

Biomarkers of Alzheimer's Disease

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Purpose

Objectively mark

- Presence of neurodegenerative pathology
- Change in pathologic activity

Biomarkers of Alzheimer's Disease

Advantages

- Early detection of neurodegenerative pathology
- Improve diagnostic certainty in challenging patients
- Increased diagnostic accuracy by non-specialist
- Increased diagnostic efficiency (time & Money)
- Objective monitoring of treatment efficacy

Biomarkers of AD

MRI

Anatomical

- Regional volume – cross sectional & longitudinal
- Boundary shift – longitudinal

Macromolecular

- T1 rho
- Magnetization transfer

Biochemical

- MR spectroscopy

Physiologic

- Function induced regional changes in blood flow

Biomarkers of AD

PET

Regional metabolic impairment

- Standard format
- Stereotaxtic Surface Projection

Pathology specific imaging

- Amyloid ligand imaging

Biomarkers of AD

Biochemical

- Tau
- Amyloid
- Isoprostane
- Sulfatide
- Proteomics

Frontotemporal Dementia Neuropathological Classification

Based on tau pathology, neuron loss, gliosis

3R-tau

- 1. Pick's disease**
- 2. FTDP-17**
- 3. Other**

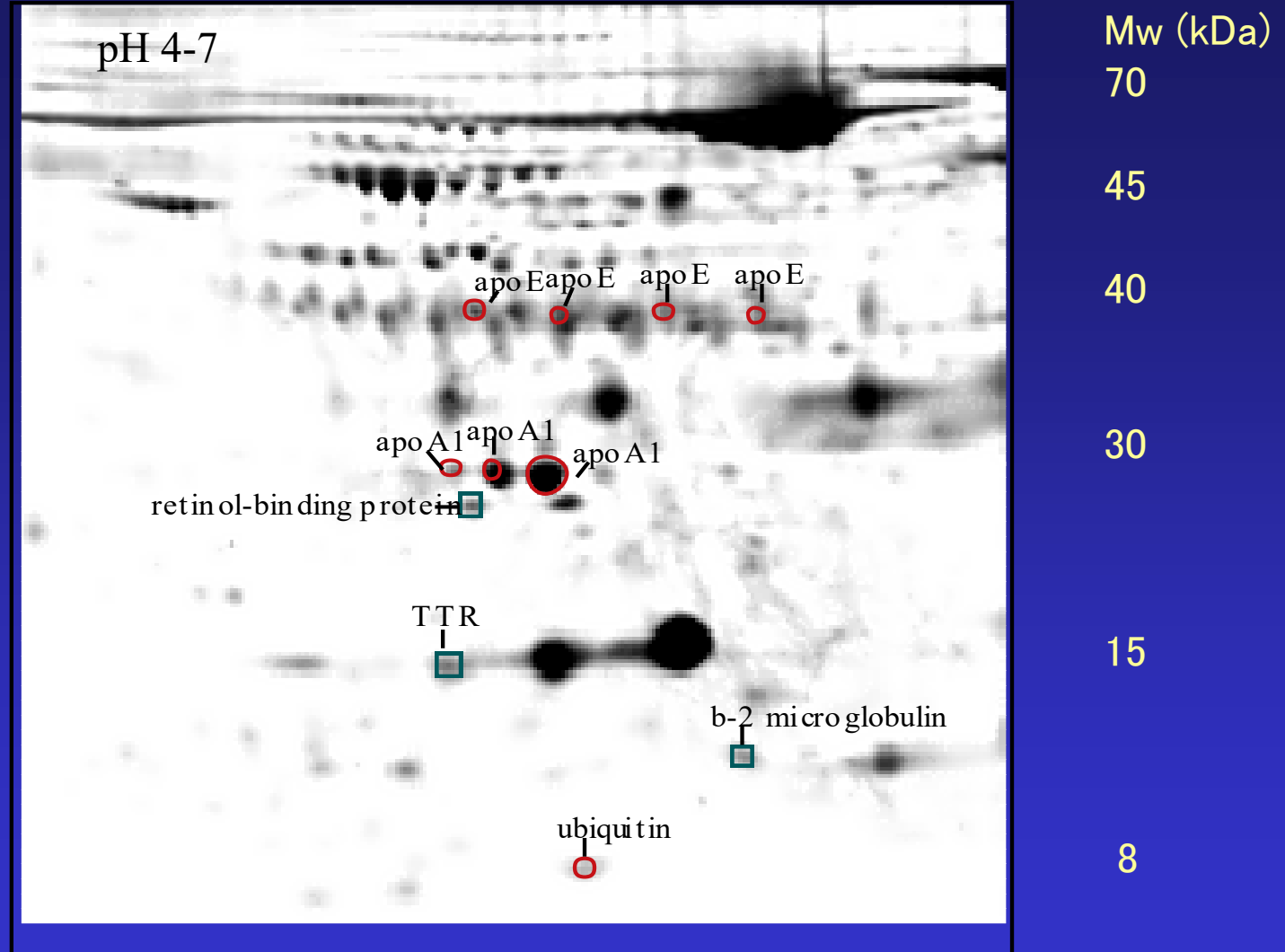
3R/4R-tau

- 1. NFT dementia**
- 2. FTDP-17**
- 3. Other**
- 4. AD**

4R-tau

- 1. CBD**
- 2. PSP**
- 3. FTDP-17**
- 4. Other**

Altered proteins in CSF of AD patients



Circles= reduced protein intensity ($p < 0.001$)

Squares = increased protein intensity ($p < 0.001$)

Molecular and Biochemical Markers of Alzheimer's Disease

The Gold Standard

- Ability to detect a fundamental feature of AD neuropathology
- Validated in neuropathologically confirmed AD cases
- Ability to detect AD early in its course
- Ability to distinguish AD from other dementias
- Reliable
- Non-invasive, simple and inexpensive

Biomarkers of Alzheimer's Disease

Criteria to identify and validate – Richard Mayeux

Biomarkers old and new

- CSF tau – Chris Clark
- CSF amyloid – Doug Galasko
- CSF sulfatide – Dave Holtzman
- F2 isoprostane – Domenico Pratico
- Neuroimaging – Mike Weiner

Panel discussion