

Proceedings of the Iowa Academy of Science

Volume 24 | Annual Issue

Article 43

1917

An Analysis of the Cranial Ganglia of *Squalus acanthias*

Sally P. Hughes
Grinnell College

Copyright ©1917 Iowa Academy of Science, Inc.

Follow this and additional works at: <https://scholarworks.uni.edu/pias>

Recommended Citation

Hughes, Sally P. (1917) "An Analysis of the Cranial Ganglia of *Squalus acanthias*," *Proceedings of the Iowa Academy of Science*, 24(1), 295-297.

Available at: <https://scholarworks.uni.edu/pias/vol24/iss1/43>

This Research is brought to you for free and open access by the Iowa Academy of Science at UNI ScholarWorks. It has been accepted for inclusion in Proceedings of the Iowa Academy of Science by an authorized editor of UNI ScholarWorks. For more information, please contact scholarworks@uni.edu.

AN ANALYSIS OF THE CRANIAL GANGLIA OF
SQUALUS ACANTHIAS.

SALLY P. HUGHES.

This analysis confirms to a large degree the observations of Strong (1903) and Landacre (1916). In *Squalus acanthias* the fifth, seventh and eighth nerves arise close together from the wall of the medulla and form a complex of roots, ganglia and fiber tracts. Taking them up in order, the gasserian or fifth nerve ganglion is seen to be a large hourglass-shaped mass, extending out ventro-laterally from the brain wall; the distal part gives rise to the maxillaris V and the proximal part to the superficial ophthalmic V and the mandibular V. The profundus ganglion is entirely distinct from the gasserian. It is in contact dorsally with the anterior lateral line ganglion which sweeps out in a semicircle laterally, nearly hiding the trigeminal ganglia. The fibers of the superficial ophthalmic V join those of the profundus at the ventro-medial edge of the profundus ganglion and pass together with them in a compact tract along the dorsal edge of the gasserian, entering the brain as the first and probably the third roots of the fifth nerve. The second root is of visceral motor fibers from the mandibular V, the third is sensory, then two small motor roots, followed by the main sensory root of the trigeminus, with a few motor fibers running with it.

The lateral line fibers of the complex are restricted to the seventh. There are three lateral line ganglia in this complex—one for the superficial ophthalmic, one for the buccalis (these two are in contact where the flattened head of the **infraorbital** trunk meets the ophthalmic), and one situated out on the hyomandibular trunk, the external mandibular **ganglion**. This last is a round column of cells which does not affect the shape of the nerve trunk. The fibers of the mandibularis externus join those of the buccalis to form a large ascending root which arises from the lateral line lobe of the brain. The superficial ophthalmic fibers pass through this caudally, forming the ventral lateral line root.

The VIIIth ganglion is closely bounded ventrally by the lateral line root. It comprises a proximal vestibular portion and a

more columnar posterior saccular portion. The auditory fibers enter the brain in a compact root just posterior and ventral to the lateral line roots.

The geniculate or visceral VII ganglion is a triangular mass quite distinct from the rest, in contact caudally with the posterior lateral line ganglion. The roots of the VII-VIII complex are, from anterior to posterior: (1) the large ventral lateral line root, (2) a visceral root soon separating into a distinct dorsal communis and a ventral motor root, (3) the dorsal lateral line root, (4) most posteriorly, the large auditory root. These do not follow each other in succession, but overlap to a large extent so that lateral line, communis, visceral motor, and auditory fibers may be seen leaving the brain in a single section.

The IXth nerve contains visceral sensory, visceral motor and lateral line components. It rises from the wall of the medulla by a series of five roots. The first three are small motor roots, extending in an attenuated tract much farther anteriorly than the main root which is largely visceral sensory. The lateral line root is a small distinct tract entering the brain just ventral to the lateral line root of X. The ganglion lies at the end of a long root, in a cavity of the cartilage of the ear capsule. The visceral ganglion forms a large oval enlargement on the nerve. The lateral line ganglion is a small mass of cells beginning somewhat anterior to the visceral ganglion. Though lying close to the latter, it is perfectly distinct from it, and its presence is indicated by an appreciable indentation in cross-section.

The vagus nerve contains visceral sensory, visceral motor, general cutaneous and lateral line components. The last two are distributed through supra-temporal and auricular rami to the canal organs of the posterior head regions and through a large lateralis trunk to the caudal organs of the body. The lateral line fibers rise in one large compact root just dorsal and extending slightly posterior to the lateral line root of IX. They pass posteriorly in a flat ribbonlike band closely appressed to the brain wall. The lateral line ganglion shows evidence of segmentation into three parts. The first is the most anterior part of the vagal ganglion, a slender column of cells which gives rise to the supra-temporal ramus. Just posterior to this and for some distance in contact with it lies the major part of the ganglion, two scarcely separable masses of cells from the first of which

risers the lateral line component of the auricular ramus. The third ganglion and the remaining fibers from the second ganglion form the main lateralis trunk. I fail to find a distinct root or ganglion for the small general cutaneous element in the vagus. Its fibers are distributed with those from the first two lateral line ganglia, a few entering the supratemporal X and the major part uniting in approximately equal portions with lateral line fibers to form the auricularis X. The visceral roots of the Xth extend for a long distance postero-dorsally along the medulla wall. In the specimen studied there is a series of seventeen visceral roots. The majority of these are mixed, comprising a wide sensory strand and a small motor strand. The posterior (4) roots are all motor. The motor fibers arrange themselves in fairly definite strands and are traceable through the large fibrous root of X to their distribution in the branchial and visceral nerves. The visceral X ganglia show a segmentation into four branchial and one intestinal divisions, all more or less in contact, and the last two quite fused. The cervical plexus is composed of the two occipital nerves and a large motor and a small sensory element from each of the first three spinal nerves. Though closely in contact with the vagus for some distance there is no interchange of fibers.

DEPARTMENT OF ZOOLOGY,
GRINNELL COLLEGE.