

GROWING NEW NEURONS TO HEAL INJURED BRAINS

BY PEIGI MCGILVARY

Brain is fascinating things. Weighing in at just three pounds, these squidgy, wrinkly masses contain everything we will ever think, learn, imagine, believe or remember—while controlling each heartbeat, breath, and fluttering eyelash. To do this, they need the billions of neurons (brain cells) that developed before we were born.

Tradition has it that when a neuron dies, it cannot be replaced; the brain cells we're born with are the only ones we'll ever have. Recently, however, research has turned that theory on its head.

“We know now that an injury to the brain—from a stroke, for example, triggers the creation of new cells, which migrate to the site of the injury,” says Leigh Anne Swayne, neuroscientist and assistant professor in UVic’s Division of Medical Sciences. “These are unique unspecialized cells, called neural stem cells, that can develop in different ways, including becoming full-grown neurons.”

Swayne works to understand how these new brain cells function and how we might be able to harness them to repair brain injuries. “I’m looking at proteins called ion channels that are

on the surface of neural stem cells and provide pathways in and out of the cell,” says Swayne, “I am trying to find out how they help control the way cells grow, migrate and specialize.”

UVic’s Division of Medical Sciences has made a commitment to neuroscientific research like Swayne’s. “The population on Vancouver Island is aging and the incidence of stroke and brain-damaging diseases like Alzheimer’s and Parkinson’s is increasing,” says Swayne. “Our results will increase understanding about what happens after a stroke, and how dementias and cancers work on a molecular level, so we can limit damage. Right now there is a real urgency for discovery, and we’re very excited about the possibility of improving people’s lives.”

With her background in biochemistry, neuroanatomy and cellular physiology, Swayne emphasizes that basic molecular science is essential in understanding the mechanics of brain function. “Only when we have a solid body of knowledge about how brain cells work—almost atom-by-atom—will we be able to manipulate them safely and find ways to repair damage without creating unwanted side-effects.

Swayne’s work is supported by the Natural Sciences and Engineering Research Council, the University of Victoria, The Victoria Foundation,

local bioscience company StressMarq, and the Heart and Stroke Foundation Centre for Stroke Recovery, among others. “The diversity of our partners shows that people really ‘get’ how important it is to understand exactly how the brain works,” she says. “Their support is crucial.”

Swayne’s enthusiasm about her work is contagious, and she involves her students directly in neuroscientific research. Graduate students conduct independent research projects, and present their results at national scientific conferences. Undergrads are involved with Swayne in one-on-one directed studies and co-op placements. “With neuroscience research, there are so many ways for students to become involved and make an important contribution in a relatively new field,” she says. “I’m lucky to work with so many exceptional students. Their curiosity and excitement are inspiring, and their participation on our research team is absolutely critical.”

In many ways, the brain is the final frontier of knowledge about how the human body works, and neuroscientists like Swayne are uncovering its secrets and pointing the way to new treatments, better recovery for those with brain injuries, and amazing new avenues of research for the future.

Swayne. PHOTO: NIK WEST

GREAT MOMENTS IN RESEARCH

ISLAND MEDICAL PROGRAM: UVIC WELCOMES ITS FIRST MEDICAL STUDENTS

In January 2005, UVic welcomed its first cohort of medical students, thanks to the Island Medical Program (IMP), part of a unique provincial program designed to increase the number of new physicians in BC and provide access to medical education across the province. The distributed learning element of this innovative program—supported by state-of-the-art lecture theatres, laboratories, and problem-based learning rooms at UVic’s Medical Sciences Building—ensures that tomorrow’s doctors are taught by the best medical educators across the province, whether they’re in Victoria, Vancouver, Kelowna or Prince George. By the end of UVic’s 50th anniversary, over 160 new doctors will have graduated from IMP. Through this unique collaboration with the province and UBC, UVic and IMP are fulfilling a vision—to educate a new generation of young physicians, address physician shortages and improve healthcare on Vancouver Island.

Info: imp.uvic.ca



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