Clinical research in Alzheimer’s disease:
Current status and future perspectives

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European Alzheimer’s Disease Consortium
Auguste D.
Case described by Alois Alzheimer in 1908

- Atrophy
- Plaques
- Tangles
William Utermohlen – self portraits

1 year before diagnosis

2 years after diagnosis

5 years after diagnosis

Patient from the Dementia Research Centre, London. Courtesy slide Nick Fox.
Alzheimer’s disease in Europe

1 out of 5 gets Alzheimer’s disease
Alzheimer’s disease in Europe

1 out of 5 gets Alzheimer’s disease

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of cases</th>
<th>Societal costs (€)</th>
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<td>2009</td>
<td>6,000,000</td>
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# Alzheimer’s disease in Europe

1 out of 5 gets Alzheimer’s disease

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<td>144.000.000.000</td>
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The amyloid cascade hypothesis

Abnormal beta amyloid processing

Neuronal dysfunction/neuronal death

Cognitive impairment

Impaired activities daily living
Clinical research

- Diagnosis
- Prognosis
- Therapy
Diagnosis
Clinical criteria Alzheimer’s disease

McKhann 1984:
- Demented
  - Memory impairment
  - Impairment in other cognitive domain
  - Both interfere with activities daily living
- No other disorder causing symptoms
Atrophy on MRI

Hypometabolism on PET scan

Markers in cerebrospinal fluid

Plaques on PET scan

Alzheimer

Control

Alzheimer

Control

Alzheimer

Control
Alzheimer pathology in non-demented subjects

Results from EC funded DESCRIPA study
Prognosis
Course of AD

Disease onset

Asymptomatic
10-20 years

Complaints
5-10 years

Dementia
10 years

Death
Acceleration of decline

Change in cognition over time

Jack et al 2008
Heterogeneity in progression

Fox et al., UCL London
Therapy
Alzheimer treatment

• Current:
  – Symptomatic

• Future:
  – Treatment underlying disease process
    • Prevention beta amyloid production
    • Prevention aggregation of beta amyloid
    • Stimulation removal beta amyloid
Vaccination against beta amyloid

Bombois et al. 2007; Van Broeck et al. 2007

Plaques

Untreated patient

Vaccinated patient

Bombois et al 2007; Van Broeck et al. 2007
Future perspectives

• Diagnosis
  – Diagnosis Alzheimer’s disease in non-demented subjects
  – Standardization tests
• Prognosis
  – Predictors of decline
• Therapy
  – Testing new therapies (set-up trial networks)
  – Development outcome measures
Funding
National funding

- Large scale programmes for dementia research:
  - France
  - Germany
  - United Kingdom
  - Sweden
  - Ireland
  - The Netherlands
European funding

- Current funding fragmented
  - Framework programme
    - No specific Alzheimer programme
  - ERA-Net
  - Innovative Medicine Initiative

⇒ European Alzheimer programme needed

⇒ Joint Programming?