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Peripheral Distribution of Myelinated Nerve Fibers Through Gray Communicating Rami in Dog.

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The cervical, lower lumbar (below L. II) and sacral spinal nerves are connected with the sympathetic trunk only through gray communicating rami which, according to the current teaching, comprise no spinal nerve components, but only fibers of sympathetic origin. Certain clinical and experimental data strongly suggest that the gray communicating rami joining the brachial and lumbosacral plexuses also comprise afferent fibers of spinal ganglion origin.

To test this hypothesis, the following experiments were carried out. Two series of dogs were subjected to operation. In the first series both roots of the thoracic spinal nerves from the 1st to the 8th inclusive were cut unilaterally just distal to the spinal ganglion, leaving the communicating rami intact. In some of the animals in the 2nd series both roots of the lumbar nerves, usually from the 1st to the 6th inclusive, were cut unilaterally distal to the spinal ganglia, in the others the left lumbar sympathetic trunk was resected above the level of the communicating ramus of the 6th lumbar nerve. The animals were killed 2 to 5 weeks after operation, when the communicating rami connecting the stellate ganglion with the cervical and first thoracic nerves, in the first series, and the communicating rami joining the 6th and 7th lumbar and 1st sacral nerves, in the 2nd series, were removed bilaterally, fixed in osmic acid and examined for myelinated fibers.

In every case the number of myelinated fibers in the corresponding rami was less on the side of the operation than on the opposite side. The results in the following cases are typical of the results obtained in both series.

		Number of myelinated fibers	
Operation	*Rami examined*	*Left*	*Right*
Case 1. Both roots of upper 8 left thoracic nerves cut.	Stellate ganglion to cervical nerves.	8	87
	Stellate ganglion to 1st thoracic nerve.	15	166
	Total	23	253

Case 3. Both roots of upper 6 left lumbar nerves cut.	Gray ramus of L. VI.	12	42
	Gray ramus of L. VII.	0	0
	Gray ramus of S. I.	0	6
	Total	12	48

Inasmuch as the preganglionic components of the efferent chains involved in the sympathetic innervation of the peripheral blood vessels and other tissues in the area of distribution of the somatic rami of the spinal nerves terminate in the ganglia of the sympathetic trunk, any fibers which join the spinal nerves through the gray rami, except those of sympathetic origin, must be regarded as fibers of spinal ganglion origin. The animals used in this study were young dogs whose gray rami contain relatively few myelinated fibers. Consequently, the myelinated fibers present were easily counted. The difference between the number of myelinated fibers in the corresponding gray rami on the normal and operated sides represents the number of myelinated posterior root fibers present. This number need not be regarded as representing the total number of fibers of spinal ganglion origin in the gray rami in question, since many posterior root fibers are unmyelinated.

The posterior root fibers which join the brachial plexus, through the gray rami arising from the stellate ganglion are components of the thoracic nerves, and probably belong to the same segments as the preganglionic components of the efferent chains with which they are associated functionally. Those which join the lumbosacral plexus, through the gray rami of the lower lumbar and sacral nerves, are components of the lower thoracic and upper lumbar nerves, and probably belong to the same segments as the preganglionic components of the efferent chains involved in the sympathetic innervation of the lower extremity.

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Heredity and Internal Secretion on Origin of Mammary Cancer in Mice.

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More than 20 years ago Loeb in preliminary investigations on the heredity of cancer in mice first applied to the analysis of this prob-