New data demonstrate potential for early detection of Alzheimer's disease

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Data published in the June issue of the *Journal of Alzheimer's Disease* demonstrated that minimally-invasive biospectroscopy was able to identify changes in oxidative stress (OS) levels in blood plasma, which may prove to be a useful biomarker in the early detection of Alzheimer's disease. There is currently no accepted laboratory test for diagnosing Alzheimer's disease.

Researchers at McGill University and the Lady Davis Institute for Medical Research (LDI) at the Jewish General Hospital (Montreal, Canada), have shown that near-infrared (NIR) biospectroscopy can identify a chemical signature, or biomarker, in blood that distinguishes Alzheimer's disease from normal aging and possibly other neurodegenerative conditions. Diagnosis of Alzheimer's disease is currently based solely on a patient's medical history and neurological examination, is labor-intensive and expensive, and often inconclusive in early stages of the illness. The availability of a biologic marker that reliably differentiates Alzheimer's disease from normal aging and other dementing conditions would represent a major achievement in the management of this common neurodegenerative disorder.

"There is an urgent need for an accurate diagnostic test to aid in the early diagnosis and management of Alzheimer's disease," said Hyman M. Schipper, MD, PhD, FRCPC, lead author of the study and Professor of Neurology and Medicine at McGill University. Dr. Schipper is also Founding Director of the Centre for Neurotranslational Research and a member of the Bloomfield Centre for Research in Aging at the LDI.

"Our observations give us hope that biospectroscopy will offer a new approach to the early diagnosis of Alzheimer's disease and other neurodegenerative disorders." Dr. Schipper is a noted expert in brain aging and neurodegeneration. Dr. David Burns of the Department of Chemistry at McGill University, an experienced biospectroscopist, was a co-investigator of the study.

In this study, an NIR biospectroscopy analysis was conducted on blood plasma samples from a total of 63 subjects, 19 with Alzheimer's disease, 27 with mild cognitive impairment (a frequent indication of Alzheimer's disease) and 17 normal elderly controls, to measure the degree of oxidative stress in plasma. OS is caused by a chemical imbalance that can damage critical components of cells and biofluids, including proteins, lipids and DNA. OS is known to be involved in many neurological diseases, including Alzheimer's and Parkinson's disease.

In differentiating Alzheimer's disease patients from the normal elderly control group, NIR achieved a sensitivity of 80% and specificity of 77%. Fifteen and twelve patients with mild cognitive impairment were classified with the normal elderly control group and Alzheimer's disease groups, respectively.

"These results demonstrate the potential for NIR biospectroscopy to differentiate mild, and possibly pre-clinical, Alzheimer's disease from normal aging with high accuracy," Dr. Schipper added. "We are very encouraged by these data and look forward to testing this potential diagnostic tool in larger-scale studies."

"Near-Infrared Spectroscopy of Blood Plasma for Diagnosis of Sporadic Alzheimer Disease," was published in *Journal of Alzheimer's Disease*, 17:2 (June 2009).

Near-infrared spectroscopy is commonly used in medical diagnostics,

food and agrochemical quality control, as well as combustion research.

This technology has been licensed to Molecular Biometrics, Inc., a metabolomics company specializing in the development of minimally-invasive biomarkers for Alzheimer's disease, Parkinson's disease and assisted reproduction.

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