ANATOMY

Pacinian Corpuscle on the Olfactory Bulb of the Squirrel Monkey

WHILE we were carrying out histochemical investigations on the localization of various groups of oxidative and dephosphorylating enzymes and esterases of the olfactory bulb of the squirrel monkey (*Saimiri sciurea*), we noticed a Pacinian corpuscle on the olfactory bulb. This corpuscle was observed in one of our histochemical preparations of succinic dehydrogenase enzyme localization[1]. It was found situated at the inferior surface of the bulb between the leptomeninges covering and the nerve fibre layer (Fig. 1). It was orientated in a coronal plane to the bulb. It had a concentric lamellae of epithelial cells arranged like onion peel as observed in other Pacinian corpuscles in standard histological sections (Fig. 2). These lamellae are made up of continuous sheets of flat squamous epithelial cells laid one on top of the other, but not by fibroblasts as was once thought[2-4]. These cells are derived by a continuation of the perineural epithelium which covers the nerve fibre supplying the corpuscle[5-12].

The nerve fibre terminal with a tapered end was found in the centre of the corpuscle. It showed strongly positive activity for the succinic dehydrogenase reaction (Figs. 1 and 2). The lamellar cells showed moderate positive activity. Similar succinic dehydrogenase localization results have been obtained in our investigations on the Pacinian corpuscle of the cat[13]. In view of the high concentration of mitochondria in the nerve terminal[14], rich succinic dehydrogenase activity is not surprising.

The presence of a Pacinian corpuscle in this part of the body has not previously been recorded. It can be assumed that the function of the corpuscle associated with the olfactory bulb is similar to that in corpuscles found elsewhere; that is, it subserved pressure and possibly vibration sensation. It may be that Pacinian corpuscles in such a site carry the pressure sensation on the olfactory bulb exerted by the cerebrospinal fluid. We also do not know for certain the exact nerve innervating this corpuscle, although theoretically it would be the trigeminal nerve, probably through its ethmoidal branches. Further investigations are being attempted in other species of primates to ascertain whether they have Pacinian corpuscles associated with their olfactory bulbs. The results of histochemical investigations of the olfactory bulb of the squirrel, monkey and rat have been described elsewhere[15-18].

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[1] Nachlas, M. M., Tsou, L. C., Souza, E. D., Cheng, C. S., and Seligman, A. M., *J. Histochem. Cytochem.*, **5**, 420 (1957).
[2] Shantha veerappa, T. R., and Bourne, G. H., *Amer. J. Anat.*, **112**, 97 (1963).
[3] Shantha veerappa, T. R., and Bourne, G. H., *Acta Anat.*, **60**, 199 (1965).
[4] Shantha veerappa, T. R., and Bourne, G. H., *Nature*, **199**, 577 (1963).
[5] Shantha veerappa, T. R., and Bourne, G. H., *J. Cell Biol.*, **14**, 343 (1962).
[6] Shantha veerappa, T. R., and Bourne, G. H., *J. Anat., Lond.*, **96**, 527 (1962).
[7] Shantha veerappa, T. R., and Bourne, G. H., *Nature*, **197**, 577 (1963).
[8] Shantha veerappa, T. R., and Bourne, G. H., *Acta Anat.*, **52**, 95 (1963).
[9] Shantha veerappa, T. R., Hope, James, and Bourne, G. H., *Acta Anat.*, **52**, 198 (1963).
[10] Shantha veerappa, T. R., and Bourne, G. H., *Z. Zellforsch.*, **61**, 742 (1964).
[11] Shantha veerappa, T. R., and Bourne, G. H., *Anat. Rec.*, **150**, 35 (1964).
[12] Shantha veerappa, T. R., and Bourne, G. H., *Acta Anat.*, **61**, 379 (1965).
[13] Shantha veerappa, T. R., and Bourne, G. H., *Amer. J. Anat.* (in the press).
[14] Pease, D. C., and Quilliam, T. A., *J. Biophys. Biochem. Cytol.*, **3**, 331 (1957).
[15] Shantha veerappa, T. R., and Bourne, G. H., *Anat. Rec.*, **151**, 475 (1965).
[16] Shantha veerappa, T. R., and Bourne, G. H., *J. Nat. Cancer Inst.*, **35**, 153 (1965).
[17] Shantha veerappa, T. R., and Bourne, G. H., *Histochemie*, **5**, 125 (1965).
[18] Shantha veerappa, T. R., and Bourne, G. H., *Exp. Cell Res.*, **40**, 292 (1965).

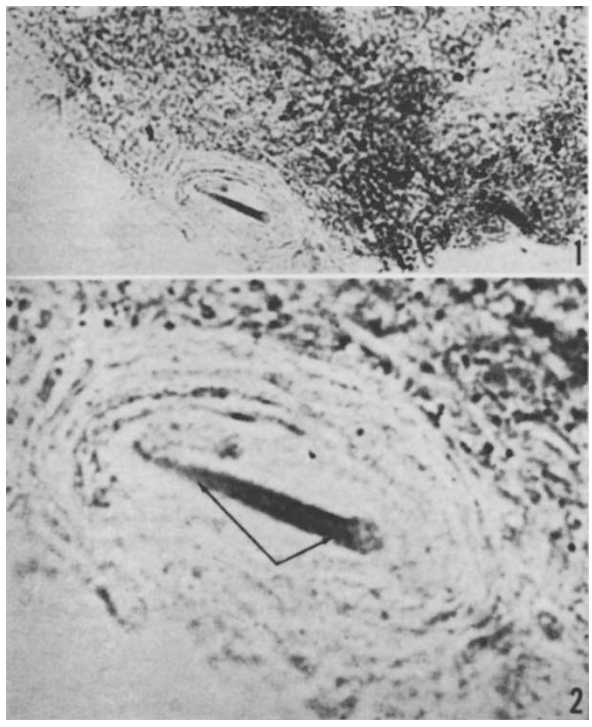

Fig. 1. Coronal section of the olfactory bulb of the squirrel monkey. Succinic dehydrogenase preparation. Note the Pacinian corpuscle found in between the nerve fibre layer of the corpuscle and leptomeninges covering of the bulb. The corpuscle is found orientated in coronal plane of the bulb. (× *c.* 280)

Fig. 2. Higher magnification of Fig. 1, showing the strongly succinic dehydrogenase-positive nerve terminal (arrows). Note also the moderately positive activity in concentric lamellar sheaths covering the nerve terminal which are made up of squamous epithelial cells derived from the perineural epithelium which covers the nerve of supply. (× *c.* 760)

Intranuclear Structures in Neurones

ULTRA-THIN sections of the central nervous system of rats and mice, both normal and experimental, have been examined in the course of an electron microscopic investigation. A hitherto unreported structure has been demonstrated in the nuclei of neurones of the hippocampus and thalamus in four normal rats and in three rats and one mouse affected with the disease under study (scrapie[1,2]).

The structure (Figs. 1, 2 and 3) has crystalline appearance due to crossing of arrays of parallel fibrils. The average diameter of the fibrils in the present preparations was 80 Å, with a centre-to-centre spacing of 135 Å. A variety of profiles was seen in the sections, some showing curvature (for example, Figs. 1 and 2), and one (Fig. 3) showing circularity. These profiles may be interpreted as samples of the same type of intranuclear structure, built up from the arrays of fibrils; the variety of profiles seen could be consistent with sectioning of the structure from different aspects.

These structures were seen in material fixed with osmium tetroxide or fixed with glutaraldehyde and post-osmicated; staining was with uranyl acetate throughout. In comparison with the numbers of individual animals examined and the number of sections studied, these structures were very rarely encountered; this may indicate that they are rarely present in neurones, or that their presence was rarely revealed by the sampling used. The average age of the rats studied was 8 months, and the mouse 5 months; it is not known if presence of the structures is correlated with age. The position of the structure within the nucleus was variable; there was no apparent relation-