

Stress-induced depression exacerbates Parkinson's

March 6 2014, by Keith Herrell

(Medical Xpress)—Chronic stress-induced depression exacerbated an experimental model of Parkinson's disease, researchers at the University of Cincinnati (UC) have shown.

The research underlines the link between Parkinson's and [depression](#), the researchers say, and shows that chronic [stress](#) can be a complicating factor in progression or severity of the disease.

The findings were published online ahead of print in *Molecular Psychiatry*, a leading scientific journal that is part of Nature Publishing Group. The lead researchers were Kim Seroogy, PhD, professor and vice chair of basic research in UC's neurology and rehabilitation medicine department and director of UC's Neuroscience Graduate Program, and James Herman, PhD, professor of psychiatry and behavioral neuroscience and director of UC's Network for Neuroscience Discovery. Ann Hemmerle, PhD, a postdoctoral researcher in Seroogy's lab, was first author of the article.

Parkinson's disease is a [degenerative neurological disorder](#) involving the death of dopamine-producing cells, or neurons, deep within the brain. Depression is highly prevalent in Parkinson's disease, previous research has found, and stress was long ago hypothesized to contribute to the neuropathology of Parkinson's—possibly by increasing the vulnerability of dopamine cells to degeneration.

Seroogy and Herman, however, observed that research was lacking on co-

morbidity of Parkinson's and depression—in other words, does stress-induced depression contribute to the development of Parkinson's, and would it also make Parkinson's worse once it already has developed?

"Studies have shown that up to 50 percent of Parkinson's patients experience debilitating depression, so it's a huge quality of life issue," Seroogy says. "In fact, many people with Parkinson's complain more of [depression symptoms](#) than they do of the actual disease symptoms.

"Our research indicates that adverse life stress on top of Parkinson's disease could be negatively modifying the disease itself."

Parkinson's disease is a chronic and progressive movement disorder, meaning that symptoms continue and worsen over time. It develops when certain cells in a region of the brain begin to die. These cells produce a chemical called dopamine that is responsible for transmitting signals within the brain that contribute to the coordination of movement.

The cause of Parkinson's disease is unknown, and there is no known cure. Treatment options such as medication and surgery are used to manage its symptoms, which include shaking, rigidity, slowness of movement and difficulty walking.

Nearly 1 million people in the U.S. are living with Parkinson's disease, according to the Parkinson's Disease Foundation.

"In addition to its critical role in movement, dopamine is very important in modifying how you feel about the world," Herman says. "Dopamine is considered to be hedonic—it gives pleasure and reward. So the loss of dopamine in Parkinson's may very well be affecting the regions of the brain that control the ability to appreciate pleasure and reward, and by doing that could be hitting both the depression circuits and the motor circuits."

In conducting their research, Seroogy and Herman examined rodents that were stressed in a variety of ways, such as being placed briefly in a cold room or a crowded setting. With chronic variable stress, the rodents never knew what form the stress would take or when it was coming, recreating the notion of helplessness in individuals with Parkinson's disease. A lesion to one side of the brain provided a model of Parkinson's disease in some of the rodents.

"When we combine chronic variable stress with experimental Parkinson's, more cells die, they die faster, and the rodents' behavior worsens," Seroogy says. (The behavior is measured by observing and recording the rats' natural exploratory behavior.)

The next step, Seroogy and Herman say, is to further investigate the mechanisms of how stress interacts with Parkinson's disease, particularly looking at glucocorticoid hormones that balance the stress response. Moreover, these findings underscore the importance clinically of screening and treating Parkinson's patients for depression.

Provided by University of Cincinnati

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