UT News
Office of Medical Information
The University of Texas Health Science Center at Dallas
5323 Harry Hines Boulevard Dallas, Texas 75235
214/688-3404

December 12, 1986

CONTACT: Susan Rutherford
OFFICE: 214/688-3404
HOME: 214/349-7820

***Research supports theory that Parkinson's disease is caused by environmental toxins.

DALLAS -- There is new evidence to support the theory that environmental toxins cause the most common form of Parkinson's disease, says neurobiologist Dr. Dwight German at The University of Texas Health Science Center at Dallas.

Scientists have observed over the past few years that certain pesticides, as well as an improperly synthesized opiate drug, can cause brain damage and clinical symptoms that closely match Parkinson's disease. They now know that a toxic compound called MPTP, present in an incorrectly made heroin-like drug and closely related in chemical structure to the pesticide paraquat, is readily taken up by specific neurons in the brain.

German is collaborating with scientists at the University of Washington School of Medicine in Seattle on using MPTP damage as a model for parkinsonism. MPTP destroys only a small, crucial brain area, says German. Specifically, MPTP attacks a subpopulation of brain cells that releases the chemical dopamine. Dopamine-containing cells control the motor and mood changes associated with parkinsonism: tremor, a shuffling gait, muscle rigidity and depression.

German is looking at the pattern of dopamine cell loss produced by both MPTP and Parkinson's disease. And based on this pattern, he has derived a hypothesis for Parkinson's destructive process. Using computer mappings of dopamine cells, German has been able to tell specifically which dopamine neurons die after MPTP exposure and which die due to Parkinson's disease. He has determined that the same population of cells is lost in MPTP exposure as is lost in Parkinsonism.

While it has been generally accepted that the primary target of Parkinson's disease is an area of the brain called the substantia nigra, German's mapping data suggest that the MPTP toxin, and perhaps also the factors causing Parkinson's disease, begins its destruction in the basal ganglia at the brain's central core. This target site is where the tendril-like axons of many dopamine cells from the substantia nigra and nearby regions converge and release dopamine, as well as take up the substance to reuse it. It is the basal ganglia, he says, where the first damage may be done. Then gradually the toxin works its way back to the cell body, where the neuron is destroyed.

Recent U.S. and Scandinavian experiments with dopamine cell transplants for the treatment of Parkinson's disease have used the basal ganglia as the site for implantation of new dopamine cells. Although such experiments have been successful in reversing the parkinsonian symptoms in laboratory animals, these procedures have not been as successful in treating parkinsonism in humans.

German theorizes that the basal ganglia region may not be an ideal environment for the newly implanted cells. The destructive process responsible for Parkinson's disease may cause the basal ganglia to lack certain growth factors necessary to help the transplanted cells survive. Furthermore, this abnormal environment may have contributed to the dopamine cells' death, causing the disease in the first place.

German's studies are being funded by the National Institutes of Health, the American Parkinson's Disease Association and the Dallas Area Parkinsonism Society.

###

Distribution: AA,AB,AC,AF,AF1,AG,AG1,AH,AI,AK,AK1,AM,SC

NOTE: The University of Texas Health Science Center at Dallas comprises Southwestern Medical School, Southwestern Graduate School of Biomedical Sciences and the School of Allied Health Sciences.