

International Business Times

Head Injuries And Pesticides: A Recipe For Parkinson's Risk

BY Roxanne Palmer | November 12 2012 6:45 PM

Exposure to pesticides and head injuries are each unpleasant enough on their own, but if you experience both, you are three times more likely to develop Parkinson's disease, according to a new study.



(Photo: Reuters)

Michael J. Fox and wife Tracy Pollan arrive at the Michael J. Fox Foundation for Parkinson's Research benefit in New York, December 1, 2007. Parkinson's Disease is a common neurodegenerative disease, affecting more than 2 percent of people over the age of 75 years.

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Michael J. Fox and wife Tracy Pollan arrive at the Michael J. Fox Foundation for Parkinson's Research benefit in New York, December 1, 2007. Parkinson's Disease is a common neurodegenerative disease, affecting more than 2 percent of people over the age of 75 years.



Parkinson's disease begins manifesting as the nerve cells that make the chemical dopamine waste away. Lack of dopamine interferes with the nerves' ability to send messages to each other, which causes patients to lose muscle function, developing into a broad range of effects including spasms, difficulty moving, walking and swallowing and poor balance.

Many Americans know about Parkinson's thanks to the activism of "Back to the Future" and "Spin City" star Michael J. Fox. Fox was diagnosed in 1991 and went public with his condition in 1999, and established a foundation to raise money for Parkinson's research. He has also testified before Congress and appeared in campaign ads as an advocate for stem cell research.

Scientists are still unsure why the dopamine-producing cells in a Parkinson's patients' brain shut down, but environmental factors like exposure to heavy metals, pesticides and other toxic chemicals are thought to play a role in kicking off the neurodegenerative disorder.

In a study forthcoming in the journal *Neurology*, UCLA public health researcher Beate Ritz examined 357 people with Parkinson's disease and 754 people without Parkinson's, all hailing from the same agricultural region in central California, where pesticide use in the fields is heavy.

Forty-two Parkinson's patients, or 12 percent of that group, reported receiving a head injury that knocked them unconscious for five or more minutes, as compared to 50 people in the non-Parkinson's group, or 7 percent. The Parkinson's patients were nearly twice as likely to have had such injuries.

Meanwhile, Parkinson's patients were 36 percent more likely to be exposed to the weed killer paraquat, an herbicide that can be toxic to both humans and animals. Nearly half of the study subjects with Parkinson's had been exposed to paraquat, as opposed to 39 percent of the non-Parkinson's subjects.

"While each of these two factors is associated with an increased risk of Parkinson's on their own, the combination is associated with greater risk than just adding the two factors together," Ritz said in a statement on Monday.

Ritz says her work suggests that a head injury may trigger a physiological process that increases brain cells' vulnerability to attacks from toxic pesticides, or vice versa. Constant low-dose exposure to pesticides could place a person at greater risk for Parkinson's to strike after a head injury.

Science News

... from universities, journals, and other research organizations

Head Injury and Pesticide Exposure Leads to Triple the Risk of Parkinson's Disease

ScienceDaily (Nov. 12, 2012) — A new study shows that people who have had a head injury and have lived or worked near areas where the pesticide paraquat was used may be three times more likely to develop Parkinson's disease. The study is published in the November 13, 2012, print issue of *Neurology*®, the medical journal of the American Academy of Neurology. Paraquat is a herbicide commonly used on crops to control weeds. It can be deadly to humans and animals.

"While each of these two factors is associated with an increased risk of Parkinson's on their own, the combination is associated with greater risk than just adding the two factors together," said study author Beate Ritz, MD, PhD, of UCLA's Fielding School of Public Health. "This study suggests that the physiological process that is triggered by a head injury may increase brain cells' vulnerability to attacks from pesticides that can be toxic to the brain or the other way around, for example, chronic low dose exposure to pesticides may increase the risk of Parkinson's after a head injury."

The study involved 357 people with Parkinson's disease and 754 people without the disease, all of whom lived in an agricultural area in central California. The participants reported any head injuries they had ever received with a loss of consciousness for more than five minutes.

The researchers determined participants' exposure to the weed killer based on a 500-meter area around their home and work addresses, using a geographic information system (GIS) that combined data on paraquat use collected by the state of California's Pesticide Use Reporting system with land use maps.

People with Parkinson's disease were twice as likely to have had a head injury with loss of consciousness for more than five minutes as people who did not have the disease. Of the 357 people with Parkinson's disease, 42, or 12 percent, reported ever having had such a head injury, compared to 50 of the 754 people without the disease, or 7 percent.

People with Parkinson's disease were 36 percent more likely to have exposure to paraquat than those who did not have the disease. Of those with Parkinson's, 169 had exposure to the weed killer, or 47 percent, compared to 291 of those without the disease, or 39 percent.

The study was supported by the National Institute of Environmental Health Science, National Institute of Neurological Disorders and Stroke, National Institutes of Health and American Parkinson Disease Association.

Pesticides, Head Injury Possible Contributors to Parkinson's

Those in agricultural areas are at high risk of exposure to the pesticide parquat

By [The Healthline Editorial Team](#) | Published Nov 12, 2012

The Gist

If a family member of yours has Parkinson's disease, you may want to look into his or her history and ask about pesticide exposure and head injury. A new study appearing in the November 13, 2012, issue of *Neurology* suggests that people with these specific risk factors are three times more likely to develop Parkinson's.

The pesticide in question is called parquat. It is a common herbicide used to control weeds, so people who live in agricultural areas are particularly at risk for toxic exposure. But when a person experiences a head injury in addition to pesticide exposure, that injury increases the person's susceptibility to Parkinson's because their body's cellular response to the pesticide is weakened.

The Expert Take

"While each of these two factors is associated with an increased risk of Parkinson's on their own, the combination is associated with greater risk than just adding the two factors together," said lead study author Dr. Beate Ritz, MD, PhD, of UCLA's Fielding School of Public Health.

Researchers do not know precisely which of the two risk factors first creates this vulnerability to Parkinson's, but their combined effect can be devastating for the human brain.

"This study suggests that the physiological process that is triggered by a head injury may increase brain cells' vulnerability to attacks from pesticides that can be toxic to the brain, or the other way around," Ritz said. "For example, chronic low dose exposure to pesticides may increase the risk of Parkinson's after a head injury."

The Takeaway

If you live near an agricultural area, be sure to check your local health department's website for a list of pesticides used on local crops. You and your family may be at risk for toxic exposure to parquat. Furthermore, try to avoid situations where head injury may occur, and take precautions to protect your head, such as wearing a helmet when engaging in sports.

Source and Method

A group of participants who lived in an agricultural area in Central California—357 people with Parkinson's and 754 people without—were involved in the study. Head injury was defined as loss of consciousness for more than five minutes, and exposure to paraquat was determined using a geographic information system (GIS) that measured the 500-meter area surrounding the homes and workplaces of the participants.

"People with Parkinson's disease were 36 percent more likely to have exposure to paraquat than those who did not have the disease," the study authors note.

Other Research

A 2007 study conducted in five European countries and published in *Occupational and Environmental Medicine* concludes the same as above—that head injury and pesticide exposure can both lead to Parkinson's.

And a [report published in October 2012](#) in *Movement Disorders* suggests that paraquat—the same pesticide examined in the above study—interacts with certain genes and increases the risk of Parkinson's. A [second report followed in October 2012](#) that reinforces the theory of gene-environment interactions, but calls for increased research into the role of pesticides.

By

Ryan Jaslow /

CBS News/ November 13, 2012, 3:45 PM

Brain injury and pesticide exposure combo may triple Parkinson's risk

Having a head injury can be risky enough, but a new study finds people who suffered a traumatic brain injury and lived in area with exposure to the pesticide called paraquat may be three times more likely to develop Parkinson's disease.

"While each of these two factors is associated with an increased risk of Parkinson's on their own, the combination is associated with greater risk than just adding the two factors together," study author Dr. Beate Ritz, a professor of epidemiology and environmental health sciences at UCLA's Fielding School of Public Health, said in a [press release](#).

- [Novel Parkinson's treatment reportedly reverses symptoms](#)
- [Computer games help Parkinson's patients: Study](#)
- [Caffeine from two to four daily cups of coffee may reduce Parkinson's disease symptoms](#)

Parkinson's disease is an incurable neurological condition that causes tremors, slowness of movement, stiffness or rigidity of the arms, legs or trunk and trouble with balance (called postural instability), according to the [National Parkinson Foundation](#). It is caused by the loss of brain cells that produce dopamine, a natural chemical that helps regulate the body's movement.

About 50,000 to 60,000 new cases are diagnosed in the U.S. each year, adding to the 1 million already diagnosed. Parkinson's is the 14th leading cause of death in the United States.

For the study, published Nov. 12 in [Neurology](#), researchers compared a group of 357 people with Parkinson's to 754 people without the disease. All participants lived in an agricultural area in central California, and they were asked to report any head injuries they had ever received that caused loss of consciousness longer than five minutes.

Some previous research suggested a traumatic brain injury could increase risk for Parkinson's disease, but the effect has not been seen across old studies, suggesting another factor might be at play. Using records of pesticide applications on California crops that date back to 1974, the researchers mapped out exposure to paraquats, a toxic herbicide used primarily for weed and grass control.

Ingesting the chemical can lead to serious health problems like organ failure, coma, or respiratory failure that leads to death according to the [Centers for Disease Control and](#)

Prevention. Based on previous animal studies, the chemical could also affect dopamine-producing areas of the brain.

Their study found 42 of the 357 people with Parkinson's -- or 12 percent -- reported having had such a head injury, compared to 50 of the 754 people without the disease (7 percent). That means people with Parkinson's were twice as likely to have had a head injury.

But, those with Parkinson's were also 36 percent more likely to report exposure to paraquat than those without the disease. The greatest risk was seen in people who reported both head injury and paraquat exposure.

"This study suggests that the physiological process that is triggered by a head injury may increase brain cells' vulnerability to attacks from pesticides that can be toxic to the brain or the other way around," Ritz said. "For example, chronic low dose exposure to pesticides may increase the risk of Parkinson's after a head injury."

An expert not involved in the research said the study supports the idea that Parkinson's could be caused by several different factors.

"Parkinson's disease is likely multifactorial in origin, with many genetic and environmental factors interacting to increase or decrease an individual's risk of developing the disease," Dr. Andrew Feigen, a Parkinson's researcher at The Feinstein Institute for Medical Research in Manhasset, N.Y. Feigen, who was not involved in the study, told CBSNews.com in an email, "It is important to note, however, that the paper is addressing risk or probability of getting PD, not cause and effect. Most people with these exposures will not develop PD, and conversely, most people with PD have not had these exposures."