

SCANNING ELECTRON MICROSCOPY OF THE OVIDUCT OF BUFFALO DURING FOLLICULAR PHASE

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ABSTRACT

The present study revealed that the lining epithelium of the oviduct was lined with non-ciliated and ciliated cells. The distribution of these cells and their concentration and characters appeared to vary in different segments of the oviduct.

Key words: SEM, oviduct, buffalo, follicular phase

The oviduct is a secretory organ that maintains and modulates a dynamic fluid filled milieu in which maturation of gametes is completed, fertilization occurs and early embryonic development begins. Keeping this importance in view, the current work was undertaken to study the surface structure of the oviduct during follicular phase of the estrous cycle.

MATERIALS AND METHODS

The present study was conducted on oviducts of five buffaloes during follicular phase of estrus cycle. The oviducts were collected from slaughter house after examining the status of ovaries. Tissue samples were collected from the fimbria, ampulla, isthmus and utero-tubal junction. These tissues were thoroughly washed in phosphate buffer saline (pH 7.4) and subsequently trimmed. The primary fixation of tissues was carried out with 2.5% glutaraldehyde in 0.1M phosphate buffer at 4°C for 4 h followed by washing in the buffer. The specimens were then mounted on aluminum stubs, sputter coated with 35nm thick layer of silver and viewed under LEO 435 VP (Phillips) scanning electron microscope to take desired photographs.

RESULTS AND DISCUSSION

FIMBRIA: The mucosa of the fimbria was thrown into large number of longitudinal folds being connected each other by transversely placed folds (Fig 1). The surface of these folds

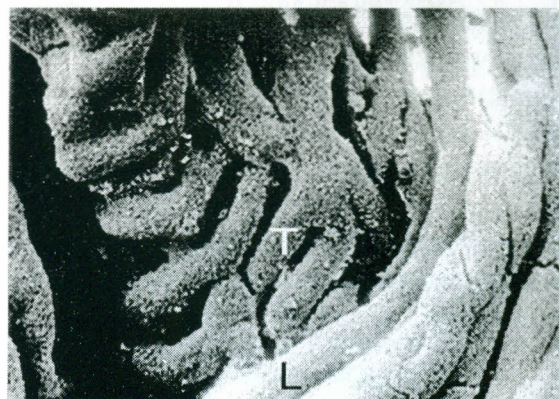


Fig 1. SEM of fimbria showing longitudinal (L) and transverse folds (T). (x 136)

was seen to be lined with predominated ciliated cells forming a ciliary carpet. Isolated non-ciliated cells distributed among ciliated cells had very small microvillus processes which were short, thick and stubby in appearance. These cells also had few large flattened cytoplasmic projections and occasionally a few secretory droplets (Fig 2).

AMPULLA: During the follicular phase, the ampulla had more ciliated cells than non-ciliated cells. The non-ciliated cells were mostly spherical in shape. Some of these cells had sparsely

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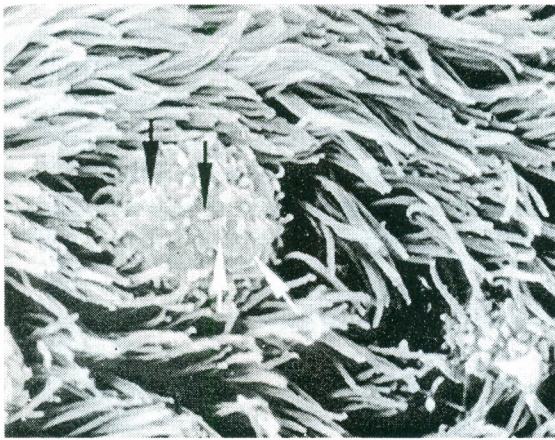


Fig 2. SEM of fimbria showing ciliated cells and different sized non ciliated cells having short and stubby microvillous processes (black arrow) and few flattened processes (white arrow). (x 6.89 K)

distributed microvillus processes, while some of them had flattened plate like projections with very small microvillus processes placed here and there (Fig 3). Giant microvillus processes on few cells were also observed and such cells had flattened and ruffled processes (Fig. 3). The secretory



Fig 3. SEM of ampulla showing non-ciliated cells with sparsely distributed microvillous processes (white arrow) and some with flattened processes (black arrow). Giant microvillus processes are also seen (arrow head). (x 4.87 K)

material was in the form of small globular blebs which was present on the ciliated cells.

ISTHMUS: The mucosa of the isthmus was thrown into larger number of folds. The ciliated cells were comparatively more in number than non-ciliated cells. These non-ciliated cells were usually placed in the form of a group. Such cells were seen to be in different phases of development as they vary in size and

concentration of microvillus processes on the surface. Some of them had giant single microvillus process on the surface. In between these cells, the small sized cells, however, had more and larger sized microvillus processes (Fig 4). Very few cells on their surface had a pit like appearance. Some cells had short microvillus

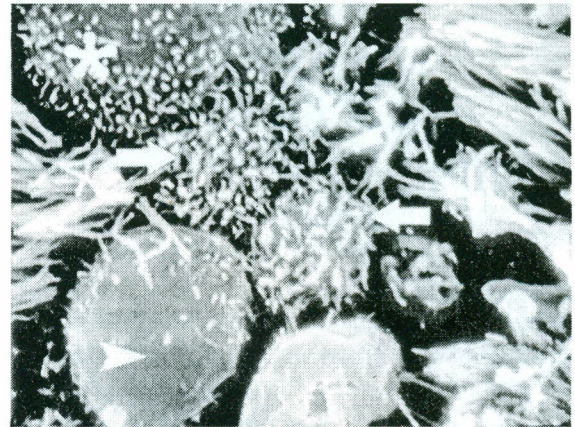


Fig 4. SEM of isthmus showing a bunch of non ciliated cells. Two small cells having thickly packed microvillous processes (arrows) while one large one is having very few (arrow head) and the other one is having very small and thinly placed microvillous processes (*). (x 4.9 K)

processes and in between these processes pointed and tapering cilia were observed.

UTERO- TUBAL JUNCTION: The mucosa of utero-tubal-junction was thrown into large number of thick folds which were seen coiling with each other. Between folds the secretory material in the form of thread like network was seen. The mucosa primarily consisted of ciliated and non-ciliated cells. The non-ciliated cells were, however, more in number as compared to the ciliated cells. The ciliated cells were very few and thickness of the cilia was also less and at places large numbers of small sized cells with short microvillous processes were also observed (Fig 5). The non-ciliated cells projected in between the cilia and had wide plate like ridges on the surface. Most of the non-ciliated cells gave a shrunken appearance. Some of them had large sized holes while some appeared to be bald. Few secretory droplets were observed and at places free floating cells were also seen.

These above findings were in consonance with the findings of Hafez (1972) in female rabbit and monkey, Kangawa *et al.* (1972) in female



Fig 5. SEM of utero-tubal junction showing slender cilia, (arrows) thickly packed short microvillus processes (arrow head) and free floating protrusion mass (*). (x 5.83 K)

rabbits, and Hafez and Kanagawa (1973) in the oviduct of cow. However, contrary to it, Stalheim *et al.* (1975) reported that luminal surface of uterine tubes of cow, mare, sow and doe contained clusters of ciliated and non-ciliated cells in approximately equal numbers in the infundibular and ampullar parts.

Abe and Oikawa (1992) also examined the luminal surface of the different segments of oviduct and utero-tubal junction of Chinese meishan pig during follicular phases and reported that ciliary changes with respect to ciliated cells were more marked in the fimbria and ampullary regions while in the isthmus and utero-tubal junction areas changes were observed in the non-ciliated cells also. Abe and Oikawa (1993) in cows and Abe *et al.* (1993) in goats also reported

that marked cyclic changes were observed on the surface of the epithelium in the fimbria and ampulla, but few changes were found in isthmus and utero-tubal junction. The epithelium of the fimbria and ampulla of oviducts in follicular phase were densely ciliated and the cilia concealed the apical processes of non-ciliated cells.

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