Researchers identify path to treat Parkinson's disease at its inception

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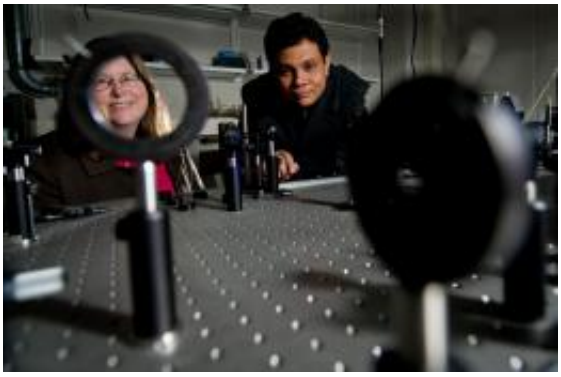

Lisa Lapidus, associate professor of physics and astronomy, and Basir Ahmad, postdoctoral researcher, have identified a new treatment path for Parkinson's disease. Photo by G.L. Kohuth.

(Medical Xpress) -- Imagine if doctors could spot Parkinson's disease at its inception and treat the protein that triggers it before the disease can sicken the patient.

A team of researchers led by Basir Ahmad, a postdoctoral researcher at Michigan State University, has demonstrated that slow-wriggling alpha-synuclein proteins are the cause of aggregation, or clumping together, which is the first step of Parkinson's. The results are published in the current issue of the *Proceedings of the National Academy of Sciences*.

Proteins, which are chain molecules composed of amino acids, do most

of the work in cells. While scientists understand how proteins are structured, they do not yet know how they are built - a process known as folding. When errors happen in folding, proteins clump together, form plaques such as those found in Parkinson's disease, Alzheimer's and Lou Gehrig's disease, and cause cells to degenerate.

Lisa Lapidus, MSU associate professor of physics and astronomy and co-author of the paper, has dedicated her lab to researching folding. Using lasers to investigate the protein alpha-synuclein, the scientists correlated the speed at which the protein rearranges with its tendency to clump. A slower speed places the protein in a "dangerous regime," a pace that allows it to develop sticky patches, aggregate and cause cellular damage, Lapidus said.

"There are many, many steps that take place in aggregation, but we've identified the first step," she said. "Finding a method to fight the disease at its first stage, rather than somewhere further down the road, can hopefully increase the success rate in which the disease is treated."

The identification of this critical first step already has the researchers pursuing new ways to attack the disease. Lapidus is currently testing a number of naturally occurring compounds, such as curcumin, ECGC and resveratrol, which could push the rearranging protein out of the danger zone.

"We are now looking for molecules that can alter the protein when it first begins to 'misfold,' which could eventually lead to the development of a drug that could prevent aggregation before it happens," she said.

Yujie Chen, MSU graduate student, was one of the co-authors of the paper.

More information: Aggregation of α-synuclein is kinetically

controlled by intramolecular diffusion, Basir Ahmad et al., *PNAS*, doi:10.1073/pnas.1109526109