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New research reveals critical knowledge about the nervous system

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Uncover the neural communication links involved in myelination, the process of protecting a nerve's axon, and it may become possible to reverse the breakdown of the nervous system's electrical transmissions in such disorders as multiple sclerosis, spinal cord injuries, diabetes and cancers of the nervous system.

With $697,065 in grants from the New Jersey Commission on Spinal Cord Injury and the New Jersey Commission on Brain Injury Research, Haesun Kim of Teaneck, NJ, assistant professor of biological sciences at Rutgers University in Newark, is working on gaining a better understanding of those links.

Specifically, her work focuses on Schwann cells within the peripheral nervous system and their communication links with the axons they myelinate by enwrapping them in myelin. Axons are the long fibrous part of neurons that carry the nerve's electrical signals. A fatty substance, myelin covers those axons both to protect them and to provide a conduit for the fast conduction of electrical signals within the nervous system. Once that myelin is lost,the electrical signal breaks down and eventually the neuron dies – like a cell phone that loses its signal.

Determining how Schwann cells and axons communicate with one another could lead to an understanding of how to promote remyelination, the rebuilding of myelin, and restoration of that signal. One unique aspect of the communication link between Schwann cells and axons is that they

are mutually dependent upon that connection for their existence.

“When Schwann cells are generated during development, axons send out signals to the Schwann cells and tell them, ‘You are going to become myelin cells and you are going to myelinate me,’” explains Kim. “The Schwann cells in turn guide the axons to where they need to go and direct the axons to grow.”

By pinpointing the sequence and nuances of the communication links involved in myelination, targeted genetic and pharmacological interventions possibly could be developed to restore the loss of myelin. Such an understanding additionally may allow for the effective transplanting of Schwann cells in the central nervous system to promote remyelination and the correction of neurological disorders at that level.

Source: Rutgers University

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