

# Pesticides Linked to Parkinson's Disease

## Study Reveals Home Pesticide Use Leads to 70% Higher Disease Rate

By John Kepner

The U.S. government spends millions of dollars each year trying to find a cure for common diseases — from asthma and hyperactivity to cancer and neurological disorders. Researchers work long hours trying to develop that lucrative vaccine that will solve our medical problems. But what if reasonable changes in our use of toxic chemicals could actually prevent these life-threatening diseases? Many scientific studies link pesticides to asthma, cancer and other environmental illnesses, but we still lack the tough laws to prevent exposure to toxic chemicals, especially pesticides. After years of notably high rates in farming communities<sup>1</sup>, recent studies have shown Parkinson's disease to be clearly linked to home-use pesticides.

### Parkinson's Disease

Parkinson's disease is a neurological disorder characterized by progressively degenerative symptoms including tremors, muscle rigidity, slowness and imbalance. A loss of cells in the *substantia nigra*, a region of the brain that produces the chemical dopamine, which is essential to signal muscle cells properly, causes the symptoms of Parkinson's disease. According to medical science, the cause of Parkinson's disease is still uncertain, but recent studies suggest that it is caused by factors in the environment, rather than genetics<sup>2</sup>. Other researchers believe that there is a genetic predisposition that is triggered by certain toxics in the environment. These scientists caution that because it is impossible to know your genetic disposition, all people should avoid contact with environmental toxics. Pesticides, industrial chemicals and heavy metals are the primary suspects linked to Parkinson's disease. While the disease is usually seen in people over 60, recently there has been a rise in cases for people under 40<sup>3</sup>. Today an estimated one million Americans are living with the disease. Treatments are available for the symptoms, but there is currently no cure for Parkinson's disease.

### Early Findings

The suspicion that pesticides might be linked to Parkinson's disease was theorized in the 1980's following a wave of drug-induced Parkinson's-like illnesses. The drug, MPTP, which was used as a heroin substitute, is transformed in the brain after injection. The new compound, MPP+, causes the loss of dopamine producing cells and the sudden onset of a Parkinson's-like illness<sup>4</sup>. It was later discovered that MPP+ was not only the breakdown product of an obscure drug, but also the active ingredient of the herbicide cyperquat, and closely related to other pesticides.

This discovery sparked interest in studying the link between pesticides and Parkinson's disease. The early studies revealed a positive correlation between rural life, farming or orchard work and the incidence of the disease. A 1988 study published in *Neurology*, discovered that many people living in rural areas, with no diagnosed neurological disorders, had lower levels of dopamine producing cells than urban populations<sup>5</sup>. This suggested that even in the absence of the illness, some aspect of rural life was putting them at risk for Parkinson's disease. Another important study came in 1990, when Dr. William Koller at the University of Kansas interviewed 300 subjects, half of whom suffered from Parkinson's disease. He discovered that Parkinsonians were twice as likely as their healthy counterparts to have grown up in farming communities, where pesticides often contaminate ground water. Dr. Koller's study showed that people with the disease were also more likely to draw their drinking water from wells<sup>1</sup>. In 1996, a German study linked Parkinson's disease specifically to pesticides, particularly organochlorines, alkylated phosphates and wood preservatives, and found no link to other rural factors.

### Recent Findings: From Farm to Home

Through the end of the 1990's, most studies linking pesticide use to Parkinson's disease were conducted in farming communities, and the decade came to an end with no substantial link to non-agricultural pesticides. However, in May 2000, Dr. Lorene Nelson, a neuroepidemiologist at Stanford University, released the results of the first study to show a correlation between pesticides and Parkinson's disease, outside of agriculture<sup>6</sup>. Her study, which was also the largest ever of its kind, showed a significant link between Parkinson's disease and home pesticide use. The study questioned about 1000 subjects, half of whom were recently diagnosed with Parkinson's disease. The participants answered detailed questions about the type of pesticides used, frequency of use, and when they were first exposed to home and garden pesticides.

Dr. Nelson's study revealed that people exposed to in-home insecticides are 70 percent more likely to develop Parkinson's disease. Exposure to garden insecticides carries a 50 percent increase of developing the disease. Among herbicide users, the risk of developing Parkinson's increases as the number of days in contact with herbicides accumulates. Respondents who reported handling or applying herbicides for up to 30 days were 40 percent more likely to develop the Parkinson's, whereas respondents that reported 160 days exposure, had a 70 percent increase. Dr. Nelson's full report is expected to be published in early 2001.

<sup>1</sup> Koller, W. et al. 1990. Environmental Risk Factors in Parkinson's Disease. *Neurology* 40:1218-1221.

<sup>2</sup> Tanner, C. et al. 1999. Parkinson Disease In Twins: An Etiological Study. *Journal of the American Medical Association*. 281:341-378.

<sup>3</sup> National Institute of Neurological Disorders and Stroke. *Parkinson's Disease: Hope Through Research*. National Institutes of Health. [www.ninds.nih.gov/health\\_and\\_medical/pubs/parkinson\\_disease\\_htr.htm](http://www.ninds.nih.gov/health_and_medical/pubs/parkinson_disease_htr.htm).

<sup>4</sup> Langston, W.J. and P. Ballard. 1983. Chronic Parkinsonism in Humans Due to a Product of Meperidine-Analog Synthesis. *Science*. 219:979-980.

<sup>5</sup> Thiessen, B. et al. 1998. Substantia Nigra Neuronal Counts in Normal Rural and Urban Population. *Neurology*. 38:348.

<sup>6</sup> Stephenson, J. 2000. Exposure to Home Pesticides Linked to Parkinson Disease. *JAMA Medical News and Perspectives*. 238:3.