The Effect of Mechanical Loading on the Clear Cells of the Oral Epithelium.

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"Clear" or dendritic cells are found at various levels in the epithelium and are most numerous in keratinized epithelium (Hutchens, *et al., J Invest Derm* 1951:56:325-336). They consist of a variety of cell types such as Langerhans cells, Merkel cells and Melanocytes. Lymphocytes may also have the appearance of "clear" cells. When the oral epithelium is subjected to mechanical loading, the morphology of the individual cells is significantly altered (Stroud, M.S. Thesis, Univ. of Washington 1967, Scapino, *J Morphol* 1967: 122:89-114 and Fleisch and Austin, *J Prosthet Dent* 1978:39:211-216). The purpose of this study was to observe the effects of mechanical loading on the "clear" cells of the oral epithelium.

Sixteen adult Vervet monkeys (*Cercopithecus aethiops*) were selected post-surgically from nephrectomized animals. A standardized load of 50 gms was applied to the hard palate, cheek, tongue and alveolar mucosa. The animals were decapitated, and the heads with the apparatus attached were completely immersed in 10% neutral buffered formol saline. All the procedures were completed within two minutes (Fleisch and Austin, *J Prosthet Dent* 1978:39:211-216). The load was applied for five days while the tissues were immersed in formol saline. Blocks of tissue containing the stressed areas were removed, processed and stained with haematoxylin and eosin for viewing with a light microscope.

In normal unloaded tissue, clear cells were seen in all four regions examined. They occurred mainly in the basal and spinous cell layers and were most numerous in the tongue epithelium and least in the cheek. They did not conform in shape and size with the adjacent epithelial cells and varied considerably in size (Fig. 1). It was not possible, with the technique used, to differentiate between the three types of clear cells which have been described, namely, Melanocytes, Langerhans cells and Merkel cells. In the loaded tissue, the nuclei and cytoplasm of the "clear" cells exhibited no significant change in morphology as compared to the flattening and elongation of the adjacent cells (Fig. 2). This observation was consistent in all the sections examined.

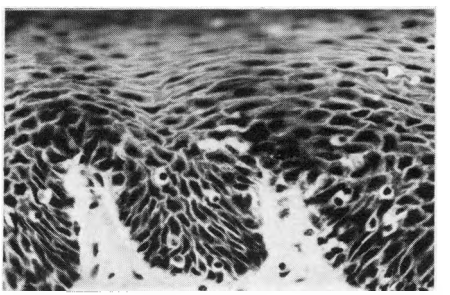

Fig. 1—Clear Cells in normal alveolar mucosa epithelium x 360.

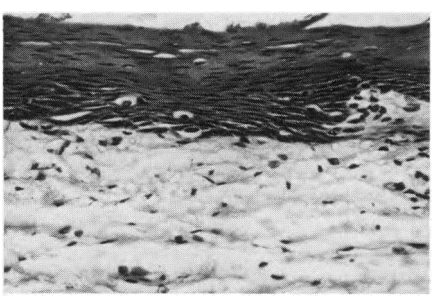

Fig. 2—Clear cells in loaded alveolar mucosa epithelium x 360.

A possible explanation of this phenomenon is that "clear" cells have long protoplasmic processes which interdigitate between the other cells of the epithelium (Hutchens, *et al., J Invest Derm* 1971:56:325-336). When the cells are compressed, the cytoplasm within these processes is forced into the main body of the cell, producing an increased hydrostatic pressure within the cell, thus resisting distortion.

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