New research may lead to therapy that delays onset, reduces severity of MS symptoms

March 15 2011

Purdue professor Riyi Shi conducts research at his laboratory on how hydralazine affects multiple sclerosis symptoms. A provisional patent has been filed on Shi's research, and commercialization partners are being sought. (Photo/Andrew Hancock)

People suffering from multiple sclerosis may benefit if patent-pending research conducted at Purdue University shows that a decades-old drug approved by the FDA to treat hypertension also can delay the onset and reduce the severity of MS symptoms.

Purdue professor Riyi Shi is examining the effects of hydralazine on acrolein (pronounced a-KRO-le-an), a compound that can affect the central nervous system and damage nerve cells. Acrolein causes harm by reacting with the proteins and lipids that make up cells, including neurons. Hydralazine sequesters acrolein and acrolein-protein

compounds, leading to their expulsion from the body.

"While hydralazine was once standard therapy, it currently is not widely used to treat hypertension because there are newer therapies available. It is reserved for people resistant to other hypertension drugs," said Shi, a medical doctor and a professor of neuroscience and biomedical engineering in Purdue's Department of Basic Medical Sciences, School of Veterinary Medicine, Center for Paralysis Research and Weldon School of Biomedical Engineering.

Shi's research focuses on discovering the effective dosage levels necessary to combat acrolein.

"Hydralazine usage in pediatric patients is 7.5 mg per kg of body weight, but we began testing at a much lower ratio: 1 mg per kg of body weight, which has turned out to be effective in delaying the onset of symptoms and lowering their severity in an animal model of MS," he said. "We have discovered that this dosage level does not cause a significant blood pressure drop or other side effects associated with using higher dosage levels for extended periods of time. We expect that potential use in human MS patients would be at significantly lower doses than the treatment for hypertension."

While results have been promising in animal testing, Shi stressed that hydralazine therapy for MS is not yet ready for clinical usage.

Shi's first study, published in the journal *Neuroscience*, tested hydralazine's effectiveness before MS symptoms developed. He plans to follow up with studies to identify optimal treatment timing and dosage.

"We currently are testing to see if hydralazine can reduce symptoms if treatment starts after they begin," he said. "If the drug continues to prove effective, we have good reason to think it might be useful in human MS

patients."

Shi already has applied for a provisional patent on his research through the Purdue Research Foundation's Office of Technology Commercialization (OTC). The OTC also has provided Shi with support through the Trask Innovation Fund, which assists Purdue faculty with work to further commercial potential of technologies disclosed to the Office of Technology Commercialization. The fund does not support basic research but instead provides funds to reduce inventions to practice, provide critical additional data or develop prototypes, which make the technology more marketable.

Provided by Purdue University