Protein with potential

The work of Dr. Philippe Monnier is helping patients with degenerative eye disease retain vision. It may lead to breakthroughs in neurological conditions too

By Chris Atchison

When Dr. Philippe Monnier set out to find effective treatments for debilitating vision disorders, he had no idea that his research might also lead to breakthroughs in the treatment of a wide range of neurological conditions, from multiple sclerosis to stroke.

It was a welcome – if unexpected – discovery.

Dr. Monnier, a senior scientist at the Donald K. Johnson Eye Institute, has been conducting research into how a protein called neogenin influences the progression of inherited retinal degenerations, or IRDs. This family of vision diseases affects about one in 2,000 Canadians and includes age-related macular degeneration, retinitis pigmentosa and glaucoma.

IRDs are caused by gene mutations that result in the death of photoreceptor cells in the eye, typically leading to vision loss. There are currently no cures for IRDs, and all treatments to date have been focused on slowing their progression.

Dr. Monnier and his team discovered that the protein neogenin can have a big influence on whether photoreceptors live or die. Neogenin levels were found to be higher in the eye tissue of patients with retinal degeneration. Limiting neogenin production using genetic tools in lab models was found to promote photoreceptor survival and, in turn, limit vision loss.

"What we found is that neogenin is a major trigger of cell death in photoreceptors," Dr. Monnier explains. "If we can turn off that switch, we can promote survival in photoreceptors."

Dr. Monnier and his colleagues have since developed a therapy that does exactly that. So far, it's been used in multiple models for retinitis pigmentosa, delivering impressive results.

But the application of the team's cutting-edge neogenin research doesn't end there. Dr. Monnier believes that neogenin also has an impact on other cells types, including neuronal cells. Neuronal cells die in conditions such as multiple sclerosis, spinal cord injuries and stroke.

"When you have a stroke, for example, many neuronal cells die within the brain. That has a negative effect on long-term survival and recovery," Dr. Monnier says. If researchers can find a way to use neogenin to prevent neuronal cell death, "we may be able to restore brain function and quality of life," he adds.

The next step is to develop a drug that can treat eye diseases and potentially a wider range of brain disorders.

"Our long-term goal is to apply these new insights into different areas of human health," Dr. Monnier says. "You start work on the eye, but then you realize that because the eye is made of neurons, you can apply this discovery to other parts of the brain." V

Dr. Philippe Monnier's work with the protein neogenin has already delivered results in treating retinitis pigmentosa