CALIFORNIA STATE SCIENCE FAIR
2002 PROJECT SUMMARY

Name(s)
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Project Number
22571

Project Title
BDNF Expression in the Aged and AD Brain and Its Expression in Relation to Cytoskeletal Proteins

Abstract

Objectives/Goals
My objective is to better understand Alzheimer's disease through fluorescent immunohistochemistry and double labeling.
1) Establish the distribution of BDNF (brain-derived neurotrophic factor) in the control (normal) aged brains and late AD brains.
2) Show changes in cytoskeletal aspects from normal to AD brains.
3) Find a correlation between BDNF and cytoskeletal proteins.

I hypothesize that both BDNF and cytoskeletal labeling will decrease from aged to AD brains.

Methods/Materials
Major materials used inclue: humman brain tissues (frontal cortex), vibratome, vacuum, orbit shaker, fluoroboxes, microscope slides and coverslips, fluorescent microscope, mercury lamp, permafluor, and primary and secondary antibodies.

Completion of my experiment involved 4 basic steps.
1) Obtain brain cases (6) from the tissue repository at UCI and cut them into thin slices using a vibratome.
2) Use fluorescent immunohistochemistry and double labeling to label BDNF and cytoskeletal structures (including washes, primary antibody, and secondary antibody)
3) Mount tissues on slides (8 tissues per case x 6 cases = 48 tissue samples) and coverslip them.
4) View all slides under a fluorescent microscope and determine levels of BDNF and cytoskeletal proteins.

Results
Trends are exhibited. The amount of BDNF decreased slightly from normal to AD brains while the amount of cytoskeletal proteins increased more dramatically. There was a negative correlation between BDNF and cytoskeletal proteins.

Conclusions/Discussion
BDNF and cytoskeletal proteins both play crucual roles in AD. BDNF is lost with aging, but those who lose too much of this neurotrophin develop AD. Cytoskeletal proteins are increased because as AD attacks, more proteins are required to maintain structure and rigidity. My hypothesis was only partially correct, as I predicted correctly that BDNF levels would decrease but while I though cytoskeletal amounts

Summary Statement
My project is about differences between normal and AD (Alzheimer disease) brains, focusing on the changes in BDNF (brain-derived neurotrophic factor) and its relationship to cytoskeletal aspects.

Help Received
Used equipment at the Institute of Brain Aging and Dementia of the University of California, Irvine, under the supervision of Dr. Paul Adlard