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Evidence for growth of supraspinal axons through the lesion after transection of the thoracic spinal cord in the developing opossum *Didelphis virginiana*.

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Abstract

In the present study, we asked whether supraspinal axons grow through a complete transection of the spinal cord in the developing opossum *Didelphis virginiana*. When the thoracic cord was transected at postnatal day (PD) 5 and bilateral injections of Fast Blue (FB) were made four segments caudal to the lesion 30-40 days later, FB-containing neurons were found in each of the supraspinal nuclei labeled by comparable injections in age-matched unlesioned controls. Continuity between the cut ends of the cord was obviously gross when the animals were killed, and histologically recognizable spinal cord was present at the lesion site. When the same procedure was followed on pups subjected to transection at PD12, FB-containing neurons were still present at supraspinal levels, but they appeared to be fewer in number than in the PD5 cases or the age-matched controls, and none were found within the medial pontine reticular and lateral vestibular nuclei. When the lesion was made at PD20, labeled neurons were even fewer in number, and when it was made at PD26, they were restricted to the medullary raphe and the red nuclei. There was no evidence for growth of supraspinal axons across lesions made at PD33. We conclude that supraspinal axons grow through the lesion after transection of the spinal cord in neonatal opossums and that the critical period for growth of reticulospinal and vestibulospinal axons through the lesion ends earlier than that for comparable growth of raphespinal and rubrospinal axons.

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