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# AFFERENT CONNECTIONS TO THE ABDUCENT NUCLEUS IN THE CAT

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## INTRODUCTION

By means of anterograde degeneration techniques and under the supervision of the late Professor Alf Brodal one of us (G.H.H.) more than ten years ago studied the projection from the reticular formation to the cranial nerve motor nuclei. In the abducent nucleus a scanty bilateral terminal degeneration was revealed, but it was not possible from that material to decide the exact origin of these afferents. No degeneration was found in the oculomotor or trochlear nuclei (Hoddevik, unpublished results). Recently, in the cat the abducent afferents have been studied by means of retrograde transport of free horseradish peroxidase (HRP) (18), or the wheat germ agglutinin-horseradish peroxidase conjugate (WGA-HRP) (15). However, in both these studies the injected tracer had spread outside the borders of the abducent nucleus. Furthermore, when free HRP is used, an additional pitfall is that this tracer appears to be taken up and transported retrogradely even by presumably unlesioned fibres passing through the periphery of an injection site (30). Ozaki and Okamura (23) studied the distribution of premotor neurons by retrograde-retrograde transneuronal transport of WGA-HRP after injections centred in the lateral rectus muscle, but this study also included afferents to the accessory abducent nucleus.

A more reliable method for the study of afferents to small nuclei is now available through a modification of the implantation technique described by Mori *et al.* (22). WGA-HRP is used as tracer (10), since this conjugate appears not to be taken up and transported by unlesioned fibres passing through the stained area at the implantation site (4; see also refs. 9, 24, 26). In the present investigation seven cats with WGA-HRP implants, of which four were almost entirely restricted to the abducent nucleus, were used to study the origin of its non-cortical afferents. The results obtained with this refined technique will be described below.

## MATERIAL AND METHODS

Seven cats (weight 1.9 to 3.5 kg) with WGA-HRP implants in the abducent nucleus were selected for this study. A glass micropipette was filled with paraffine, and the paraffine near the tip was then dissolved in ethyl ether and the tip filled with crystalline WGA-HRP. Under deep pentobarbital anesthesia and from a dorsal approach the pipette was then