

New drug may treat and limit progression of Parkinson's disease

July 31 2017



Immunohistochemistry for alpha-synuclein showing positive staining (brown) of an intraneuronal Lewy-body in the Substantia nigra in Parkinson's disease. Credit: Wikipedia

Researchers at Binghamton University have developed a new drug that

may limit the progression of Parkinson's disease while providing better symptom relief to potentially hundreds of thousands of people with the disease.

Symptoms of Parkinson's disease are commonly managed using a selective dopamine receptor agonists. While these drugs are useful in early-stage Parkinson's, they tend to lose efficacy in later disease stages. As important, currently marketed drugs do not appear to modify disease progression. A research team including Binghamton University psychology professor Chris Bishop and former graduate student David Lindenbach recently employed a preclinical model of Parkinson's disease to compare the effects of the dopamine agonist ropinirole to their new [drug](#), known as D-512. Results demonstrated that D-512 was more efficacious than ropinirole in treating the symptoms of Parkinson's disease while also prolonging the time window in which the animals showed benefits. These findings followed on the heels of prior work by this collaborative group which demonstrated that D-512 may also protect against the progression of Parkinson's disease.

"A major issue for Parkinson's disease patients is the need to take multiple medications, multiple times per day. So we were quite astounded to discover that our new compound, D-512, was superior to the widely-used drug, ropinirole, in terms of maximal [symptom relief](#) and duration of action," said Lindenbach.

The researchers also noted that D-512 may have fewer side effects than current medications. When patients take anti-parkinsonian drugs, over time they develop hyperkinetic movements that are hard to control, called dyskinesia. Coupled with D-512's beneficial effects on motor symptoms, they argue that its therapeutic features are highly desirable.

"What you have is a better therapeutic index with our drug versus the current medication. And when you couple that with the fact that it's

seemingly multifunctional...then what we have is a compound that just isn't currently available to Parkinson's patients but that we think has a lot of promise," said Bishop.

"D-512 is unique because it not only treats the symptoms of Parkinson's disease, but the molecule itself is an antioxidant," said Lindenbach. "This antioxidant property is important because a major cause of Parkinson's disease appears to be excessive oxidative stress in a small group of movement-facilitating brain cells."

The researchers are currently at a pre-clinical phase. Their goals are two-fold: to understand how D-512 actually provides neural protection and therapeutic relief, while also looking at different models of Parkinson's disease that will translate into the clinic.

"There are some intermediate steps that we may be involved in. I think one of these is determining whether this compound works in later stages to slow down the [disease progression](#). It seems to work very well if you give it really early, before the disease takes hold—but looking at it at later time points and determining whether it can slow the [disease](#) down once it's really taken hold, also has important implications," said Bishop.

The paper, "D-512, a novel dopamine D2 / D3 receptor agonist, demonstrates superior anti-parkinsonian efficacy over ropinirole in parkinsonian rats," was published in *The British Journal of Pharmacology*.

More information: David Lindenbach et al, D-512, a novel dopamine D2 / D3 receptor agonist, demonstrates superior anti-parkinsonian efficacy over ropinirole in parkinsonian rats, *British Journal of Pharmacology* (2017). [DOI: 10.1111/bph.13937](https://doi.org/10.1111/bph.13937)

Provided by Binghamton University

Citation: New drug may treat and limit progression of Parkinson's disease (2017, July 31)
retrieved 24 April 2024 from

<https://medicalxpress.com/news/2017-07-drug-limit-parkinson-disease.html>

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