Barancik Prize winner aims for myelin repair

Jonah Chan, PhD, focuses on the potential of existing drugs to repair myelin.

by Vicky Uhland

Imagine that an already-existing medication for a common condition like headache or allergies could also be used to repair the nerve damage that appears to be the basis of disability in people with multiple sclerosis.

In the past, it would have taken years to test whether these drugs had such capability. But now, thanks to the work of Jonah Chan, PhD, associate professor of neurology and holder of the Debbie and Andy Rachleff Endowed Chair in Neurology at the University of California, San Francisco, it's possible to rapidly screen hundreds of thousands of existing drugs for such potential—and one promising medication is now in the preparation stage for a phase 2 clinical trial. If this trial is successful, the therapy could ultimately be beneficial for people with relapsing-remitting MS and progressive MS.

Dr. Jonah Chan, winner of the 2013 Barancik Prize, is researching the potential of existing drugs used for common medical conditions to promote myelin repair. Photo courtesy of Dr. Chan.

Because of this revolutionary research, Dr. Chan was awarded the first National MS Society international Barancik Prize for Innovation in Multiple Sclerosis Research. The $100,000 annual prize is funded by the Charles and Margery Barancik SO Foundation. The Baranciks developed the prize to celebrate exceptionally innovative and original scientific research that has the potential to help treat or cure MS. “We believe in the power and influence that one creative and driven individual can have on the course of future events in creating a world free of MS,” says Charles Barancik.

Dr. Chan’s research focuses on repair and regeneration of myelin, which insulates the body’s nerve fibers. In MS, myelin is targeted and destroyed in the brain and spinal cord, which initially disrupts nerve signals. Many researchers believe nerve cells degenerate when the protective myelin coating is stripped away, leaving nerve fibers (axons) vulnerable. “We hope that anyone who has not undergone significant neurodegeneration could be treated, and that the treatment will help preserve those axons,” says Dr. Chan.

Expanding rings of knowledge

As a 2010–2014 recipient of the Society’s prestigious Harry Weaver Neuroscience Scholarship, Dr. Chan had already developed cutting-edge methods of myelin repair or regeneration using cells called oligodendrocytes, and now hoped to find therapeutics to assist these cells.

What if, Dr. Chan theorized, one or more of the thousands of drugs or compounds that have

been already approved by the Food and Drug Administration to treat a variety of diseases and conditions could also be used to repair myelin? To answer this question, Dr. Chan first had to develop a tool that could quickly and easily measure how effective a therapeutic compound is at myelin repair or regeneration—something notoriously difficult to measure in people.

Using the technology that creates computer microchips, Dr. Chan helped design and fabricate thousands of microscopically sized glass pillars, or micropillars. Oligodendrocytes form myelin around each micropillar, looking somewhat like the rings of a tree. Dr. Chan and his team at UCSF can then easily observe—sometimes within three or four days—whether a particular compound promotes myelin rings. In essence, a researcher can count the rings to see how effective the substance is at myelin generation.

So far, Dr. Chan and his team have tested about 1,000 of these drugs or compounds, with plans to test hundreds of thousands more. He and his team have already identified two clusters of promising compounds, and enrollment for clinical trials on one of them is expected to begin by the end of 2013. If those compounds or their derivatives ultimately prove to be effective for MS, they will move into a phase 3 trial. If all goes well, they could eventually become available for people with MS.

The Society's Chief Research Officer Timothy Coetzee, PhD, calls Dr. Chan's work "scientifically and technically compelling, and also inspiring for the impact it could have on the lives of people with MS."

Dr. Chan has been interested in MS research since he first began exploring molecular mechanisms of myelin repair as a Society Career Transition Fellow at Stanford University. He credits his fellowship mentor, Eric Shooter, PhD, a neurobiology professor at Stanford; and his chairman, Dr. Stephen Hauser, "for inspiring me to be inquisitive, helping me to develop perseverance and a work ethic, and reminding me to never forget that I have the privilege of contributing to humanity." Since then, Dr. Chan has paid it forward, mentoring new Society Fellows. Through this kind of collaboration, he says, the Society "prepares and paves the way for numerous future scientists trained and committed to MS research."

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