AI. Projections of the Cerebral Somatic Areas to the Medulla Oblongata in Cats.

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In adult cats under flaxedil and artificial respiration, the cerebral somatic areas are stimulated by single electrical shock and electrical activities are recorded in the medulla oblongata at the inferior olivary level and the level of the pyramidal decussation to compare the findings thus obtained with those by the Nauta method.

Projections of the cerebral somatic areas to the spinal trigeminal and posterior funicular nuclei are exclusively contralateral with the Nauta method, while bilateral with electrophysiological method. But latencies of the early component of the contralateral responses are different from those of the ipsilateral ones. The former is generally shorter than the latter.

The distributions of the initial latencies of the responses in the contralateral
reticular formation, in which degenerating fibers are shown, are nearly the same as those in the territories of both the contralateral spinal trigeminal and posterior funicular nuclei, while the initial latencies of the ipsilateral responses lengthen in the following order: (A) at the medial part of the reticular formation, in which degenerating axons are observed, (B) the lateral part of the RF and (C) the territories of both nuclear regions, in which a few or only few degenerating fibers are recognized.

Following medullary pyramidotomy the distributions of the initial latencies of the contralateral responses become similar to those of the ipsilateral responses. This suggests that the somatic areas project fibers multisynaptically to the reticular formation and the territories of the nuclear regions without coursing the medullary pyramid.


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Serial fresh frozen sections of the rabbit's brain stem were stained with galloxyanin, by Klüver-Barrera's method and by Glenner's method for monoamine oxidase (MAO) alternatively. Comparing the MAO-positive portions with parts that had been demonstrated to show autonomic responses to electrical stimulation by Kurotsu et al., it was clarified that the MAO activity in the brain is fairly specific to autonomic systems. MAO positive regions which act parasympathetically are as follows: the lateral preoptic and lateral hypothalamic areas, the ventral tegmental area of Tsai, lateral part of the deep mesencephalic gray, the nucleus parabrachialis, the nucleus locus coeruleus, ventral part of the upper mesencephalic reticular formation, the dorsal motor nucleus of the vagus nerve, a part of the central gray matter of the spinal cord dorsolateral to the central canal, the subependymal layers of the brain stem ventricular system (especially the ventromedial portion), the septal nucleus, the nucleus reuniens arcuatus pars dorsalis, and the medial habenular nucleus. Following regions of the activity are sympathetic: the medial preoptic and medial hypothalamic areas, the central gray matter of the mesencephalon and rhombencephalon, the nucleus solitarius, ventrolateral parts of the pontine and lower mesencephalic reticular formations, the lateral column of the spinal cord, and the nucleus lemnisci lateralis dorsalis. Activity of the following is also related to autonomic functions: the habenulopeduncular and pedunculotegmental fibers, the interpeduncular nucleus, the superior colliculus, the nucleus centralis superior, the nucleus raphes magnus, and the substantia gelatinosa of the spinal cord.