

## Ultrastructure of a Presumptive Golgi-Mazzoni Receptor in the Periodontal Ligament in Mice.

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A variety of encapsulated and free periodontal nerve endings have been described in extracted human teeth (Griffin and Harris, *Australian DJ*, 19:255-59, 1974; Harris and Griffin, *Australian DJ*, 19:174-81, 326-37, 1974), and in mouse molars with intact surrounding periodontium (Corpron *et al.*, *J Dent Res*, 53:75, 1974; Avery *et al.*, *J Dent Res*, 54:92, 1975; Corpron *et al.*, *J Dent Res*, 57:B224, 1977).

During previous investigations of periodontal nerves in mice, we observed occasional unique receptors not previously reported. It is the purpose of this investigation to localize and describe such endings using the mouse as the species in which the relation of the tooth and periodontium are preserved intact. Blocks of tissue containing mandibular first molars and surrounding periodontium were removed from 100-day-old Swiss-Webster mice, fixed in one-half Karnovsky's fixative, post-fixed in osmic acid, dehydrated in graded alcohols and propylene oxide, embedded in Epon 812, sectioned, double-stained with lead citrate and uranyl acetate, and photographed with a Zeiss EM 9S2 electron microscope. Thick sections (one micrometer) were cut and stained with methylene blue, and viewed with a light microscope to determine the orientation and location of the tissue. Of the two types of non-myelinated nerves observed and not in close relation to blood vessels, the first type was free-ending, typical of pain receptors. The second type was a unique structure in which a small, typical axon contained numerous round or oval mitochondria, neurofilaments, and microvesicles. As the axonal diameter decreased, the Schwann Cell (SC) became thinner, discontinuously surrounded the axon, and appeared darkly stained. Occasionally, the SC was observed to extend beyond the axon and to enclose and compartmentalize variously shaped pockets of fibers resembling collagen and slightly smaller in diameter than regular collagenous fibers (Fig. 1). Additionally, axons were observed to divide and surround an extension of the fibers from the periodontal ligament, which were separated from the axonal cytoplasm by only the neurilemma or a thin extension of the SC (Fig. 2). These nerve terminals were located predominantly along, and

in close approximation to, the border of the apical alveolar bone, and were relatively few as compared to other free nerve endings.

These endings resembled and were presumed to be a type of Golgi-Mazzoni mechanoreceptor similar to those described in the facial periosteum of cats (Sakada, *Oral-facial Sensory and Motor Mechanisms*, R. Dubner and Y. Kawamura, eds., 1971:123-33).

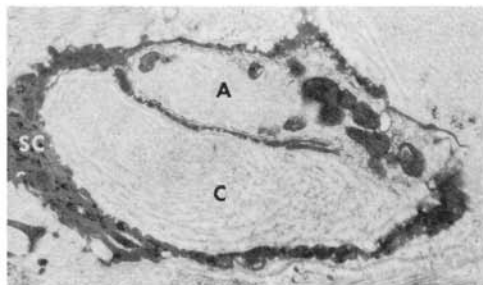


Fig. 1 — A small, unmyelinated periodontal nerve in cross-section with its Schwann Cell (SC) covering extends beyond the axon (A) to surround an area of collagen-like fibers (C). (18,000x)

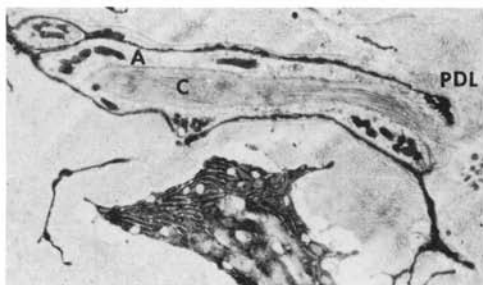


Fig. 2 — A tangential section of a small, unmyelinated periodontal nerve in which the axon (A) appears to contain within its structure an area of collagen-like fibers (C) which extend beyond the axon into the collagen fibers of the periodontal ligament (PDL). (8,100x)

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