



Florida Institute of Technology

# A NOVEL DIAGNOSTIC FOR ALZHEIMER'S DISEASE IN LIVING PATIENTS

## Summary

Alzheimer's disease (AD) is a neurodegenerative disorder characterized by a progressive decline in cognitive function, as well as by numerous amyloid plaques, neurofibrillary tangles (NFTs) and extensive neuronal loss in the brains of AD patients. Furthermore, it has been suggested that oxidant stress may be of functional importance in the pathogenesis of AD and that the production of reactive oxygen species (ROS) in the brain leads to lipid peroxidation and neuronal degeneration. Efforts to elucidate the role of lipid peroxidation and oxidative stress *in vivo* have been hampered by the availability of markers, which have been of limited value due to chemical instability or a lack of sensitivity or specificity. Researchers at Florida Institute of Technology and the University of Pennsylvania have identified a particular type of compound that appears as a result of lipid peroxidation selectively in affected regions of AD brains, but not in controls, i.e., in the frontal and temporal cortex, but not in the cerebellar cortex. This suggests that oxidative stress may play a role in the pathogenesis of AD, and that the determination of compound levels in cerebrospinal fluid or other body fluids could be exploited to develop novel tests for the diagnosis of AD in living patients.

## Applications

- There is an unmet need in the art for compositions and methods relating to molecular markers of oxidant stress or lipid peroxidation in a mammal for use in the diagnosis, treatment and development of therapeutics for diseases which manifest oxidant stress, such as Alzheimer's disease. The present invention meets these needs.

## Advantages

- The invention further relates to a method of identifying a compound useful for the treatment of Alzheimer's disease in a mammal. The method comprises a) measuring the level of an isoprostane molecular marker for lipid peroxidation in either a sample of a tissue or body fluid obtained from a first mammal prior to administering the compound, or, in a sample of a tissue or body fluid obtained from an otherwise identical second mammal which is not to be administered the compound; b) administering the compound to the first mammal; c) thereafter measuring the level of the isoprostane molecular marker in a tissue or body fluid obtained from the first mammal; and, d) comparing the level of the isoprostane molecular marker measured in c) with the level of the isoprostane molecular marker measured in a), wherein when the level of the isoprostane molecular marker measured in c) is reduced relative to the level of the isoprostane molecular marker measured in a), a compound useful for the treatment of Alzheimer's disease in a mammal is identified

## The Technology

The invention relates to a method of measuring the level of lipid peroxidation in a mammal suspected of having an oxidant stress syndrome or disease. The method comprises a) obtaining a first sample of a tissue or body fluid from the mammal; b) assessing the level of an isoprostane molecular marker for lipid peroxidation present in the first sample; and, c) comparing the level of the isoprostane molecular marker present in the first sample with the level of the isoprostane molecular marker present in a second sample of a tissue or body fluid obtained from an otherwise identical mammal which is not afflicted with an oxidant stress syndrome or disease, wherein an elevated level of the isoprostane molecular marker in the first sample relative to the level of the isoprostane molecular marker in the second sample, is indicative of an elevated level of lipid peroxidation in the mammal, thereby indicating the presence of an oxidant stress syndrome or disease in the mammal.

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