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2013 Global NeuroDiscovery Challenge

21 CBT INNOVATION AWARD ($50,000)

ONLINE VOTING
NOVEMBER 1-5
Three Finalists Submissions

HYPOTHESIS #1: 051 SYSTEMS BIOLOGY APPROACH

MALE/FEMALE DIFFERENCES IN ALZHEIMER'S DISEASE HAVE UNIQUE CHANGES IN CELLULAR NETWORKS

Kimberly Glass, PhD, John Quackenbush, PhD
Harvard School of Public Health, Dana-Farber Cancer Institute, Boston, MA.

Kimberly Glass, PhD

John Quackenbush, PhD

The Science: *The state of a cell is defined by a complex network of interacting genes and gene products. Cellular networks have properties unique to normal and diseased states.*

Hypothesis: These researchers offer the hypothesis that differences in cellular networks can be used to identify male and female features of healthy brain tissue compared to male and female brain tissue affected by Alzheimer's. Their preliminary findings suggest that male and female brain networks are different in the healthy state but become similar as Alzheimer's develops and progresses. The changes are found in the energy metabolism networks.

Innovation: *These investigators developed a sophisticated computer tool known as PANDA (Passing Attributes between Networks for Data Assimilation) to analyze communication within cellular networks. PANDA is based on prior knowledge about the structure of cellular networks. The strength of PANDA lays in its investigation of both upstream events and subsequent responses. As data from several sources are gathered, the models are updated and provide a more complete picture of biological pathway activity that can explain the overall biological response.*

Proposed Research: Drs Glass and Quackenbush's proposed research is to confirm their preliminary findings in additional Alzheimer's datasets to predict which networks have the greatest importance in affecting risk for Alzheimer's and on pathways that are different in women and men in Alzheimer's. These investigators are already using PANDA to investigate male/female differences in chronic obstructive pulmonary disease.

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