Unearthing how brains make new cells

Neuroscientists talk about discovering the organ's regenerative advantages and the experiences involved

BY JAMES TALAN

When Fred "Randy" Gage began his career in neuroscience more than four decades ago, the prevailing thinking was that adult brains were simply static: They couldn't reproduce and that their neurons were forever. What you were given in the womb, they were gone forever. But Gage, who studies on how adult brain cells in the 1960s discovered how neurons were formed, has refined that finding over decades—such as: running—and stressed, complex and variable environments can give rise to new populations of cells that serve the brain with the brain's neurons, a severe severance meeting of the minds, or even the brain.

Now 50 and president of the Falk Brain Institute in Los Angeles, Gage is still trying to figure out how adult brains grow and make neurons. For him, like a psychologist working on the conditions that can trigger the birth of new neurons, it's an ongoing challenge.

"It's not just a matter of isolation or brain aging, and plant biology, and climate changes," he says. "It's about how we achieve our goals and how we find new ways to make things better for ourselves and our communities."

The Washington Post spoke with Gage on a video conference call recently to talk about how adult brains grow and what he calls "neurogenesis," the process of creating new nerve cells and neurons

Dr. Gage, when did you first become interested in neurogenesis? I've had an interest in neurogenesis for as long as I can remember. I was interested in how brain circuits are formed and how they can change over time. I've been working in the laboratory of Robert Langston, a neurobiologist at the University of California, San Diego, for more than 10 years. My research focuses on understanding how adult brain cells grow and develop new connections.

How did you start testing your ideas? I moved to the University of California, San Diego, in 1987. I was interested in understanding how adult brain circuits develop and how they can be manipulated to improve brain function in people with neurological disorders. I had already made the observation that adult brain cells can grow and develop new connections, and I wanted to see if I could translate those findings to the clinic.

How do you measure the formation of new neurons? I use various techniques to measure the formation of new neurons. I use stains and markers to label specific cell types, and I use imaging techniques to look at changes in brain structure and function over time.

What are the implications of these findings for brain health and disease? The findings have important implications for understanding brain health and disease, and they have potential applications for the treatment of neurological disorders. For example, they suggest that new neurons may be able to help repair damaged brain circuits, and they suggest that new connections may help to improve brain function in people with neurological disorders.

What are some of the challenges you face in your research? One of the biggest challenges I face is that the brain is a complex and dynamic organ, and it is difficult to study. It is also difficult to translate findings from the lab to the clinic, and it is difficult to interpret the results of experiments in a meaningful way.

What is the future of neurogenesis research? The future of neurogenesis research is promising. With advances in technology and new insights into the brain, we can expect to make significant progress in understanding how the brain grows and how it changes over time. We can also expect to see new treatments and therapies for neurological disorders based on our understanding of neurogenesis.