

Media Release

Long-time Collaborators Botond Roska and José-Alain Sahel Win International Prize for Translational Neuroscience

Basel, Switzerland, June 22, 2023 --In recognition of their pioneering work on restoring vision to blind patients using optogenetic therapy, Botond Roska and José-Alain Sahel were today awarded the International Prize for Translational Neuroscience by the Gertrud Reemtsma Foundation, managed by the Max Planck Society. The €60,000 annual prize rewards biomedical scientists and clinicians who make exceptional contributions toward the understanding of neurobiology and neurological diseases. The prize was awarded on June 22, 2023, in Hamburg, Germany.

"It is with great appreciation that we receive this positive recognition from the neuroscience community," said Roska, Director of the Institute of Molecular and Clinical Ophthalmology Basel (IOB). "For us, to be listed among the prior award recipients --all of them are major names in the field-- is a great honor."

Optogenetics is a way of creating light-sensitive cells using genes derived from algae. Roska, who has been Professor at the Faculty of Medicine since 2010 and Professor at the Faculty of Natural Sciences of the University of Basel since 2019, was one of the first to apply this technique to restore vision in animal models.

After his investigations suggested promising opportunities for treating degenerative retinal diseases, Roska teamed with Sahel, who is currently chair and Distinguished Professor of the Department of Ophthalmology at the University of Pittsburgh School of Medicine and director of the UPMC Vision Institute and also the chair of the Scientific Advisory Board of IOB. In an unprecedented feat, they used optogenetic methods to partially restore vision in patients blinded by retinitis pigmentosa (RP). This is the first demonstration of optogenetics in humans and a milestone in the treatment of blinding conditions that affect millions of people worldwide.

The two scientists met in 2001 while Roska was studying for a Ph.D. in cell and molecular biology in Berkeley, US. He had come to Strasbourg, France, to spend a month at Louis Pasteur University, where Sahel was then a laboratory director. Late one night, Roska succeeded in recording the activity of some retinal cells, and his boisterous reaction prompted Sahel --who was upstairs and still working-- to investigate the commotion. "Suddenly, Dr. Sahel was there at the door, asking 'What is going on here?'" Roska says. "So, I showed him my recordings, and we spent hours discussing the research."

Thus, began a long and complementary collaboration. A basic scientist (who also has an MD), Roska directs lab studies with optogenetic therapies, while Sahel --an accomplished clinician and an expert in basic and translational research-- spearheads development and access to patients for clinical trials. By equipping diseased photoreceptors in the eye with light-sensing proteins, the pair hopes to reactivate the cells and restore their functionality.



“When we started, people thought we were crazy to put algae proteins into the eyes of blind patients,” Roska says. But to Roska, retinal diseases were low-hanging fruit for optogenetics. The methods provide a mutation-independent approach for restoring visual function, and unlike the rest of the brain --which is covered by bone-- the eyes provide easy access to an optical system. Moreover, if the gene therapy treatments don't work, “the patients are already blind, so you haven't harmed them further,” Roska says.

In their preliminary research, Roska and Sahel successfully resensitized photoreceptor circuits in blind lab mice, which soon exhibited behavioral changes in light versus dark environments. Then in 2021, the two scientists and their co-authors from the Paris Vision Institute, founded by Sahel, reported stunning results from an early-stage clinical trial with blind RP patients. Though the trial was interrupted by the COVID pandemic, one patient did complete the full study protocol. Within months, he could detect and move various objects placed on a table in front of him. The resulting paper in Nature Medicine has been downloaded more than 150,000 times. “This was the first proof-of-concept for optogenetics in any human disease,” says Roska, adding that newly-emerging data from the trial show some treated patients are achieving even better responses.

“After many years of working together, winning this award comes as a happy surprise,” Sahel says. “Dr. Roska and I share a common enthusiasm and keen interest in science, and our collaboration continually produces new ideas. Optogenetics has a huge future in ophthalmology, and our long-term goal is to make it even better for patients.”

About IOB

At the Institute of Molecular and Clinical Ophthalmology Basel (IOB), basic researchers and clinicians work hand in hand to advance the understanding of vision and its diseases, and to develop new therapies for vision loss. IOB started its operations in 2018. The institute is constituted as a foundation, granting academic freedom to its scientists. Founding partners are the University Hospital Basel, the University of Basel and Novartis. The Canton of Basel-Stadt has granted the institute substantial financial support.

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