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## **Neural Mechanism of Functional Recovery after Spinal Cord Injury**

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To exploit the effective neuro-rehabilitational therapy, experimental studies using non-human primate model of partial brain or spinal-cord injury are useful.

Transection of the direct cortico-motoneuronal pathway at the mid-cervical segment of the spinal cord in the macaque monkey results in a transient impairment of finger movements. Finger dexterity recovers within a week to a few months. We have been studying the cortical mechanism underlying the functional recovery.

Combination of brain imaging with positron emission tomography (PET) and reversible pharmacological inactivation of motor cortical regions suggest that the recovery involves the bilateral primary motor cortex during the early recovery stage, and more extensive regions of the contralesional primary motor cortex and bilateral premotor cortex during the late recovery stage. These changes in the activation pattern represent an adaptive strategy for functional compensation after spinal-cord injury.