MedicalXpress

First early-detection blood test for Parkinson's shows promise

March 11 2008

A test that profiles molecular biomarkers in blood could become the first accurate diagnostic test for Parkinson's disease, new research shows.

The screen relies on changes in dozens of small molecules in serum. These "metabolomic" alterations form a unique pattern in people with Parkinson's disease, according to a team led by researchers at the Weill Cornell Medical College in New York City.

They published the findings in the journal *Brain*.

"A reliable blood test for Parkinson's disease would revolutionize not only the care of people with this debilitating illness, it would facilitate research as well," notes study senior author Dr. M. Flint Beal, chairman and Anne Parrish Titzell Professor of Neurology at Weill Cornell Medical College, and neurologist-in-chief at NewYork-Presbyterian Hospital/Weill Cornell Medical Center.

According to the National Parkinson Foundation, an estimated 1.5 million Americans have the neurodegenerative disease, and 60,000 new cases are diagnosed each year. Actor Michael J. Fox, boxer Muhammad Ali, and former U.S. Attorney General Janet Reno all suffer from Parkinson's, which strikes men and women in roughly equal numbers.

"Right now, a Parkinson's diagnosis is made solely on a clinical review of symptoms -- we have no biologic test," notes Dr. Beal. At best, a symptom-based screen is still only 90 percent accurate, he adds.

"That can cause real problems, because that remaining 10 percent of patients -- who may have look-alike conditions such as multi-system atrophy or progressive supranuclear palsy -- end up getting treated with Parkinson's drugs," Dr. Beal says. "These medicines may appear to help them a little while, but in the meantime, they haven't been getting the treatment that's necessarily best for them."

An early-detection test would also be enormously useful in tracking the health of patients who may be at higher risk for Parkinson's, such as those with a family history of the disease.

Finally, the integrity of clinical trials is undermined by the lack of an accurate screen, Dr. Beal notes. "Every time you do a clinical trial into Parkinson's and you have patients that are misdiagnosed, it enters 'noise' into the analysis, skewing the results. A truly reliable test could help eliminate that," the researcher notes.

That's why encouraging results for the new test -- based on a patient's "metabolomic profile" -- are so important.

Metabolomics is the study of changes in thousands of distinct, very small molecules found in body fluids or tissues. "Anytime you have a genetic or environmental perturbation, these molecules are altered in specific ways," Dr. Beal explains.

Because Parkinson's treatment could itself trigger some of these alterations, the researchers first compared metabolomic patterns in the blood of Parkinson's patients who were not undergoing treatment versus those who were medicated. "That gave us a 'medication-free' profile that we could use going forward," Dr. Beal explains.

In the next stage of the research, the team compared blood samples from 66 patients with Parkinson's disease against 25 healthy controls (most of

whom were the patients' spouses). The metabolomic analysis included over 2,000 small molecules found in the blood.

"We discovered a clear differentiation between the metabolomic profiles of the Parkinson's disease patients versus those of the controls," Dr. Beal says. "No one molecule was definitive, but a pattern of about 160 compounds emerged that was highly specific to Parkinson's patients."

The significance of many individual compounds to the disease remains unknown and will be the focus of future study. But changes in a few well-known metabolites linked to oxidative stress were clearly linked to Parkinson's. These included low levels of the antioxidant uric acid; an increase in blood levels of another antioxidant, glutathione; and increased levels of a marker for oxidative damage called 8-OHdG.

"Together, these and other compounds were arranged into a metabolomic pattern that identified Parkinson's disease with great accuracy," Dr. Beal says.

He stressed that more work needs to be done to validate the finding, and a test that might be used routinely by doctors is still a few years away.

"We are currently enlarging the sample size and studying people at serial intervals, to see if this test might also serve as a benchmark for disease progression," Dr. Beal says. "We are also looking at people who carry a gene for a familial form of Parkinson's, but who do not have the illness now. We hope to track them over time to see if this metabolomic profile is predictive of disease onset."

If those data prove as promising as this early trial, an early-detection blood test for Parkinson's disease could someday become a reality. According to Dr. Beal, "That would be a big step forward for both the treatment and the study of this devastating illness."

Source: New York- Presbyterian Hospital