Getting a grip on hand function: Researchers discover spinal cord circuit that controls our ability to grasp
10 April 2013

Drs. Rob Brownstone and Tuan Bui.

Dalhousie neurosurgeon and scientist Dr. Rob Brownstone and postdoctoral fellow Dr. Tuan Bui have identified the spinal cord circuit that controls the hand's ability to grasp. This breakthrough finding opens the door to the possibility of restoring hand function with treatments that target this spinal cord circuit. The world's leading neuroscience journal, *Neuron*, will publish the researchers' finding online at 12 noon EST on Wednesday, April 10.

Drs. Brownstone and Bui have found that a group of neurons in the spinal cord circuit they believed played a role in walking when they discovered it controls the hand grasp instead. This observation occurred around the same time that Dr. Brownstone met a patient in his treatment of spinal cord injuries, brain injuries and neurodegenerative diseases affecting the brain and/or spinal cord can all impair hand function, with devastating effects on independence and ability to function in daily life. People with quadriplegia ranked hand function #1, when asked in a 2004 survey which function they would most want to recover if they could. They rated hand function well above trunk stability, walking, sexual function, bladder and bowel control, and normal sensation.

"This spinal cord circuit allows us to subtly and unconsciously adjust our grasp so we apply the right amount of force to whatever we're holding. This mechanism is disrupted in spinal cord injuries, which can completely eliminate the ability to grasp, and in neurodegenerative diseases, which can lead to an uncontrollable reflexive grasp so that people grab and can't let go of whatever they touch" says Dr. Brownstone.

Spinal cord injuries, brain injuries and neurodegenerative diseases affecting the brain and/or spinal cord can all impair hand function, with devastating effects on independence and ability to function in daily life. People with quadriplegia ranked hand function #1, when asked in a 2004 survey which function they would most want to recover if they could. They rated hand function well above trunk stability, walking, sexual function, bladder and bowel control, and normal sensation.

Drs. Brownstone and Bui were testing a spinal cord circuit they believed played a role in walking when they discovered it controls the hand grasp instead. This observation occurred around the same time that Dr. Brownstone met a patient in his treatment of spinal cord injuries, brain injuries and neurodegenerative diseases affecting the brain and/or spinal cord can all impair hand function, with devastating effects on independence and ability to function in daily life. People with quadriplegia ranked hand function #1, when asked in a 2004 survey which function they would most want to recover if they could. They rated hand function well above trunk stability, walking, sexual function, bladder and bowel control, and normal sensation.

"This spinal cord circuit allows us to subtly and unconsciously adjust our grasp so we apply the right amount of force to whatever we're holding. This mechanism is disrupted in spinal cord injuries, which can completely eliminate the ability to grasp, and in neurodegenerative diseases, which can lead to an uncontrollable reflexive grasp so that people grab and can't let go of whatever they touch" says Dr. Brownstone.

Spinal cord injuries, brain injuries and neurodegenerative diseases affecting the brain and/or spinal cord can all impair hand function, with devastating effects on independence and ability to function in daily life. People with quadriplegia ranked hand function #1, when asked in a 2004 survey which function they would most want to recover if they could. They rated hand function well above trunk stability, walking, sexual function, bladder and bowel control, and normal sensation.
neurosurgery clinic who was unable to control her grasp. When she took his hand, she was unable to let go—he had to peel away her fingers to release his hand. He and Dr. Bui were struck by the implications of their observations and embarked on a series of experiments, with collaborators at Columbia University in New York City, to validate the finding.

Provided by Dalhousie University


This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.