

Colonoscopy or flexible sigmoidoscopy may be used to predict Parkinson's

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Two studies by neurological researchers at Rush University Medical Center suggest that, in the future, colonic tissue obtained during either colonoscopy or flexible sigmoidoscopy may be used to predict who will develop Parkinson's disease, a neurodegenerative disorder of aging that leads to progressive deterioration of motor function due to loss of neurons in the brain that produce dopamine, a neurotransmitter essential to executing movement.

Currently, [Parkinson's disease](#) afflicts almost 5 million people worldwide. It is projected that by 2030, Parkinson's disease will affect over 10 million individuals.

A protein called [alpha-synuclein](#) is deposited in cells of the brain of patients with Parkinson's disease and is considered a pathologic hallmark of the disorder. These [protein aggregates](#) form Lewy bodies, a characteristic structure seen in Parkinson's disease brains at autopsy. Identification of the role of alpha-synuclein aggregation in [neuronal dysfunction](#) and death has broadened understanding of how Parkinson's disease develops and introduced a [valuable tool](#) for tracking its progress.

Physicians at Rush have demonstrated that the alpha-synuclein protein can also be seen in the [nerve cells](#) in the wall of the intestines in research subjects with early Parkinson's disease, but not in healthy subjects. In this study, 10 subjects with early Parkinson's disease had [flexible sigmoidoscopy](#), a technique like colonoscopy, in which a flexible scope is inserted into the lower intestine. In the flexible sigmoidoscopy

technique, the scope is only inserted about 8 inches and no colon preparation or anesthesia are required. The procedure takes only 5-10 minutes.

Now, a group of Rush scientists has become the first to demonstrate alpha-synuclein aggregation in [biological tissue](#) obtained before onset of motor symptoms of Parkinson's disease.

The studies, published the May 15 issue of the journal *Movement Disorders*, were conducted by Dr. Kathleen M. Shannon, neurologist in the Movement Disorders and Parkinson's Center at Rush, and a multidisciplinary team of scientists at Rush. The team analyzed samples of tissue obtained during colonoscopy examinations that took place 2-5 years before the first symptom of Parkinson's disease appeared in 3 research subjects, and all 3 showed the characteristic protein in the wall of the lower intestine.

"Recent clinical and pathological evidence supports the notion that Parkinson's disease may begin in the intestinal wall then spread through the nerves to the brain. Clinical signs of intestinal disease, such as constipation, Parkinson's disease diagnosis by more than a decade. These studies suggest it may one day be possible to use colonic tissue biopsy to predict who will develop motor Parkinson's disease," said Shannon.

"Such tissue could be obtained at the time of screening colonoscopy, a procedure routinely applied for colon cancer surveillance beginning at age 50, and repeated every three to 10 years in adults of middle age," said Shannon.

Alternatively, the Rush investigators showed that colonic tissue is easily obtained using flexible sigmoidoscopy, a technique that, unlike [colonoscopy](#), requires no colon cleansing preparation or sedation, and can be performed in 10 minutes.

Currently, diagnosis of Parkinson's disease depends on the appearance of such cardinal features as tremor, slowed movement, rigidity and gait problems. The clinical diagnosis can be difficult early in the disease, and as many as 10 percent to 20 percent of patients may be misdiagnosed. Studies have shown that by the time primary symptoms appear, many patients with Parkinson's disease will have lost 60 percent to 80 percent or more of dopamine-producing cells in the brain.

"In view of a multi-billion-dollar translational research effort that aims to identify agents that slow or stop the progression of Parkinson's disease, the need for accurate and timely diagnostic biomarkers, including the potential for pre-motor diagnosis, is particularly acute," the authors stated.

"We believe that alpha-synuclein in the colonic submucosa may be a pre-motor biomarker that easily can be studied in cohorts at increased risk of developing Parkinson's disease (relatives of Parkinson's disease subjects, subjects with anosmia [inability to smell], rapid eye movement sleep behavior disorder and others)."

The Rush scientists stressed the need to replicate this finding in other populations, including normal controls as well as in subjects with other neurodegenerative Parkinson's-like disorders, and to determine the safest and highest-yield biomarker site.

Provided by Rush University Medical Center

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