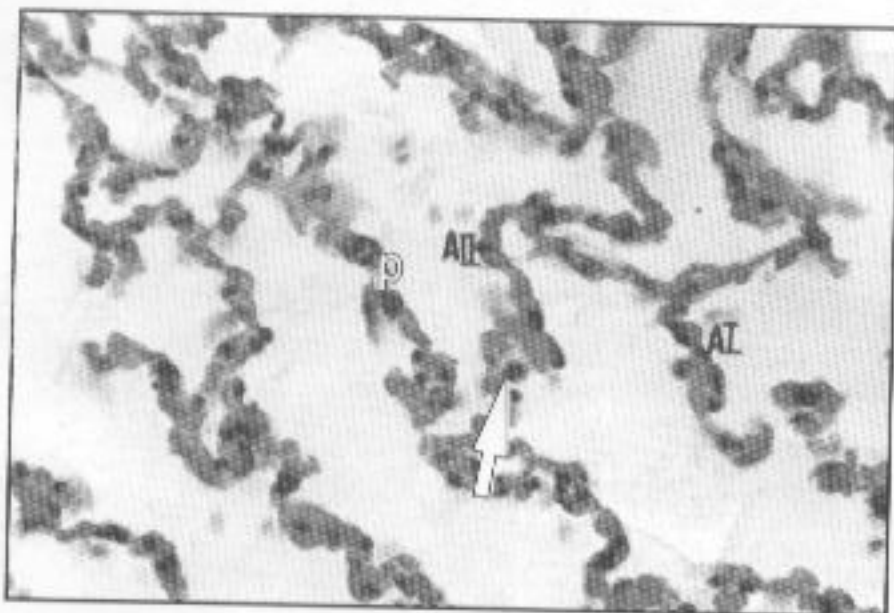


Fig. 4. Microphotograph of the alveolar sac in the lung of camels showing pneumocyte type I (AI), pneumocyte type II (AII), macrophage (arrow head), pore of kohn (P), (H&E staining, x640).

micron (Desplechain, 1983). During early lung development in Wister rats, the pores of kohn seem to serve as passageways for alveolar macrophages (Van Meir, 1991).

The visceral pleura of camel was a serous membrane that completely covers both lungs, except at the hilum and pulmonary ligament, it consisted of squamous mesothelium cells with varying amount of elastic fiber and dense irregular connective tissue (Fig. 5). The visceral pleura was thinnest in the dog and cat but it was thick in large domestic mammals (Dellman, 1998).

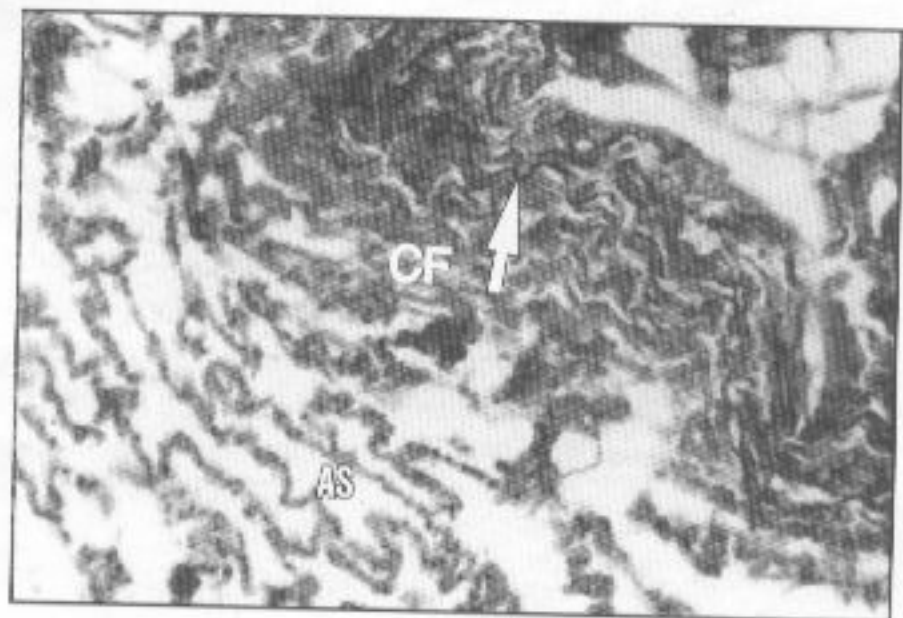


Fig. 5. Microphotograph of the visceral pleura in the lung of camels showing collagen fiber (CF), elastic fiber (arrow head), alveolar sac (AS), (H&E staining, x640).

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अहमद रजा राजी। एक ककूदी ऊंट (कैमिलस ड्रोमेडेरियस) के फुफ्फुस मृदूतक का ऊतकीय अध्ययन।

प्रकाश सूक्ष्मदर्शी के उपयोग से ऊंट के फुफ्फुस मृदूतक का ऊतकीय अध्ययन किया गया। ऊंट के फुफ्फुस में आन्तरफुफ्फुसीय श्वसनियों पर श्वसनी उपकला की पर्त मढ़ी थी। ऊंट की श्वसनियों का मौलिकोतक अधःश्लेष्मिका प्रत्यास्थ तंतुओं, चिकनी पेशी और उपास्थि युक्त अबद्ध संयोजी ऊतक था। ऊंट की श्वसनिकाओं में उपास्थि या ग्रंथि नहीं थी। ऊंट में श्वसनी श्वसनिकायें अनुपस्थित थीं। ऊंट की कूपिका भित्ति में कोहन छिद्र पाए गये। दोनों फुफ्फुस अंतरंग फुफ्फुसावरण से पूर्णतः आच्छादित थे। यह विभिन्न मात्रा में प्रत्यास्थ तंतुओं और सघन अनियमित संयोजी ऊतक युक्त शल्की मिसोएपिथिलियली कोशिकाओं से युक्त थी।