Nerve endings of filliform, fungiform and vallate papillae of dorsal tongue mucosa of White-lipped peccary (Tayassu pecari): Neurohistological observations

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INTRODUCTION

The dorsal sensory innervation of tongue mucosa presents a great variability from the terminal nerve endings to the regions of oral mucosa. Bernick (1952) reported the presence of nerve fibers and their according characteristics in periodontal tissues of rhesus monkey. The sensory innervation of filliform, fungiform and vallate papillae of the dorsal tongue mucosa of White-lipped peccary (Tayassu pecari) was studied in this investigation.
Fig. 1. Frontal section of dorsal tongue mucosa of White-lipped peccary stained by silver impregnation method. The nerve fibers run in the connective tissue filiform papillae (arrows). 60x.

Fig. 2. Frontal section of vallate papilla of White-lipped peccary stained by silver impregnation method. The epithelial layer (E), connective tissue papillae (large arrows) and nerve fibers strongly stained (small arrows) are noted at the base of papilla. 60x.

Fig. 3. Frontal section of fungiform papilla intensely stained by silver impregnation method. The fungiform papilla (E) presents numerous sensory nerve fibers running in the connective tissue (arrows). 60x.

Fig. 4. The nerve fibers stained by silver impregnation. The fine terminal endings are noted (arrows). 150x.

Fig. 5. The free terminal axons into the connective tissue (arrows). 240x.

Fig. 6. The numerous nerve endings (arrows) into the fungiform papilla connective tissue. 240x.
Fig. 7. The thick bundle of nerve fiber located in deep layer of dorsal tongue mucosa. 150x.

Fig. 9. Free nerve ending running into the connective tissue of filliform papilla (arrows). 240x.

Fig. 11. Numerous fine sensory nerve endings forming a complicated plexus into the connective tissue of vallate papilla (arrows). 240x.

Fig. 8. Ramifications of sensory nerve fibers into sub-epithelial connective tissue (arrows). 150x.

Fig. 10. Lamellated nerve endings (arrows) at sub-epithelial connective tissue and the epithelial layer (E) of tongue mucosa. 150x.

Fig. 12. Numerous fine free nerve endings into the connective tissue of vallate papilla (arrows). 240x.
innervation of the tongue mucosa of rhesus monkey and human were reported by Kadanoff (1971a,b,c); in Cebus apella monkey by Watanabe & Konig (1976); in dog tongue Okano (1953) and Kikuchi (1969), and in the caudal region of swine tongue by Ohtomo (1954).

On the other hand, different types of nerve endings in the oral mucosa of mammals such as lip mucosa of cat were reported by Civarelli (1908); in the pharyngeal mucosa of cats by Kamada (1955) and Eto (1959). Kubota (1964) and Kubota et al. (1966) found sensory nerve fibers in the mouth mucosa of rhesus. The aim of this paper is to elucidate the presence of several types of sensory innervation of the dorsal surface of the tongue mucosa of White-lipped peccary especially in the filliform, fungiform and vallate papillae using the silver impregnation method.

MATERIALS AND METHODS

The samples were obtained from five animals in a wild animal slaughterhouse (Agropastoril e Criadouro Panamby Porã Ltda, Pedro Barros, SP, Brazil) authorized by IBAMA (SIF/DIPOA no.2278, IBAMA/MMA-SUP 02027.009833/97-13). The tongues were carefully dissected and fixed in 10% formalin solution for 20 days at room temperature. Then, the tissues were cut in 40-60μm thick sections under Leica Cryostat at -30oC. The sections were kept at 10% formalin solution for few days and processed for silver impregnation using the Winkelmann & Schmitt (1957) method.

RESULTS

The dorsal surface of White-lipped peccary tongue mucosa presents numerous filliform papillae (Fig.1). The fungiform papillae are concentrated in the cranial and middle parts of tongue and in the two vallate papillae in the caudal region (Fig.2) exhibiting a thick epithelial layer. The cellular components are stained with silver impregnation are shown as dark lines (Fig.1 and 3).

The fine terminal endings are often present in the subepithelial connective tissue and in the papillae connective tissue. The connective tissue of fungiform and vallate papillae show numerous sensitive nerve endings (Fig.2 and 3). The thick nerve fibers come from the deep muscle layer of tongue and, on the base of the papillae, they divided several times forming fine terminal endings (Fig.4), Figures 5 and 6 reveal the fine free nerve endings intensely stained by silver and located very close to the epithelial layer. The formation of a plexus is noted in Figure 6. Thick bundles of nerve fibers are noted in the Figure 7. The nerve fibers ramify several times into the connective tissue layer of tongue mucosa and show numerous fine terminal endings (Fig.8).

Usually, the free nerve endings which supply the connective tissue of filliform papillae are free nerve endings (Fig.9). Organized corpuses such as the lamellated nerve endings are noted in the subepithelial spaces very close to the epithelial cells (Fig.10). The axon is located in the central portion. The connective tissue of fungiform and vallate papillae has numerous nerve fibers forming a complicated network as shown in Figures 11 and 12.

DISCUSSION

Our results demonstrated that the dorsal surface of tongue mucosa of White-lipped peccary present numerous filliform papillae especially in the cranial part, and numerous fungiform papillae and vallate papillae in the caudal region. The histological observations after the silver impregnation method exhibited the thick epithelial layer with keratinized epithelial cells. The data revealed that the characteristic of sensory nerve fibers found in the connective tissue of fungiform and vallate papilla are similar to those reported by Nakayama (1943), Gairns (1956) and Nakai (1960) in the human tongue mucosa, by Okano (1953) in the dog’s tongue, Kamada (1955) in oral mucosa of ca, Kubota (1964) in the tongue of pimy and common marmosets, Kubota et al. (1966) in the tongue of squirrel monkeys, and by Kubota & Iwamoto (1967) in the tongue of slow loris. The nerve fiber bundles found the sub-epithelial connective tissue of these papillae in the tongue mucosae are different from those reported by Dixon (1961), Gairns & Atchison (1950), Gairns (1951, 1956), and Rapp et al. (1957) in gingival mucosa.

The nerve fiber bundles encountered in the most of sections of fungiform and vallate papillae are provenient from the deep portion of the subepithelial connective tissue. These sensory nerve fibers reach the connective tissue papilla and subdivided into numerous branches which end very close to the basal epithelial cells. On the other hand, our results revealed that the nerve fiber bundles of vallate papilla present a variability of branches forming complex meshwork of sensory terminations. The presence of these nerve fibers characterizes the afferent impulse of sensitivity in the tongue mucosa of these animals.

REFERENCES


