

From:  
The Dental Institute of Experimental Research,  
University of Oslo,  
Norway

## UPTAKE OF $^3\text{H}$ -THYMIDINE BY AN EPITHELIAL REST IN THE PERIODONTAL MEMBRANE

### A PRELIMINARY REPORT

by

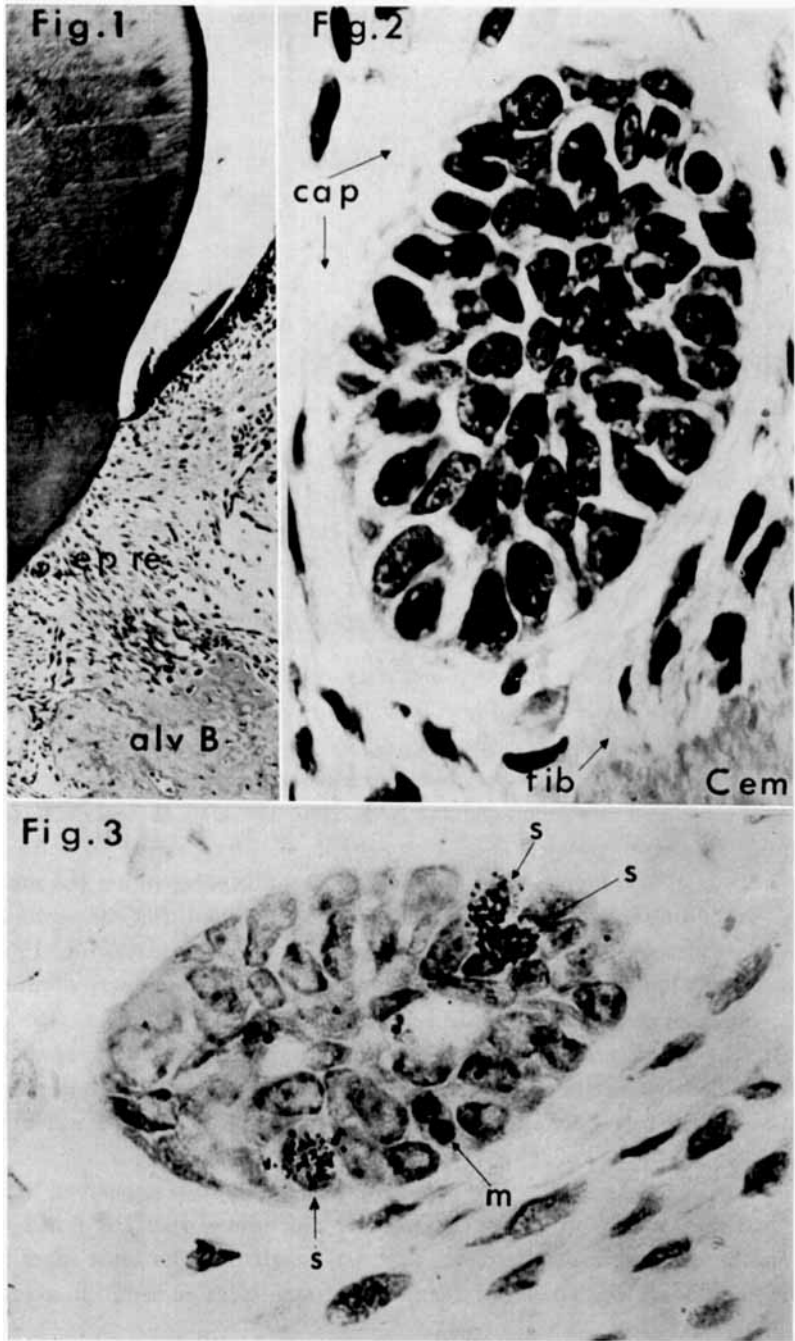
EINAR KVAM

OLE GILHUUS-MOE

The epithelial cells of Malassez are rests of the primordial layers which constitute Hertwig's sheath. They may be arranged in various forms and sizes (*Wentz, Weinmann & Schour, 1950; Reitan, 1961*). However, it has not yet been possible to decide if they have any particular function. Both electron-microscopical and histochemical methods have revealed that they have a minimal synthetic activity (*Ten Cate, 1967; Valderhaug, 1967*). As no labelled nuclei was found in the photographic emulsion covering the nuclei in  $^3\text{H}$ -thymidine injected animals, it has been concluded that the epithelial cells are quiescent (*McHugh & Zander, 1965; Diab & Stallard, 1965*). When stimulated, or as a result of pathological processes in the periodontium, they have been claimed to grow and multiply (*Ramfjord, Engler & Hiniker, 1966*). *Throwbridge* and *Shibata* (1967) found labelled nuclei in epithelial remnants located in the bifurcation area of lower rat molars. It therefore seems justified to report an incidental finding of active division and DNA synthesis of an epithelial rest.

In a rat belonging to a control series the phenomenon was observed in the marginal area of first upper molar (Fig. 1). The animal received  $1 \mu\text{Ci } ^3\text{H}$ -thymidine per gram body weight, and was sacrificed one hour after the injection. The jaw was fixed in Lavdowsky's fixing solution for 24 hours and

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decalcified in 10 % formic acid. The specimen was sectioned serially and some sections were stained with Harris' hematoxylin and eosin. The others were coated with Kodak NTB-2 nuclear track emulsion and kept in complete darkness for 22 days at 4°C in a dry atmosphere, after which they were developed, fixed, and lightly stained with hematoxylin.

The epithelial rest was well isolated from the surrounding structures by circumscribed connective tissue fibre bundles containing few cells (Fig. 2). The fibre bundles were attached to the cementum of the tooth and they intermingled with the principal fibres of the periodontal membrane (Fig. 1 and 2). The epithelial rest which was fairly large and ovoid in cross section contained densely packed cells. The nuclei were hematoxyphil and richly granulated (Fig. 2). The form and stainability of the cells resembled that of cells in the basal layer of the epidermis. When studying the serial sections, it was found that the cells constituted a definite remnant without communication with the oral mucosa.

In the sections coated with emulsion three of the cells were found to synthesize DNA (Fig. 3-s). Another cell was in a more advanced stage of division, representing an anaphase and thus denoting active division (Fig. 3-m).

In view of their presence in old individuals, it is considered reasonable to assume that the epithelial remnants have a certain cellular turnover. The apparent lack of function and low enzymatic activity may explain why mitosis are seen so infrequently in normal animals (*Valderhaug*, 1967). An interesting finding was that three cells were synthesizing DNA at the same time as the one which was actively dividing. A study of the surrounding structures revealed that no inflammatory or healing processes had occurred. On the other hand, the close relationship with the cementum, and the fibrous connection with the periodontal membrane indicate that oral functional forces may play a certain role in the metabolism and life cyclus of also these cellular remnants.

#### SUMMARY

Following injection of labeled thymidine ( $^3\text{HTDR}$ ) in untreated rats, DNA synthesizing cells and mitosis was incidentally observed in a marginal, epithelial rest of the periodontal membrane of the first, maxillary molar.

Fig. 1. Transversal section of first, upper rat molar. The epithelial rest (ep re) is situated near the tooth surface (T), isolated from surrounding structures by fibrous tissue. Hematoxylin and eosin.

Fig. 2. High power view of epithelial cells and surrounding structures. The fibre bundles (fib) of the surrounding capsule (cap) are attached to the cementum (Cem). Hematoxylin and eosin. Oil immersion.

Fig. 3. Autoradiograph. Epithelial remnant with three cells in the DNA synthesizing phase (s) and one cell denoting an anaphase (m).

## RÉSUMÉ

ABSORPTION DE THYMIDINE  $^3\text{H}$  PAR UN DÉBRIS ÉPITHÉLIAL DANS LE PÉRIODONTE. RAPPORT PRÉLIMINAIRE

Après injection de thymidine marquée ( $^3\text{HTDR}$ ) chez des rats non traités, des cellules synthétisant l'ADN et des mitoses ont incidemment été observées dans un débris épithélial marginal du périodonte de la première molaire supérieure.

## ZUSAMMENFASSUNG

AUFNAHME VON  $^3\text{H}$ -THYMINIDIN DURCH EINEM EPITHELIALEN REST IN DER WURZELHAUT  
EIN VORLÄUFIGER BERICHT

Nach Injektion von radioaktivem Thyminidin ( $^3\text{HTDR}$ ) in unbehandelte Ratten wurden DNA-synthetisierende Zellen und Mitosen in einem marginalen Malassez'schen Epithelrest des ersten oberen Molaren beobachtet.

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Address:

*Dental Institute of Experimental Research,  
University of Oslo,  
Blindern, Oslo 3, Norway*