CHAPTER

9

Electrophysiological mapping of rat sensorimotor lumbosacral spinal networks after complete paralysis☆

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Abstract

Stimulation of the spinal cord has been shown to have great potential for improving function after motor deficits caused by injury or pathological conditions. Using a wide range of animal models, many studies have shown that stimulation applied to the neural networks intrinsic to the spinal cord can result in a dramatic improvement of motor ability, even allowing an animal to step and stand after a complete spinal cord transection. Clinical use of this technology, however, has been slow to develop due to the invasive nature of the implantation procedures and the difficulty of ascertaining specific sites of stimulation that would provide optimal amelioration of the motor deficits. Moreover, the development of tools available to control precise stimulation chronically via biocompatible electrodes has been limited. In this chapter, we outline the use of a multisite electrode array in the spinal rat model to identify and stimulate specific sites of the spinal cord to produce discrete motor behaviors in spinal rats. The results

☆P. G., R. R. R., Y.G. and V. R. E. designed the experiments. M. N. and Y. T. designed and fabricated the implant. R. R. R. and H. Z. performed all the surgeries. P. G. and J. C. performed the experiments. P. G. analyzed the data. P. G., Y. G., R. R. R. and V. R. E. wrote the chapter. All authors approved the final version of the chapter.

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