A decade of MS breakthroughs

Barancik Prize winners continue their work to find a cure for multiple sclerosis.

by Vicky Uhland

A decade ago, a pair of philanthropists whose family had been touched by multiple sclerosis decided to fund the largest prize available to MS researchers.

Prizes play a key role in advancing scientific breakthroughs. But the big ones tend to go to well-established scientists who don't need the acclaim and funding as much as up-and-coming researchers do. The late Charles and Margery Barancik wanted to change that.

The Baranciks' private family foundation, based in Sarasota, Florida, already funded a variety of initiatives Charles and Margery were personally interested in, including education, humanitarian causes, arts and culture, and the environment. For more than 20 years, the Baranciks had also been major supporters of MS research, but they wanted to do more. So, they decided to work with the National Multiple Sclerosis Society to create the Barancik Prize for Innovation in MS Research.

This $100,000 annual prize is designed to accelerate development of new treatments and, ultimately, a cure for MS. It's awarded to early- to mid-career MS researchers whose work has demonstrated outstanding innovation and originality.

Over the last 10 years, the Barancik Prize has recognized researchers working in cutting-edge MS fields like remyelination, genetics, precision medicine, immunity and comorbidities. Here's a look at four of the past winners, how the prize has affected them and the MS

breakthroughs they're working on today.

2013 winner: Jonah Chan, PhD
Rachleff professor of neurology at the University of California, San Francisco

One of the hallmarks of MS is that it targets and destroys myelin — the substance that insulates nerve fibers — in the brain and spinal cord. This is thought to lead to the loss of nerve fibers and nerve cells, which leads to long-term disability in people with MS. For years, researchers have focused on ways to protect the nerves by repairing or regenerating myelin — a process known as remyelination.

Shortly before he was awarded the inaugural Barancik Prize, Jonah Chan and his team at UCSF developed a tool that could test thousands of U.S. Food and Drug Administration-approved drugs or therapeutic compounds to see if they affect myelin growth. Four years after winning the prize, Chan coauthored a study showing that clemastine, an over-the-counter treatment for allergies, showed signs of repairing myelin in people with MS who had chronic optic neuropathy.

Jonah Chan, PhD, with his research team discussing the insulative properties of myelination. Photo by Pat Mazzera

"To our knowledge, this is the first randomized controlled trial to document efficacy of a remyelinating drug for the treatment of chronic demyelinating injury in multiple sclerosis. Our

findings suggest that myelin repair can be achieved even following prolonged damage," Chan and his fellow researchers wrote in a summary of the study, which was published in 2017 in Lancet.

It was an exciting discovery supported by the Barancik Prize.

"After receiving the award, Dr. Ari Green and I established the Innovation Program for Remyelination and Repair at UCSF, focusing our research efforts on the mechanisms of repair and validating the biology and pathology that are associated with remyelination. The Barancik Prize championed our approach, encouraged us to be more daring in our science and is a reminder that it is a privilege to contribute to something greater than ourselves," Chan says.

Chan's myelin testing tool has helped identify other common medications that have remyelination potential, and his team is currently studying some of those compounds. They're also trying to promote nerve-fiber survival and integrity after myelin loss. And they're investigating the role of myelin on cognition and behavior.

"In short, the goal is to try and halt progression in MS," Chan says.

https://momentummagazineonline.com/wp-content/uploads/2023/12/jonah_chan-momentum-540p.mp4

Chan says his greatest challenge currently is to show clinically that myelin can be repaired in people with MS. To accomplish this, he and his team are working on developing biomarkers that can definitively measure if remyelination has occurred in a person.

This teamwork is essential for past and future MS breakthroughs. "The Barancik Prize acknowledged all of the collaborative efforts of my colleagues and the brilliant students and postdocs who worked tirelessly in the laboratory," says Chan, who put his money where his mouth is: He shared some of his $100,000 Barancik Prize money with all the members of his laboratory.

2015 winners:
Laura Balcer, MD
Professor, Departments of Neurology, Ophthalmology and Population Health at New York University Grossman School of Medicine

Peter Calabresi, MD
Director, Division of Neuroimmunology, and professor of neurology at Johns Hopkins Medicine

Elliot Frohman, MD, PhD
President and CEO, The Frohman Foundation

Laura Balcer, MD

Poets say the eyes are the window to the soul. But for Laura Balcer, Peter Calabresi and Elliot Frohman, the eyes are also the window to MS.

This trio of researchers was awarded the third Barancik Prize for their work examining the relationship between eye structure and function and MS disease progression. They discovered how a simple, noninvasive procedure called optical coherence tomography, or OCT, can detect MS-related visual problems before symptoms appear, and can also be used to track worsening visual issues relating to MS progression.

OCT produces detailed images of the nerves in the back of a person's eye and gives clinicians a map of MS-related changes — even when the person's vision scores 20/20 on a standard eye chart. OCT images help clinicians get a better handle on "silent" disease activity and may eventually help explain mismatches between MRI findings and MS symptoms.

Balcer said she became intrigued with the role of eye structure and function in MS back in the mid-1990s, when she was a fellow in neuro-ophthalmology with Steven Galetta, MD. She was also studying for her master's degree in epidemiology.

"We went to the literature and found there weren't visual outcome measures for MS, even though vision is really a foundation in many MS patients," she says.

Balcer says there's evidence that the optic nerve is involved in nearly 50% of the first clinical exacerbations in people with MS — and yet, a paper recently published by a PhD student in her lab cited data showing that people who have a vision issue as their first presentation may be less likely to be treated as quickly.

At the time they won the Barancik Prize, Balcer and her fellow researchers were working on guidelines that would allow clinicians to diagnose optic neuritis and make OCT a part of clinical practice. In 2022, they published a paper in Lancet detailing diagnostic criteria for optic neuritis.

Now, "we're excited that OCT is part of clinical care in most [MS care] sites," Balcer says.

"One of our hopes is that OCT is a very sensitive way of showing that a patient has an optic-nerve lesion even in the absence of symptoms. We are working to build up evidence that the optic nerve should be a lesion site in the diagnostic criteria for MS."

Balcer's lab is currently developing more advanced imaging with OCT. She and her colleagues are also working on clinical trials applying OCT diagnostics to other neurological diseases, including Alzheimer's disease and related disorders.

"It's really gratifying to see that our work in MS can have applications for other conditions as well," she says.

2017 winner: Robin Franklin, FMedSci, FRS
Principal investigator, Altos Labs–Cambridge Institute of Science, Cambridge, England

Robin Franklin,
FMedSci, FRS

Like Jonah Chan, Robin Franklin's work focuses on remyelination.

Franklin's doctoral adviser at the University of Cambridge was a pioneer in research showing that oligodendrocytes — the cells that produce myelin in the brain — can not only regenerate, but can do so quite effectively. Franklin has continued his mentor's research, delving even deeper into the role of oligodendrocytes and the stem cells that produce them.

Franklin discovered that these stem cells are able to gather in areas of the brain where myelin is injured and transform themselves into new myelin. But he didn't stop there. He was the first scientist to show that this myelin regeneration can end as we grow older, setting the stage for MS disease progression.

Franklin's research into oligodendrocyte stem cells and how to make them function efficiently as people age is one of the reasons he won the Barancik Prize. And, in turn, the prize has encouraged him to conduct more research into identifying new treatments to reverse this aging process and develop effective myelin-regeneration therapies.

"One of the most gratifying things that has happened since I won the prize in 2017 is that our work has now formed the basis of an ongoing clinical trial being run by my colleague, Professor Alasdair Coles in Cambridge, using metformin and clemastine as a combination therapy to enhance remyelination in people affected with MS," Franklin says.

In 2022, Franklin left his job as a professor and director of the MS Society Cambridge Centre

for Myelin Repair and become a principal investigator at Altos Labs, an international biotech company dedicated to cellular-rejuvenation research and development. At Altos, Franklin says he has the opportunity to continue his Barancik Prize–winning work with other researchers and scientists in a cross-disciplinary and highly collaborative manner.

“It is difficult to express the impact that the award of the Barancik Prize had on my career and esteem as a scientist. It was the first major international prize I was awarded, and I was the first and, so far, only non-North American winner,” he says. “Winning the prize certainly gave the research in my lab an enormous boost, strengthening my resolve to pursue fundamental research that would have translational pull into the lives of people affected with MS.”

2018 winner: Katerina Akassoglou, PhD
Professor of neurology at the University of California, San Francisco, and senior investigator at the Gladstone Institutes in San Francisco

Katerina
Akassoglou, PhD

In 1994, when she was still a student, Katerina Akassoglou made a groundbreaking discovery for people with MS. She and her fellow researchers found a potential link between immune cells that reside in the brain and the mobility symptoms associated with MS.

While scientists had previously analyzed immune cells in the body, the brain was a new frontier. Akassoglou decided to dedicate her career to studying this further. Over the last three decades, her research has led the scientific community to reassess the relationship between the brain and the immune and vascular systems. After winning the Barancik Prize, Akassoglou launched the Gladstone-UCSF Center for Neurovascular Brain Immunology to continue this work.

“It’s based on the research that the Barancik Prize recognized — that we need this multidisciplinary lens of neuroscience, immunology, vascular biology and hematology to be able to understand nervous system functions and develop new treatments,” she says.

One of Akassoglou’s key discoveries is an antibody that targets a toxic function of a blood-clotting protein called fibrin. Tests show this antibody has a huge effect on the course of MS-

like disease in mice, including protecting their brains from harmful inflammation and neuron loss and significantly decreasing the severity of their MS symptoms.

A year after winning the Barancik Prize, Akassoglou cofounded a biotech company called MedaRed to see if this antibody has the same effect in humans — and if so, whether it's possible to develop a medication using the antibody. Currently, Akassoglou and her team are making plans to conduct a phase 1 clinical trial on the antibody in people.

"It's truly a privilege to be able to see a process from the very beginning, from the conception of an idea all the way to making the invention of a tool that might actually have an impact for patients with multiple sclerosis," Akassoglou says. "I really hope the next steps are towards the right direction for the potential of this therapy."

Akassoglou adds that Society funding, including her Barancik Prize winnings, have helped make this research a reality.

"The Barancik Prize supports out-of-the-box thinking, and I think it's encouraging other researchers to sometimes pursue research avenues that might not be the current trend at the moment in the scientific community. This can sometimes lead to paradigm-shifting discoveries," she says.

Previous Barancik winners

Ten Barancik Prizes for Innovation in MS Research have been awarded since the first in 2013. Along with those featured, the other winners include:

Philip De Jager,
MD, PhD

2014: Philip De Jager, MD, PhD
De Jager created a genetic map of multiple sclerosis susceptibility and is developing potential genetically based, personalized approaches to predict, treat and prevent MS.

"Dr. De Jager has leveraged his deep understanding of the clinical context of MS with his background in molecular genetics and immunology in order to design new ways of approaching and answering challenging MS questions," says Tim Coetzee, PhD, chief

advocacy, services and science officer at the National Multiple Sclerosis Society.

Daniel Reich, MD, PhD

2016: Daniel Reich, MD, PhD
Reich discovered an imaging approach that detects inflammation of the tissue layer that surrounds the brain and assesses the level of damage or potential for recovery.

“Dr. Reich’s novel approaches to imaging disease activity in people with MS are creating new pathways to better treatments,” Coetzee says.

Francisco Quintana, PhD

2019: Francisco Quintana, PhD
Quintana developed a research platform to identify gene-environment interactions that control the central nervous system inflammation that drives the damage that occurs in MS.

“Professor Quintana collaborates on a global scale to apply creative approaches to very complex questions about what triggers brain inflammation in MS and to find ways to stop it,” says Bruce Bebo, PhD, executive vice president of research at the Society.

Dwight

**Bergles,
PhD**

2020: Dwight Bergles, PhD
Bergles pioneered the study of immature cells in the brain, known as oligodendrocyte precursor cells, to promote myelin repair and restore function in people with MS.

“Dr. Bergles and his team have developed advanced research tools that have made it possible to answer critical research questions that advance strategies to improve quality of life in people with MS,” Bebo says.

**Amit Bar-
Or, MD**

2021: Amit Bar-Or, MD
Bar-Or uncovered how the immune system drives MS and focuses on the potential of precision medicine to achieve permanent remission of MS and prevent its onset.

“Dr. Bar-Or is a true thought leader who is applying very sophisticated approaches to translate complex findings and changing the way we think of MS,” Bebo says.

**Ruth Ann
Marrie, MD,
PhD**

2022: Ruth Ann Marrie, MD, PhD
Marrie examines how comorbidities, adverse childhood experiences, social circumstances, health behaviors and other life factors affect the onset and evolution of MS.

“Dr. Marrie brings her perspective as a neurologist to ask research questions that are very relevant to improving people’s quality of life and providing answers that will increase our

ability to stop and even prevent MS in the future," Bebo says.

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