Experimental Investigation of the Regeneration of New Branches to the Original Denervated Intercostal Muscles by an Isolated Intercostal Nerve Transplanted to the Spinal Cord

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Left 11th and 12th intercostal nerves of 15 rats were dissected out for 20-35 mm and isolated from the root externally from the peripheral tissues, and cut. Its proximal end was transplanted into the left half of the spinal cord at the level between L1-3. After 57-413 days survival, the rats were dissected for investigation. It was found that 1-3 new branches grew out from the transplanted nerve trunk, distributing to the original denervated intercostal muscles. With optical and electron microscopy observations it was confirmed that they were living regenerated nerve fibers. After CB-HRP injected into the transplanted nerve, it was found that these nerve fibers originated from the anterior horn of intercostal spinal nerve and the neuron of the transplant cord. Therefore it was shown that peripheral nerve defect, without nerve apposition or bridging, not through distal segment of the ruptured nerve, under certain conditions could send out regenerated fibers from the proximal segment to form new branches distributing to the denervated target tissue.