The reduction of NADH ubiquinone oxidoreductase 24- and 75-kDa subunits in brains of patients with Down syndrome and Alzheimer's disease.

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NADH: ubiquinone oxidoreductase (complex I), one of the most complicated multi-protein enzyme complexes, is important for energy metabolism because it is the initial enzyme of the mitochondrial respiratory chain. Deficiency of complex I is frequently found in various tissues of patients with neurodegenerative disease. Here we studied the protein levels of complex I 24- and 75-kDa subunits in several brain regions from patients with Down syndrome (DS) and Alzheimer's disease (AD). We determined protein levels of complex I 24-, 75-kDa subunits and mitochondrial marker proteins mitochondrial matrix protein P1 (hsp60) and aconitate hydratase from seven brain regions of patients with DS, AD and controls. Proteins were separated by two-dimensional (2-D) gel electrophoresis and identified by matrix-assisted laser desorption ionization mass spectrometry (MALDI-MS). Complex I 24-kDa subunit was significantly reduced in occipital cortex and thalamus in patients with DS and temporal and occipital cortices in patients with AD. Complex I 75-kDa subunit was significantly reduced in brain regions from patients with DS (temporal, occipital and caudate nucleus) and AD (parietal cortex). Reductions of two subunits of complex I may lead to the impairment of energy metabolism and result in neuronal cell death (apoptosis), a hallmark of both neurodegenerative disorders.