Born 1926
Lutz et al, 2008 Nature

Figure 1: Projected changes in the level of ageing for the world population over the course of the century for four indicators of ageing as defined in the text.

Global Median Age (in years), 2001
INDICATORS OF AGEING

- World
- Japan/Oceania
- South Asia
- China
Facts about ageing

- In 2000, there were 600 million people aged 60 and over; there will be 1.2 billion by 2025 and 2 billion by 2050.
- Today, about two thirds of all older people are living in the developing world; by 2025, it will be 75%.
- In the developed world, the very old (age 80+) is the fastest growing population group.
- Women outlive men in virtually all societies; consequently in very old age, the ratio of women/men is 2:1.
Brain changes with age:
- Atrophy of gyri
- Widened sulci
- Enlarged ventricular system

Brain weight shrinks:
- 5% by 70 years
- 10% by 80 years
- 20% by 90 years
Dementia in Australia *

- 298,000 people with dementia in 2011
- 74% aged 75+ but 23,900 under 65 yrs
- 70% live in community
- Projections: 400,000 by 2020; 900,000 by 2050
- 3rd leading cause of death
- 4th leading cause of disease burden
- 3rd leading cause of disability burden; (1st in 65+)

* Dementia in Australia, AIHW, 2012
Global Cost of Dementia

- Total estimated cost worldwide US$604 billion in 2010
- If dementia were...
  - a country, it would have the world’s 18th largest economy
  - a company, it would be world’s largest by annual revenue

World Alzheimer Report, ADI, 2010
AGE-RELATED CHANGE IN COGNITION

![Graph showing age-related changes in cognition](image)

- **Normal**
- **MCI**
- **DEMENTIA**
CHeBA

Neuro-psychology

Proteomics

Genetics

Stem Cell Lab

Nutrition

Neuroimaging

Intervention trials

Neuropsychiatric Nutrition

A/Prof Wei Wen
Hippocampus and ageing
WHITE MATTER LESIONS
GWAS of memory function in older people

Discordant Identical Twins and Epigenetics

A) Cognitive ability (p-score)

B) MZ twin 1: AGCTCGTAGCTCGATCAGTCGTAGTSS

B) MZ twin 2: AGCTCGTAGCTCGATCAGTCGTAGTSS

CHeBA: Healthy Brains Positive Ageing

UNSW Australia
Proteomics for blood biomarker discovery

Apolipoproteins

Bioanalytical Mass Spectrometry Facility (BMSF)

Structure of apoB-100 in LDL

Apolipoproteins

- ApoA1
- ApoA2
- ApoB
- ApoE
- ApoC3
- ApoH
- ApoI

Cholesterol
Triglyceride
Blood coagulation
APP/AB

hypercholesterolaemia, hyperlipidaemia, atherosclerosis, thrombosis, hypertension

AD/ dementia

Indicated by latest in vivo evidence, however needs replication.
Have been investigated and supported by epidemiology studies and animal models.
Brain Stimulation and Cognitive Training

Cognitive Training + Progressive Resistance Training
Cognitive Training + Sham Physical Exercise
Progressive Resistance Training + Sham Cognitive Training
Sham Cognitive Training + Sham Physical Exercise
THE FUTURE Collaboration

- Sydney Memory & Ageing Study
- PATH Through Life Study
- Mayo Clinic study
- New York Studies x2
- Pennsylvania Study
- UK Study
- French Study
- Dutch Study
- Korean Study
- Singapore Study
- Chinese Study
- Hong Kong Study

Sydney Centenarian Study
France
Georgia, USA
Heidelberg, Germany
New England, USA
Okinawa, Japan
Tokyo Japan
Polish Study
Swedish Study
Sardinia, Italy

BrainInflame International Consortium
*BrainInflame during Aging*

Dr Darren Lipnicki
Dr Melissa Slavin
Dr Charlene Levitan

CHARGE
ENIGMA
THE FUTURE

TRANSLATION

INFLUENCING MEDICAL PRACTICE

INFLUENCING POLICY

MAKING A REAL DIFFERENCE TO THE LIVES OF PEOPLE
CHeBA: the future .... Reaching out

- Researchers
- Potential researchers
- Clinicians
- Community
- Services, policy
- Internationally - region
Thank you

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