LEPTOTRICHIA BUCCALIS
A GRAM-NEGATIVE BACTERIUM

Tor Hofstad

Laboratory of Oral Microbiology
Department of Microbiology, The Gade Institute
Schools of Medicine and Dentistry, University of Bergen
Bergen, Norway

ABSTRACT. Oral strains of Leptotrichia buccalis (Robin) Trevisan 1879, 138 (Basionym Leptothrix buccalis Robin 1853, 394) were found to be Gram-negative, on the basis of cell wall morphology and chemical composition. The G-C ratio 34 mole per cent places L. buccalis in a group with the genera Sphaerophorus and Fusobacterium in the family Bacteroidaceae.

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The Gram-variable anaerobic oral filamentous organism Leptotrichia buccalis (Robin) Trevisan, 1879 was first adequately described by Thjötta et al. (1939), who looked upon this organism as a species of Gram-negative bacteria closely related to Fusobacterium (Bøe and Thjötta, 1944). The morphological and cultural findings of Thjötta et al. were later confirmed by Hamilton and Zahler (1957). Hamilton and Zahler, however, concluded that L. buccalis should be classified in the tribe Lactobacilleae of the family Lactobacillaceae. This taxonomical position of L. buccalis was maintained by Gilmour et al. (1961), and has been supported by Kasai (1961, 1965).

During the last years a few oral strains of L. buccalis have been examined in this laboratory. The morphology and the cultural characteristics correspond to the description of L. buccalis given by Thjötta et al. (Hofstad, 1967a). Isolated cell walls have been examined chemically (Hofstad, 1967b), and whole cells have been examined in the electron microscope with particular attention to the cell wall morphology (Hofstad and Selvig, 1969). The chemical examination of undigested and trypsin-digested walls revealed, in

addition to mucopeptide, not only polysaccharide, but also lipid and protein. The hexosamine content was low, 5 and 7 per cent of dry weight in undigested and trypsin-digested walls, respectively. When thin sections of L. buccalis, strain L11, were examined with the electron microscope a cell wall profile characteristic of Gram-negative bacteria was observed, viz. a cytoplasm surrounded by an inner double-tracked plasma membrane, a solid membrane, and an outer double-tracked membrane.

Our findings show that L. buccalis is a Gram-negative bacterium. The isolation of endotoxins from L. buccalis (Araujo et al., 1963, Gustafson et al., 1966) further support the Gram-negative nature of this organism.

We have recently examined the DNA base composition of L. buccalis, strain L11 (Dalen and Hofstad, unpublished data). DNA was isolated as described by Marmur (1963) from organisms harvested in the logarithmic phase of growth, and the guanine-cytosine (GC) content estimated by thermal denaturation (Marmur and Doty, 1962) to be 34 mole per cent of total DNA. This DNA base ratio is similar to DNA base ratios found in strains of Sphaerophorus and Fusobacterium (for references, see Werner, 1968).

We suggest that genus Leptotrichia should be included in the family Bacteroidaceae with L. buccalis as the type species.

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