

Neuronal Ageing

Proteomics

Neuronal Ageing

Axonal transport

Mollusc

Effects of Age on Neuronal Protein Expression

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The investigation

Objectives

Increasing age is associated with changes in the numbers of connections a neuron makes with a target cell. As such the age-related changes at the neuronal level lead to cognitive decline and decreased independence. This project will provide an initial screen on the effects of age on the proteome (entire protein complement) using the nervous system of the pond snail *Lymnaea stagnalis* to assess the significance of changes in protein level within the ageing brain.

Plan

Protein extracts from the snail central nervous system are prepared and separated according to their pH and molecular weight. The proteins are subsequently fragmented into smaller pieces and identified using an instrument called a mass spectrometer (see fig 1).

In order to determine the role that specific proteins play in the ageing process we plan to either increase or decrease the levels of key proteins and examine their effects on behaviour of the snails and the properties of the nervous system.

Resources

Mass spectrometry, electrophysiology, PCR, proteomics facility, ageing snail population



Reference

1. Morrison JH, Hof PR
Life and death of neurons in the ageing brain
Science 1997 278 (5337): 412-9

2. Perlson E et al
Differential proteomics reveals multiple components in retrogradely transported axoplasm after nerve injury.
Molecular & Cellular Proteomics 3: 510-520, 2004

Potential Benefits

For older people

Brain ageing is a complex process involving a deterioration of several biological processes leading to cognitive decline. A number of pathways are being investigated however the triggers and consequences of age-related changes at the protein level remain unclear. In this study we aim to identify key proteins regulating some of these pathways which could be used as targets for drug design.

For society

This study will provide new information concerning the role of changes in protein expression in neuronal ageing and has the potential to identify novel targets involved in the ageing process.

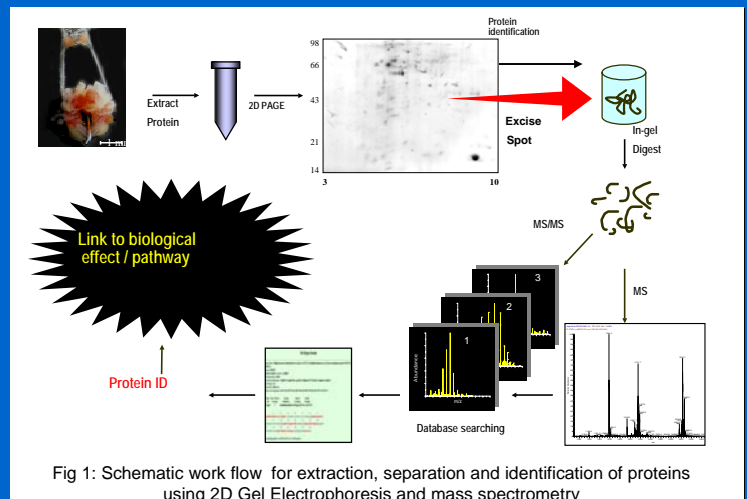


Fig 1: Schematic work flow for extraction, separation and identification of proteins using 2D Gel Electrophoresis and mass spectrometry

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