

## Combination of PET, MR Imaging Shows White Matter Degeneration in Huntington's Disease Patients

*We all need nuclear medicine even those in the anti-nuclear lunatic fringe.*

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Potential Exists to Possibly Prevent Disease Before Onset Symptoms Appear, Suggests Report in February's Journal of Nuclear Medicine

Using both brain function (PET) and anatomical structure (MR) imaging studies, Italian researchers—within the context of an Italian-British collaboration—discovered that degenerative and dysfunctional events occur in individuals many years before the onset of Huntington's disease—particularly in the brain's white matter—an area not previously considered primarily involved with the disease. In fact, the brain's white matter “progressively reduced” as individuals approached the first disease symptoms, according to a study published in February's Journal of Nuclear Medicine.

“Our observations—made by analyzing the results of the largest group of subjects studied to date—may suggest new methodologies and drug trials for therapy,” said Ferdinando Squitieri, M.D., Ph.D., who works in the Neurogenetics Unit and Centre for Rare Diseases of IRCCS Neuromed in Pozzilli, Isernia, Italy. “It is possible to approach the disease at the presymptomatic stage by monitoring the brain tissue volumes and the basal ganglia and cortex dysfunction. If so, we may be able to prevent Huntington's disease before onset symptoms by using proper drugs,” added the co-author of “Brain White-Matter Volume Loss and Glucose Hypometabolism Precede the Clinical Symptoms of Huntington's Disease.”

Huntington's Disease is a devastating, hereditary, degenerative brain disorder, which slowly diminishes an individual's ability to walk, think, talk and reason. About one out of every 10,000 Americans has the disease, which has one of the highest rates of patient suicide, said Squitieri. The disease profoundly affects the lives of entire families, as an affected person becomes totally dependent on others for his or her care. Each child of a parent affected by the disease has a 50/50 chance of inheriting the gene that causes the disease.

The Huntington's gene has been determined; however, it's unclear how the gene leads to damage of nerve cells in the brain, including the basal ganglia and cerebral cortex. Medical researchers have been studying it in order to determine how it causes disease. At this time, there is no way to stop or reverse the course of the disease, which leads to death after 10 to 25 years. A genetic test is available to indicate whether an individual has inherited the gene, but the test doesn't indicate at what age the disease will develop.

“Our findings are opening a new field in molecular medicine—the predictive medicine to prevent pathologies,” explained Squitieri. “Our study suggests that there's a potential presymptomatic biomarker—a volumetric change of white matter—that can possibly be used for monitoring neuroprotective treatments,” he said. “For the first time, we are providing in vivo evidence that glial cells—the supportive cells in the central nervous system—are involved in early disease,” he noted.

More research needs to be done, and scientists need “to go through the basic science to find the real biological cause of such anatomical brain changes,” said Squitieri. White

matter volume loss may become a potential presymptomatic biomarker, while grey matter volume loss (loss of neurons) may represent a marker of disease progression in individuals with Huntington's, he said. Increased cerebrospinal fluid may be the best predictor of disease stage. Squitieri added that the participation and contribution of patients and their families to this type of study is crucial to further research of the disease.