

TRANSMISSION ELECTRON MICROSCOPIC STUDY OF THE ALVEOLAR SEPTUM IN ADULT CAMEL

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The histological description of the alveoli of the mammalian respiratory tract was studied in human beings (Bloom and Fawcett, 1976), and equine (Pirie, 1990). However no information is yet available on the ultra structure of alveoli of the camel. The purpose of this study was to provide a concise account of the basic histology of alveolar septum of *Camelus dromedarius* by Transmission electron microscopy (TEM).

Materials and Methods

The pulmonary parenchyma of lung of adult one humped camels (*Camelus dromedarius*) of both sexes were used for this study. The camels were checked for health, slaughtered and pulmonary parenchyma was dissected free and flushed with normal saline and fixed with 2.5% buffered glutaraldehyde (pH = 7.4) for 24 h, washed in phosphate buffer for 15 minutes, and transferred to 1% osmium tetroxide solution phosphate buffer for 1.5 h. They were then dehydrated in graded ethanol and immersed in epon 812. Selected fragments of the epon blocks were sectioned with an ultramicrotome (LEO) placed on grids, and stained with uranyl acetate and lead citrate (John, 1992). Sections were analyzed using a Philips CM 10 TEM (Philips Analytical, Windhaven, and the Netherlands).

Results and Discussion

TEM images showed that the epithelium lining the alveoli of camel lung consist of simple squamous (type I of alveolar cells, Fig 1) and intermittent cuboidal secretory cell (type II of alveolar cells, Fig. 2). Septal alveoli capillary with blood air barrier (Fig. 3) was observed.

Type 1 alveolar cell (Fig 1) showed a squamous and heterochromatic nuclei a few mitochondria, minimal amounts of rER and moderate number of endocytotic vesicles in cytoplasm.

Type II alveolar cell in camel was cuboidal with big nucleus and organelles including mitochondria. rER and Golgi complex and big lamellar body with high contrast in the cytoplasm (Fig. 2) Lamellar body secreted surfactant, it is a mixture of proteins and phospholipids and consisted mainly of lecithin. In goats, lipid vacuoles were observed in alveolar type II cells and do not appear to have been reported in other mammalian species (Kahwa and Purton, 1997). In rat, type II Alveolar cells thus appear to fluctuate, showing three phases over 24 h including, formation, accumulation and secretion of lamellar bodies it is noteworthy that the accumulation stage occurs during the resting phase of the rat,

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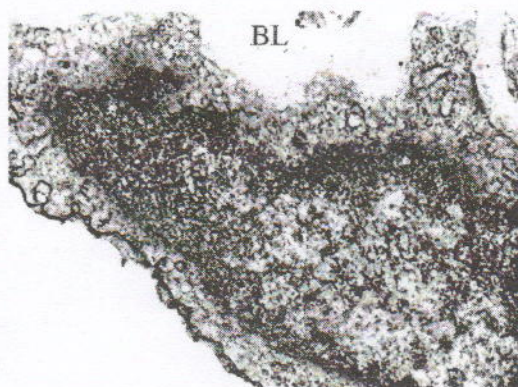


Fig. 1 : A transmission electron microscopy showing a type I alveolar cell. The nucleus (N) with scanty peripheral heterochromatin. Its cytoplasm contains numerous vesicles (V) of various sizes. Basal lamina (BL), X 35000

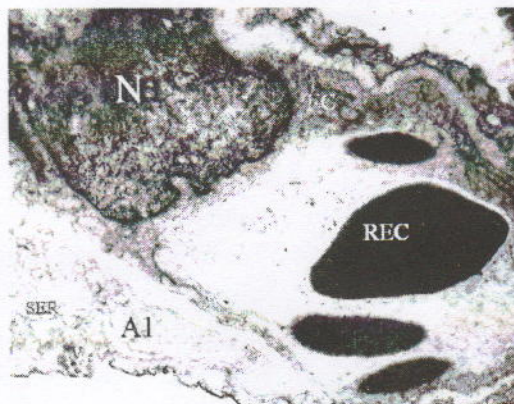


Fig. 3 : A transmission electron microscopy showing a type I alveolar cell (AL), Endothelial cell (EC), Red blood cell (RBC), Vesicle (V), Nucleus (N), Smooth Endoplasmic Reticulum (SER), X 14800.



Fig. 2 : A transmission electron microscopy showing a type II alveolar cell. The nucleus (N) cytoplasm (C) with numerous big lamellar bodies (LB), X 11900.

whereas the secretion stage occurs during its body active phase (Ishii and Hasegawa, 1989). The fine structure of the human type II alveolar cell was studied by means of morphometry and lamellar bodies were independent of cellular swelling, while mitochondria, nucleus, remaining

cytoplasm components increased in size with increasing cell size (Fehrenbach and Schmiedl, 1995).

Blood-air barrier (BAB) in camel consisted of 3 layers as seen in other mammals (Fig. 3). The average thickness of this BAB was 1.5 μm in most species (Dellman, 1993). Capillary was observed under the blood air barrier with erythrocyte (oval in shape) and endothelial cell which was connected by light junction. Endothelial cell was characterized by few organelles and relatively large amounts of endocytotic vesicles (Fig. 3). Inter-alveolar capillary blood volume in mammals ranges from 0.01 ml in the shrew to 2800 ml in the adult horse (Dellman, *loc.cit*).

The macrophage or dust cells were observed with euchromatin nucleus and lysosome with airborne particle, big in size, different shapes and high in contrast.

Kohn or alveolar pores in alveolar wall of camel, was observed similar to the sheep

(Bouljihad and Leopold, 1994), and horse (Pirie, 1990).

Summary

Transmission electron microscopic features of alveolar septum in one humped camels (*Camelus dromedarius*) is presented and discussed.

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