THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER
NEWS

Media Contact: Eileen Scahill
Wexner Medical Center Media Relations
614-293-3737
Eileen.Scahill@osumc.edu

**DISCOVERY OF NEW CELL MAY BE KEY TO TREATING INCURABLE NEUROLOGICAL DISEASES**

COLUMBUS, Ohio – Research led by investigators at The Ohio State University Wexner Medical Center provides new hope for recovery from degenerative neurological diseases — such as ALS and multiple sclerosis — as well as from damage caused by traumatic brain and spine injuries and stroke.

Using a mouse model, researchers at Ohio State and the University of Michigan discovered a new type of immune cell that not only rescues damaged nerve cells from death, but partially reverses nerve fiber damage. The research team also identified a human immune cell line, with similar characteristics, that promotes nervous system repair.

Study findings are published in the journal Nature Immunology.

“This immune cell subset secretes growth factors that enhance the survival of nerve cells following traumatic injury to the central nervous system. It stimulates severed nerve fibers to regrow in the central nervous system, which is really unprecedented,” said Dr. Benjamin Segal, professor and chair of the Department of Neurology at The Ohio State College of Medicine and co-director of the Ohio State Wexner Medical Center’s Neurological Institute. “In the future, this line of research might ultimately lead to the development of novel cell based therapies that restore lost neurological functions across a range of conditions.”

The cell discovered by these researchers is a granulocyte, a type of white blood cell that has small granules. The most common granulocytes, neutrophils, normally help the body fight off infection. The unique cell type resembles an immature neutrophil but is distinctive in possessing neuroprotective and neuroregenerative properties. It drives central nervous system axon (nerve) regrowth *in vivo*, in part through the secretion of a cocktail of growth factors.

“We found that this pro-regenerative neutrophil promotes repair in the optic nerve and spinal cord, demonstrating its relevance across CNS compartments and neuronal populations. A human cell line with

characteristics of immature neutrophils also exhibited neuro-regenerative capacity, suggesting that our observations might be translatable to the clinic," said first author Dr. Andrew Sas, an assistant professor and physician scientist in the Department of Neurology at Ohio State.

Researchers demonstrated the therapeutic potency of the immature neutrophils subset by injecting them into mice with crush injury to the optic nerve or lacerated nerve fibers in the spinal cord. Mice injected with the new neutrophil subset, but not more typical mature neutrophils, grew new nerve fibers.

"I treat patients who have permanent neurological deficits, and they have to deal with debilitating symptoms every day. The possibility of reversing those deficits and improving the quality of life of individuals with neurological disorders is very exciting," said Dr. Segal, who's also director of Ohio State's Neuroscience Research Institute. "There's so much that we're learning at the bench that has yet to be translated to the clinic. I think there's huge potential for future medical breakthroughs in our field."

The next step is to harness this cell and expand it in a lab to enhance its healing effects. Researchers hope these cells can then be injected into patients to improve function and mobility and slow or stop progressive neurological decline.

"Our findings could ultimately lead to the development of novel immunotherapies that reverse central nervous damage and restore lost neurological function across a spectrum of diseases," Sas said.

###