Once Again, What is the Mucous Neck Cell?

By

MASATAKE IMAI, TAIZO SHIBATA* and NOBUAKI HIGASHI*

9-3 Miyamae 1-chome, Suginami-ku, Tokyo 168, Japan
*Department of Anatomy, Kanazawa Medical University.
Uchinada-machi, Kahoku-gun, Ishikawa 920-02, Japan

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Summary: The authors made a study of the character of mucous neck cells and the following conclusions were drawn.

1. Mucous neck cells are at the most immature stage of chief cells. They are thus unable to differentiate into epithelial cells of the deeper part of the foveola.
2. Many workers consider that the mucous neck cells and glandular cells of the pyloric and duodenal glands are of the same kind. However, certain mucosubstances in mucous neck cells are different from those in glandular cells of the pyloric and duodenal glands.
3. Only mucous neck cells contain pepsinogen granules.
4. Based on the results in 2 and 3, mucous neck cells are clearly different from glandular cells of the pyloric and duodenal glands.

Corpron (1966) presented a figure on the relationships of some kinds of cells in the stomach (Fig. 1). Imai et al. (1967) reported a new opinion opposing Corpron's view (Fig. 2). Soon after, however, they found that they had erroneously concluded that the mucous neck cells differentiated to the foveolar epithelium, although they have had no opportunity to correct such a mistake. Imai et al. (1982) recently reported on the differences between the mucous neck cells and glandular cells of the pyloric and duodenal glands. Taking this opportunity, they wish to clarify again the character of the mucous neck cell. The interrelationships of the surface cells of the stomach are also under investigation, and the authors intend to report the result elsewhere.

Materials and Methods

This report is based on the data in references 2), 3), 4) and 5).

Discussion

1. Are mucous neck cells able to differentiate to the foveolar epithelium?
Based on the structural similarity between the mucous neck cell and the epithelial cells in the deeper part of the foveola, the authors suggested that the mucous neck cells were able to differentiate to the foveolar epithelium. However, due to the fact that there is an undifferentiated cell layer between the mucous neck cell layer and the foveolar epithelium, it is impossible for the mucous
2. Relation between the mucous neck cells and chief cells

Yasuda et al. (1966) demonstrated the existence of pepsin in mucous neck cells by means of a fluorescent antibody technique. Imai et al. (1967) recognized a few fine granules in mucous neck cells by the Bowie method for pepsinogen granules. Moreover, they confirmed that these cells differentiated gradually to chief cells through the stage of so-called immature chief cells. In other words, the fundic gland consists of three kinds of chief cells—the mucous neck cells are the most immature; the body consists of more differentiated chief cells, which are, however, still in the immature stage; and the mature chief cells occupy the fundus (Figs. 2 and 3). Corpron (1966) found that the chief cells differentiated directly from nondifferentiated cells or were transformed from mucous neck cells originating in the nondifferentiated cells (Fig. 1). Based on the above details, it is clear that the authors' view of the origin of the chief cells is different from that of Corpron. Incidentally, Tsujimura (1976) has confirmed the presence of pepsinogen granules in the mucous neck cells of the dog.

Mitotic cell division in the mucous neck cells and immature chief cells is easily visible. However,
the authors consider that such division is caused by mixed immature chief cells. The authors also consider that the mature cells have no possibility of mitotic division.

Some workers have insisted on the amitotic proliferation of chief cells, but the authors have not been able to recognize such division in the mature chief cells. The relationship of the chief cells possibly conform to the process: nondifferentiated cells → mucous neck cells → immature chief cells → mature chief cells.

3. Difference between mucous neck cells and glandular cells of the pyloric and duodenal glands

Many workers have suggested that the mucous neck cells and glandular cells of the pyloric and duodenal glands belong to the same kind of cells. However, Imai et al. denied such an opinion based on their studies. They demonstrated differences between the mucosubstances contained in the mucous neck cells and other glandular cells. The mucous neck cells have neutral mucous of types II and III which are unrecognizable in the pyloric and duodenal glands. The pyloric and duodenal glands have acid mucous of types I, II and III which are not contained in the mucous neck cells. Moreover, only the mucous neck cells have pepsinogen granules. Based on these findings, it is concluded that the mucous neck cells are clearly different from the glandular cells of the pyloric and duodenal glands.

References