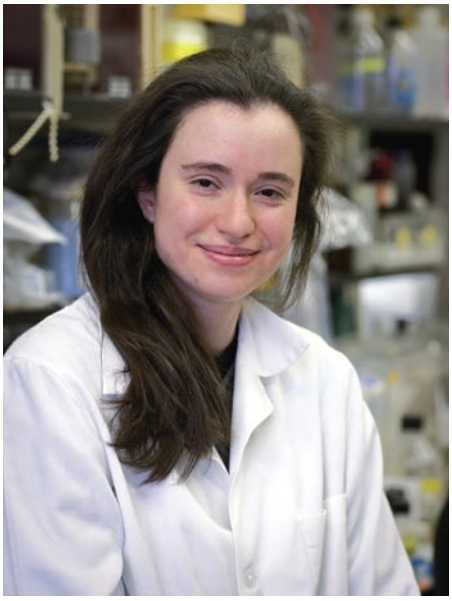
Breakthrough in Alzheimer's and Parkinson's Research



Dr. Myriam Heiman

In the November 14, 2008, issue of the journal *Cell*, researchers at The Michael Stern Parkinson's Research Center at The Rockefeller University report a breakthrough in cellular analysis that solves a problem that has perplexed neurological research for decades.

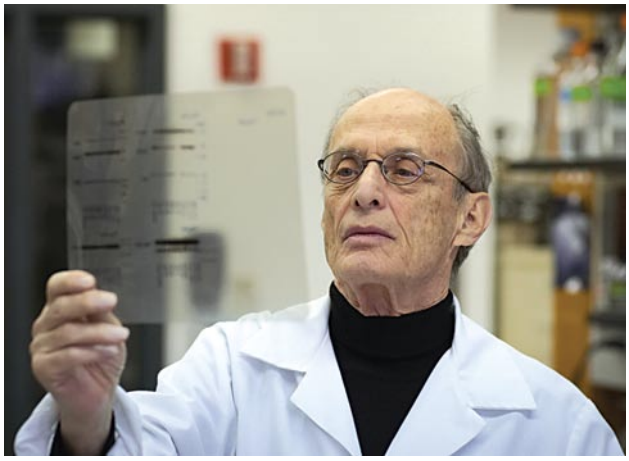
Lead author Myriam Heiman and her colleagues have developed a method to reveal the kinds and amounts of proteins different cells produce, what biologists call the cell's translational profile. The technique involves isolating the genetic messages that govern protein production in different cell types. The new method, "translating ribosome affinity purification" (TRAP), can identify all the genetic messages that give a cell type its unique identity, including perhaps its susceptibility to disease.

Like skilled assassins, many diseases seem to know exactly what types of cells to attack. While destroying one type of cell, a disease will inexplicably spare a seemingly identical group of neighbors. What makes cells vulnerable or not may depend largely on these translational profiles. For this reason, scientists have struggled to analyze the subtle molecular differences among the hundreds of specialized cell types that are tangled together in tissues like the brain.

The new TRAP procedure solves a problem that has been a fundamental barrier to a deeper understanding of the brain and how neurological diseases attack it. The true breakthrough lies in its ability to distinguish the profile of any cell type in any tissue in the body. Its usefulness is not just limited to brain cells, meaning it has far-reaching research applications—cancer, heart disease, diabetes, as well as many others. Dr. Paul Greengard, the director of the Michael Stern Center where Myriam Heiman is a Research Associate, says about half of the research in his lab now employs the new technique to study the biochemical bases of Alzheimer's, Parkinson's and other diseases. It is also being applied to the still-mysterious ways in which psychoactive drugs fight schizophrenia and depression.

The TRAP tool advances the speed at which researchers can yield results and should fundamentally change biochemical studies of the brain. "We can look at a thousand genes instead of one at a time, so things should clear a thousand times faster," says Dr. Greengard, who won the Nobel Prize in Physiology or Medicine in 2000 for research into how neurons communicate.

This new technique will help accelerate scientific research into discovering the subtle molecular differences amongst the hundreds of specialized cell types. A deeper understanding of body cell mechanisms will help researchers investigate the causes of Alzheimer's and Parkinson's diseases. ■



Dr. Greengard, pictured above, is also the director of the Fisher Center for Alzheimer's Disease Research at The Rockefeller University. A complete PDF of the TRAP finding from *Cell* can be found on www.parkinsoninfo.org.