MedicalXpress

U of M researchers identify process that may help treat Parkinson's, spinal cord injuries

April 16 2008

A new discovery by University of Minnesota researchers may lead to a better understanding of how the spinal cord controls how people walk. These insights could help lead to treatments for central nervous system maladies such as Parkinson's disease and spinal cord injuries.

The study, headed by Joshua Puhl, Ph.D., and Karen Mesce, Ph.D., in the Departments of Entomology and Neuroscience, discovered it's possible that the human nervous system – within each segment or region of spinal cord – may have its own "unit burst generator" to control rhythmic movements such as walking.

By studying a simpler model of locomotion, in the medicinal leech, the research shows where these unit burst generators reside and that each nerve cord segment has a complete generator. When a neuron fires, it sets off a chain reaction that gives rise to rhythmic movement. Once those circuits are turned on, the body essentially goes on autopilot.

Mesce and her research group targeted the segmented leech for study because they have fewer and larger neurons – making them easier to study.

The study was published today online in the *Journal of Neuroscience*.

"For most of us, we can chew gum and walk at the same time," Mesce said. "We do not have to remind ourselves to place the right leg out first, bring it back and do the same for the other leg. So how does the nervous

system control rhythmic behaviors like walking or crawling""

Furthermore, and perhaps just as important, the study found that dopamine – a common human hormone – can turn each of these complete generator units on.

Since dopamine regulates movements and activates those unit burst generators, the next step will be figuring out how dopamine makes individual neurons more or less active.

“Because dopamine affects movement in many different animals, including humans, our studies may help to identify treatments for Parkinson’s patients and those with spinal cord injury,” Mesce said.

Source: University of Minnesota