Parkinson’s disease is a progressive brain disorder affecting more than 130,000 Canadians, including approximately 4,000 Saskatchewanians. Common symptoms include tremor, slowness and stiffness. Essential tremor, also known as “Diefenbaker disease,” is sometimes mistaken for Parkinson’s disease but is 10 times more common. There is no cure for either disease.

Dr. Ali Rajput, U of S Professor Emeritus of neurology, has been studying the cause, development, nature, process, treatment and course of both Parkinson’s disease and essential tremor.

“We can get valuable information from patients,” he says, “but we can only make a definite diagnosis after autopsy when we link the patient’s symptoms with findings in the brain. We cannot detect very small brain lesions with X-rays or gather direct biochemical information from live brains.”
Brains at Work: Improving Quality of Life for Parkinson’s Patients

THE INNOVATION

Since joining U of S in 1967, Rajput has had a distinguished career and has earned many honours. His work began with the establishment of the landmark Saskatoon Movement Disorders Clinic in 1968—the longest continuously run movement disorders clinic in Canada.

“By monitoring patients’ symptoms and mental functions and making video recordings, we have built a repository of information on how these diseases progress,” he says. “After autopsy, we study half their brain for histology and freeze the other half for neurochemistry, molecular genetics, and other valuable studies.”

In 2000, his son, Dr. Alex Rajput, joined U of S. He is now professor of neurology and director of both the Saskatoon Movement Disorders Program and the Frozen Brain Laboratory. Both men are on 24/7 unpaid call so that whenever a patient dies, they arrange and pay to transport the body to Saskatoon for autopsy. When a freezer alarm sounds, they have to show up.

So far, the clinic has performed more than 490 autopsies (a service provided only to the Rajputs’ patients), resulting in almost 400 frozen brain samples. The clinic has collaborations with 17 other institutions.

THE IMPACT

The Rajputs have answered some very important questions:

- They were the first to report that three motor sub-types of Parkinson’s disease have distinct patterns of biochemical changes in the brain.
- They confirmed that levodopa is the most effective drug for Parkinson’s disease.
- They dispelled concerns that levodopa contributes to brain cell death, reduces life expectancy or eventually becomes ineffective.
- They identified the best time to start levodopa to prolong survival.
- They found that a low dose is effective and has fewer side effects.
- In 2012, they were part of an international team that identified, with the help of Saskatchewan Mennonite families, an abnormal gene that leads to Parkinson’s disease. This discovery paves the way for further research into the nature of brain abnormalities that the gene defect produces and could also help in finding ways to enable early detection.

Their findings over the years have changed the practice and research on Parkinson’s disease and essential tremor worldwide.

THE FUTURE

This program is part of Ali’s substantial legacy—one that son Alex will continue to pursue. The program is functioning very well, some base funding is stable, and Alex has collaborations with nine major universities around the world.

“There is a lag between the time the disease starts in the brain and the symptoms appear,” says Ali. “Ultimately, I hope we can diagnose Parkinson’s within that window and stall the progression. Right now, that is more practical than finding a cure.”