

Schroeder H E & Theilade J. Electron microscopy of normal human gingival epithelium. *J. Period. Res.* 1:95-119, 1966.

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Based on standardized biopsies of clinically controlled normal gingiva and on systematic and representative sampling procedures, this paper was the first comprehensive ultrastructural description of a human oral stratified epithelium, describing its strata, differentiation pattern, cell junctions, and clear cells. [The SC¹® indicates that this paper has been cited in over 115 publications.]

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After receiving a DMD degree at the University of Frankfurt am Main, where the dermatologist Oskar Gans had kindled my curiosity in skin and stratified epithelia, I joined Hans R. Mühlemann in 1960 as a postdoctoral research fellow in the Department of Operative Dentistry and Periodontology in Zürich. Spending a few years on research in the formation, nature, and inhibition of dental calculus,¹ I discovered the electron microscope as a research tool.

In the early 1960s, electron microscopy (EM) had become enormously attractive, and proper methods for tissue preparation were being developed. Following a brief period of introduction to this field at New York University and the Sloan Kettering Institute in New York City, I was invited to spend the winter term of 1965-1966 with Harald Löe and Jørgen Theilade at the Royal Dental College in Aarhus, Denmark. There, Theilade chaired one of the first fully equipped departments of electron microscopy attached to a European dental school. I intended to build a similar outfit in Zürich.

The decision to choose the keratinizing oral gingival epithelium as my research subject was guided by several factors: (1) my interest in epithelia was revived, (2) no systematic work had been done on this subject, (3) Löe (then chairing the Department of Periodontology in Aarhus and conducting studies² into the development of gingivitis in humans) had just demonstrated how to achieve a clinically normal gingiva, and (4) the gingival epithelium was part of both the oral mucous membrane and the periodontium.

Ewald Weibel, then at the Institute of Anatomy in Zürich, had introduced me to the idea that the morphologic study of any tissue at the EM-level should be highly systematic, if not quantitative, and based on a representative sampling of tissue sites. My project, then, was characterized by standardized biopsy sampling from clinically normalized gingiva, a topographically defined site, systematic sampling of all epithelial strata, and modern methods for tissue preparation and application of increasing levels of magnification within each stratum. This resulted in the first comprehensive description of a human oral stratified epithelium and in the discovery of particular components of this tissue, such as the various junctions between epithelial cells (as previously described by Farquhar and Palade),³ the anchoring fibrils as part of the basal membrane (similar to what Palade and Farquhar⁴ had detected in frog skin), and the Langerhans cells and inactive melanocytes in nonpigmented oral mucosa. These are the reasons, I believe, that the paper has been cited as often as it has. I remember that I had to work in the laboratory seven days a week, 10 to 12 hours a day, to achieve these results within a six-month period.

In the ensuing years, led by continuing interest and enthusiasm, I had the opportunity in Zürich to, in fact, realize my intentions, i.e., to describe morphologically and morphometrically the various human oral stratified epithelia and their differentiation patterns in health and disease,⁵ as well as the human periodontium in general.⁶ For this work, I received an honorary doctorate from the Royal Dental College, University of Aarhus, Denmark.

1. Schroeder H E. *Formation and inhibition of dental calculus*. Berne: Huber, 1969. 212 p.
2. Theilade E, Wright W H, Børglum Jensen S & Löe H. Experimental gingivitis in man. II. A longitudinal clinical and bacteriological investigation. *J. Period. Res.* 1:1-13, 1966. (Cited 255 times.)
3. Farquhar M G & Palade G E. Junctional complexes in various epithelia. *J. Cell Biol.* 17:375-412, 1963. (Cited 1,735 times.)
4. Palade G E & Farquhar M G. A special fibril of the dermis. *J. Cell Biol.* 27:215-22, 1965. (Cited 95 times.)
5. Schroeder H E. *Differentiation of human oral stratified epithelia*. Basel: Karger, 1981. 306 p.
6. ----- . *The periodontium*. Berlin: Springer-Verlag, 1986. 418 p.