## A Transitional Cell Type in Taste Buds

It has recently been reported that three distinct cell types are present in taste buds[1,2]. In this paper preliminary results are reported concerning a peculiar cell of the taste bud, characterized by a remarkable amount of smooth endoplasmic reticulum.

*Materials and methods.* Foliate papillae of adult male rabbits were fixed in glutaraldehyde, by perfusion or by immersion, and postfixed in osmium according to the usual electron microscopic techniques.

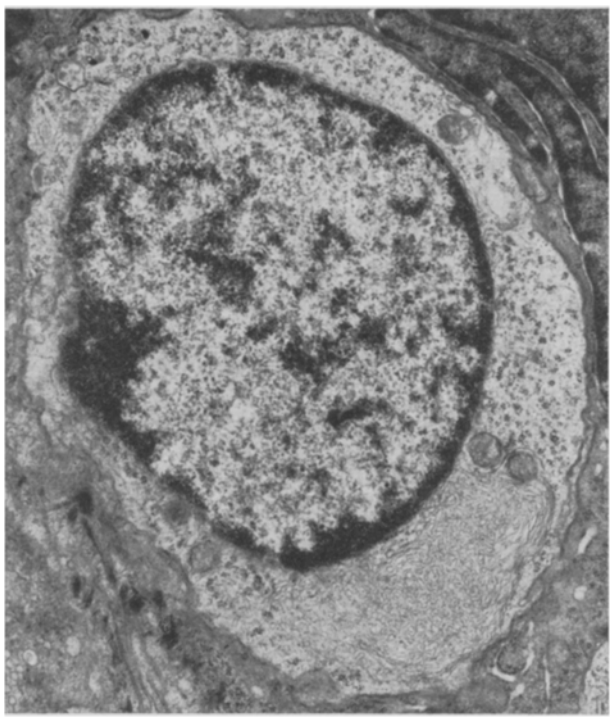

Fig. 1. Early evolutional stage of the cell which shows many free ribosomes, rare small mitochondria and, typically, a circumscribed area of smooth endoplasmic reticulum in the low cytoplasmic zone. ×15,000.

*Results and discussion.* The cells under investigation are occasionally observed in the inner part of the taste bud and show generally morphological signs of scarce differentiation: they show a roundish nucleus with scattered chromatin-like areas, many free ribosomes, some mitochondria and, typically, a variable amount of smooth endoplasmic reticulum: this appears in the form of a delicate system of interwoven tubules which freely anastomose and sometimes are seen in confluence with the lamellar profiles of the rough endoplasmic reticulum. In the early stage of differentiation, the smooth membranes occupy only a small area of the whole cytoplasm, often close to the nuclear zone (Figure 1). Successively this area increases becoming peripherally surrounded from filamentous structures or elongated cisternae of the smooth endoplasmic reticulum itself. Sometimes it is possible to observe signs of progressive differentiation consisting of increase in number of mitochondria and of Golgi complexes and appearance of filaments which are mainly localized in perinuclear zone (Figure 2). Such cells are often localized in close proximity to I type cells. Quite often pleomorphic or concentric dense bodies of the same aspect of those described in the I type cells of the taste bud[3] are to be observed close to or within the area of smooth endoplasmic reticulum; sometimes they are surrounded by circular arrays – whorl-like aligned – of smooth cisternae (Figure 3). Finally some glycogen-like particles are frequently interspersed among the tubule-like cisternae of the smooth endoplasmic reticulum.

Two[3] or three[1,2] distinct cell types have been described in the taste bud, although it seems probable that they originate from a single less-differentiated cell[4]. The cells we describe in the present report are characterized by abundance of smooth endoplasmic reticulum which permeates most of the cytoplasm. Some cytological

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[3] A. I. Farbman, J. Ultrastruct. Res. *12*, 328 (1965).
[4] S. Fujimoto and R. G. Murray, Anat. Rec. *168*, 393 (1970).

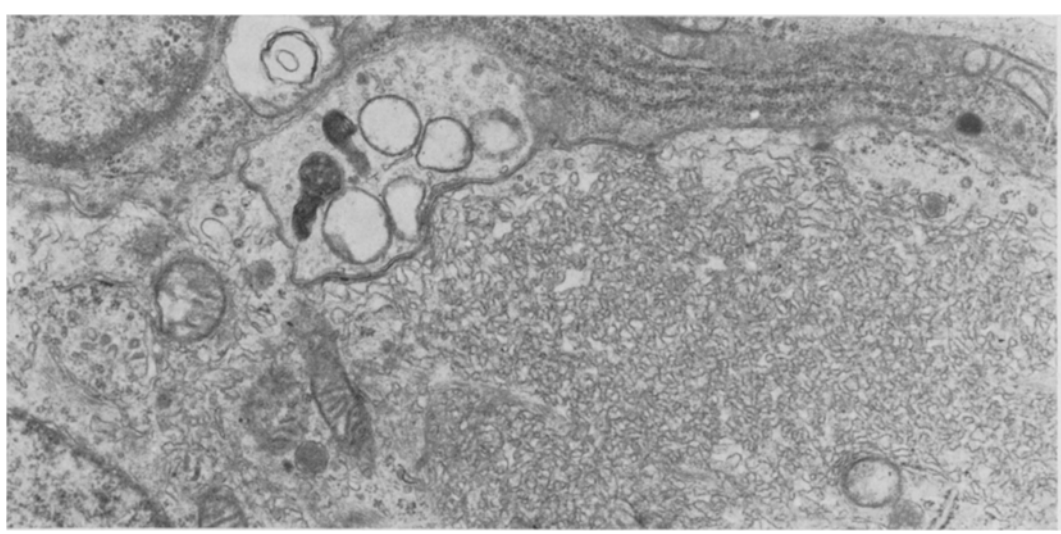

Fig. 2. More advanced stage of differentiation with some mitochondria and tubulo-vesicular profiles. Note the contact with one nerve fiber. ×20,000.

features of this cell, i.e. the high number of free ribosomes and the relative scarcity of cytoplasmic organelles, suggest an early stage of differentiation. Successively, a certain differentiation takes place although advanced evolutional stages have not yet been observed. As far as the membrane-rich smooth endoplasmic reticulum is concerned, it is possible for it to be a transient device for producing a remarkable amount of membranes in a relatively early stage of cell differentiation: in this regard it has to be noted the abundance of membranes both in the I and in the II type mature cells; in the former, in fact, are typical and abundant the elongated curvilinear rough cisternae, in the latter, scattered vesicle- and tubule-like structures permeate the whole cytoplasmic area.

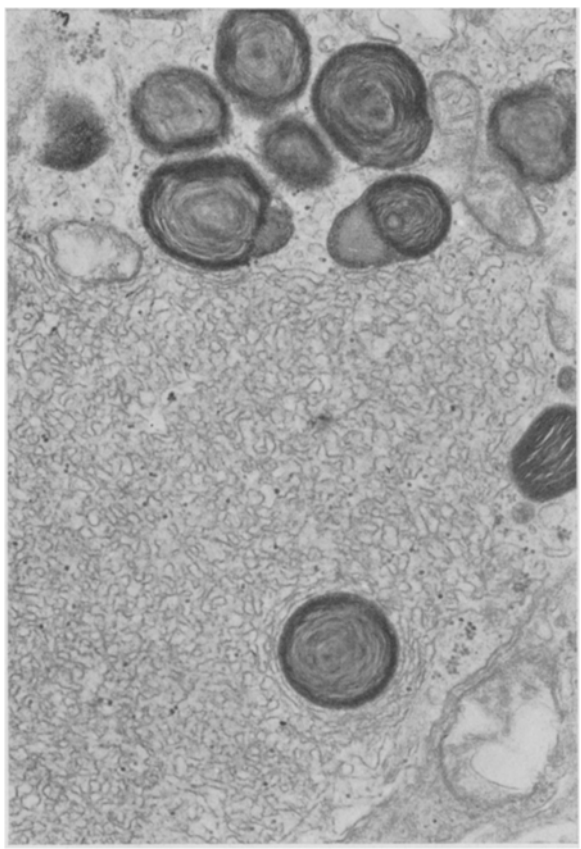

Fig. 3. Many dense bodies mainly formed by closely apposed membranes are clumped in the high part of the figure. Note the one immersed in the smooth endoplasmic reticulum and surrounded by smooth cisternae circularly arranged. Glycogen-like particles are interspersed among the smooth network. ×22,000.

The occurrence of pleomorphic and often concentric dense bodies in close topological relationship with smooth endoplasmic reticulum membranes suggests the possibility of their derivation from the smooth endoplasmic reticulum itself – as often occurs in Leydig cells in normal and experimental conditions[5]; notwithstanding, morphological aspects of gradual changes from whorls of smooth endoplasmic reticulum to dense bodies has not yet been observed. Furthermore, it must be remarked that concentric dense bodies quite similar to that described in the present report are described in the type I cells of the taste bud[3]. Beyond this fact, also the frequent occurrence of a reciprocal proximity of these 2 cell types within the taste bud suggests the hypothesis that the cells described may be a transitional cell type precursor of and evolving toward the mature I type cell of the taste bud.

*Riassunto.* Nella presente nota è brevemente analizzato l'aspetto ultrastrutturale di una cellula talora osservabile nel calice gustativo e caratterizzata da una notevole abbondanza di reticolo endoplasmatico liscio.

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[6] Acknowledgment. The technical help of V. PANETTA was greatly appreciated.

## Significance of Fixation Procedure for Preservation of Arteries

It has been shown that platelets and subsequently leucocytes adhere to subendothelial structures after removal of endothelium[1,2] or severe vascular injury[3]. In order to study particular phases of this dynamic process by electron microscopy, the fixation procedure should rapidly interrupt this process. During these experiments and experiments dealing with attachment and detachment of endothelium[4], we realized that the ultrastructure of arteries was highly dependent on how the initial fixative was applied.

Burgunder rabbits of either sex weighing 2.5–3.5 kg were anesthetized with Numal®. 2.5% glutaraldehyde in 0.1 *M* phosphate buffer, pH 7.4, 560 mOsm, at 20–22°C was used as the initial fixative and applied as follows: 1. Immersion: for 1–3 h. 2. In situ: fixative was dropped on the ouside of the clamped aorta in situ for 20 min. 3. Perfusion without pressure: Approx. 1 cm of the abdominal aorta near the renal arteries was dissected and ligated proximally. A silastic catheter was introduced to perfuse 10 ml of Krebs-Ringer's solution followed by the fixative for 20 min. Simultaneously the iliac arteries were opened. The containers with the Krebs-Ringer's solution and the fixative were placed 100 cm above the aorta. 4. Perfusion with pressure: Same as 3, but without open-

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