

**Effects on Nervous System of Embryonic Transplantation of Spinal Cord in the Anuran, *Discoglossus pictus*, Otth.**

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A piece of embryonic spinal cord, measuring 1 mm. to 1.5 mm, was transplanted, together with the surrounding tissues, in embryos of *Discoglossus pictus*, Otth., at the tail-bud stage. The transplantations were homioplasmic, and were made in the region of the hind limb. A histological study was made at or after metamorphosis.

Three forms of development took place, conditioned by the development of the tissues: (a) The grafted spinal cord developed independently of the homolateral hind limb, and these 2 organs had no mutual connections. (b) The transplanted tissues inhibited, through their own growth, the development of the homolateral hind limb. (c) Nervous connections occurred between the implanted spinal cord and the hind limb on the same side.

(a) The grafted spinal cord had a tendency to acquire a structure closely resembling that which it would normally have had. Motor-horn cells were irregularly distributed throughout, but there existed no distinct motor-horns. It gave rise to nerves which innervated the surrounding tissues. In one case where a nasal rudiment had been grafted anteriorly to the implanted spinal cord the latter sent forward a nerve which became fused with the olfactory organ.

(b) When the implanted spinal cord developed independently of the hind limb on the same side, the autochthonous spinal cord and its ganglia had a symmetrical structure. But in certain cases the implantation of the embryonic spinal cord inhibited completely the development of the homolateral hind leg. In such cases the lumbo-sacral plexus was not present on the affected side. The autochthonous spinal cord and its ganglia were asymmetric and had suffered a marked reduction on the same side, especially at the level of the segments which normally give rise to the lumbo-sacral plexus. The reduction was particularly marked in the ganglia, but it also occurred in the white matter of the autochthonous spinal cord and, to a less degree, in its gray matter. The motor-horn was absent from the cord in its affected segments, on the side of the implantation.

(c) In 2 cases the grafted spinal cord gave rise to a large, well formed nerve, which usurped the functions of the normal lumbo-

sacral plexus and innervated the homolateral hind leg. In these cases there existed no lumbo-sacral plexus on the side of the implantation, and the autochthonous spinal cord and its ganglia were asymmetric and reduced on that side. The reduction concerned the ganglia, and the white and gray matter of the autochthonous spinal cord, especially at the level of the segments of the absent plexus. The motor-horn here also was lacking in the autochthonous spinal cord on the affected side. The reduction of the motor cells was both ponderable and numerical.

These results show that the absence of innervation to a hind limb, due to the latter's absence or to its innervation by a supernumerary spinal cord, reverberates on the autochthonous spinal cord and its ganglia through a sensory and motor hypoplasia. The ganglia are very much reduced on the side, and along the segments, from which the lumbo-sacral plexus is absent; the lateral half of the spinal cord also undergoes a marked reduction of its white and gray matter on that side and along those segments. This latter reduction is easily observable through the absence of the motor-horn, and by a marked asymmetry. There is, besides, and up to a certain degree, a repercussion of the reduction in the neighboring segments. It therefore follows that the hind limb innervation plays a part in the development of both the sensory and motor neurones of the neuraxis.

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### The Water and the Phosphorus Combinations of Degenerating Nerves.

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I have shown,<sup>1</sup> by means of microchemical methods, that the lesion of a cerebral hemisphere of the guinea pig gives rise to an increase in the water, nitrogen, and sulphur content, and to a decrease in the phosphorus content of the disintegrating cerebral matter. In the present research I have studied the variations of the water and phosphorus in degenerating peripheral nerves of the rabbit.

The sciatic nerves of one side were sectioned high in the thigh of 9 rabbits; they were later analyzed variously, from the 7th to the 196th day after the operation, the normal contralateral sciatic nerve serving as a control. All the analyses, which were made in dupli-

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<sup>1</sup> May, R. M., *Bull. Soc. Chim. Biol.*, 1927, 9, 970; 1929, 11, 312.