

## **DESTRUCTION OF AMYLOID FIBRILS BY THE PLASMA PENCIL\***

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Amyloid fibrils are ordered beta-sheet aggregates that are associated with a number of neurodegenerative diseases such as Alzheimer's and Parkinson's. There are approximately twenty proteins that have been found to form fibrils in humans and are associated with disease states. However, it has been postulated that all proteins can be induced to form this low energy state if subjected to the right conditions. We are investigating potential methods that will lead to the destruction of fibrils, formed by the protein alpha-synuclein, which underlie Parkinson's disease. At present there is no cure for this progressive and debilitating disease. Initial studies by the Greene and Laroussi groups indicate that cold plasma can break these alpha-synuclein fibrils into smaller units *in vitro*. This avenue of research may facilitate the development of a medical treatment. In this study, the plasma is generated by the plasma pencil, a device capable of emitting a plasma plume several centimeters in length. The plasma pencil is powered by high voltage short pulses (nanoseconds to microseconds) and uses helium as a feed gas. The plasma plume is at room temperature but generates reactive oxygen and nitrogen species (along with charged particles) that interact with the fibrils and ultimately causing their destruction.

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