

BETTER BRAINS BETTER BODIES BETTER AGEING



An initiative by the Eastern Suburbs Older Persons Mental Health Service,
Prince of Wales Hospital



Brain health and memory – latest research

Scientia Professor Henry Brodaty
Centre for Healthy Brain Ageing
(CHeBA) UNSW

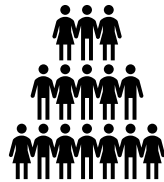
Older People's Mental Health Service,
Prince of Wales Hospital



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Brain Ageing



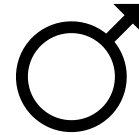
COGNITIVE AGEING & DEMENTIA



400,000-500,000
Australians



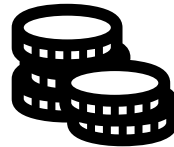
#1 cause of death
in women



#2 cause of death
in men



55 million people
worldwide



Costs global economy
\$1.3 trillion

2

New Drugs Approved
in last 20 years



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What is dementia?

- Decline in cognition
- Interfering with ability to manage daily activities

DEMENTIA

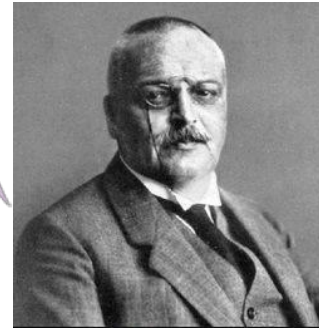
An "umbrella" term used to describe a range of symptoms associated with cognitive impairment.

ALZHEIMER'S
50% - 75%

VASCULAR
20% - 30%

LEWY BODY
10% - 25%

FRONTOTEMPORAL
10% - 15%



Alois Alzheimer

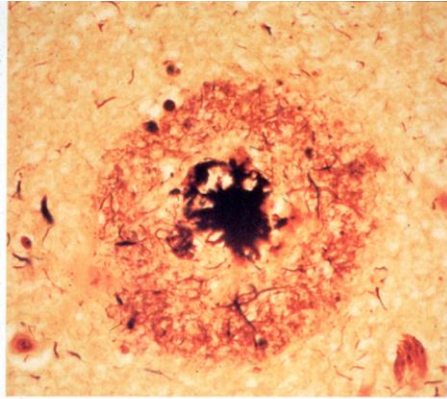


Auguste Deter

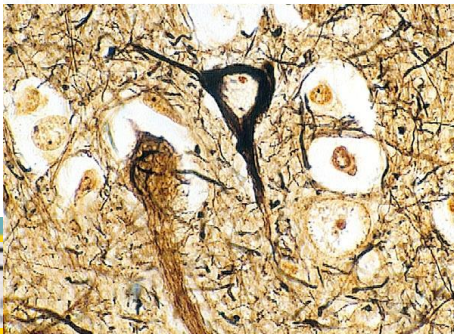


Brain in Alzheimer's

1. Brain atrophy, loss of nerve synapses and branches



2. Build-up of toxic protein in brain called amyloid beta ($A\beta$) protein
→ amyloid plaques

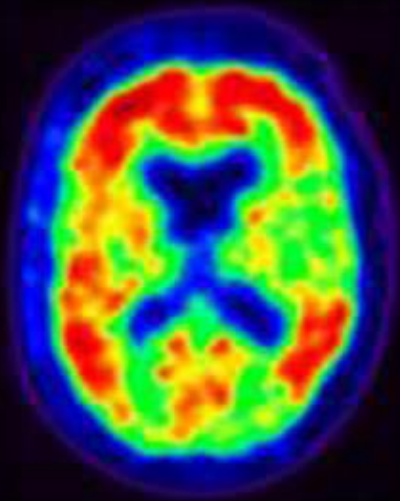


3. Phosphorus added to tau protein → tangled nerve cells

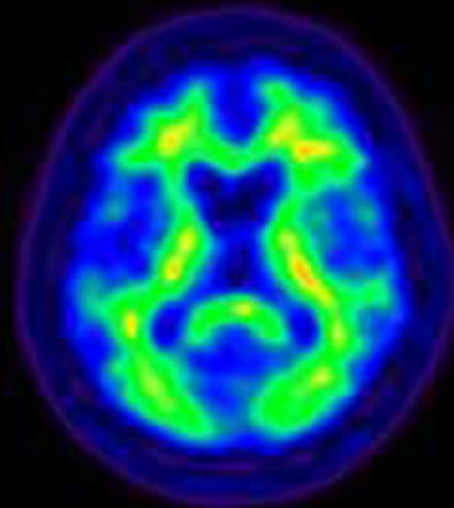
What's new in diagnosis?

Current practice: History, examination, cognitive testing; blood tests (other causes), MRI brain scan

- New:**
- 1) PET Scans for amyloid and tau**
 - 2) Spinal tap for CSF abnormal proteins**
 - 3) Blood tests for abnormal proteins**



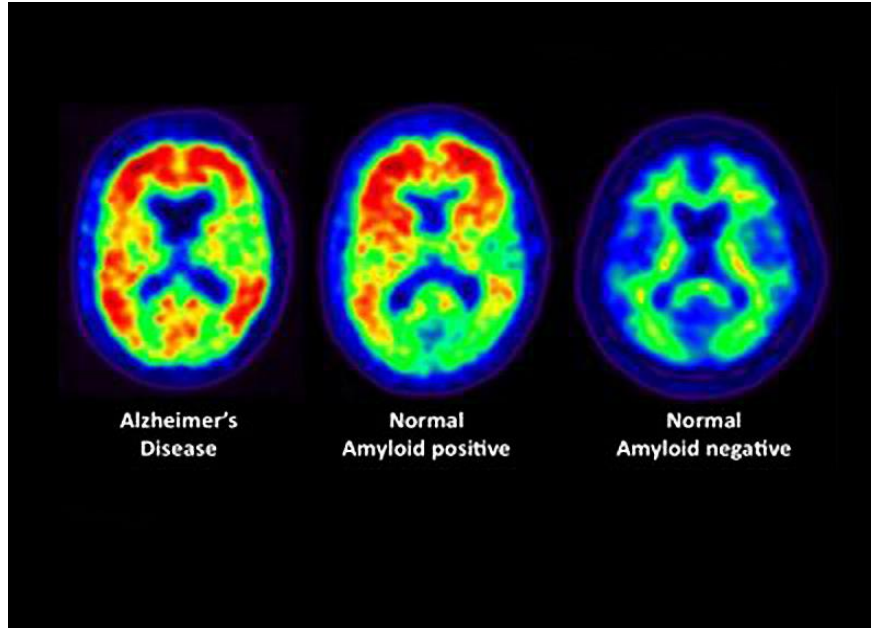
Alzheimer's
Disease



Normal
Amyloid negative

Hotter colours = more amyloid

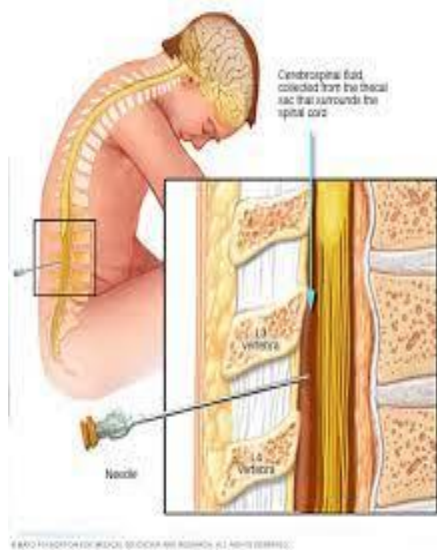
PET amyloid imaging: normal vs AD



- 35% persons 60+ amyloid+
- Amyloid+ → ↑ risk clinical progression
- Will all amyloid+ develop AD?
- When??

PET tau and dopamine transport imaging now available too

Spinal tap: CSF in Alzheimer's disease



Curious finding in Alzheimer's

- **Low levels**: amyloid beta protein, especially $A\beta_{42}/A\beta_{40}$ ratio
- High levels of total tau and phospho-tau
- Reasonably good accuracy

Blood tests for Alzheimer's disease

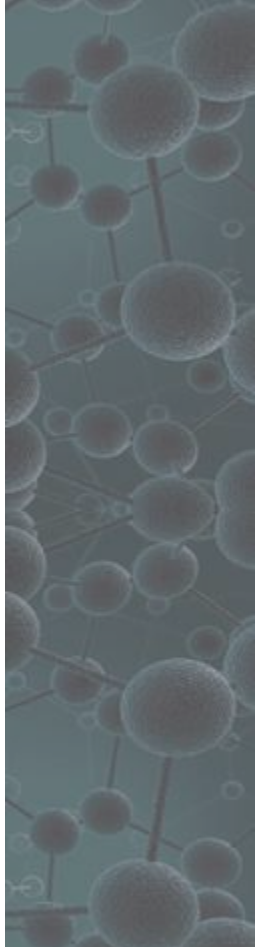


- $A\beta_{42}/A\beta_{40}$ ratio
- Phospho-tau-181 & 271
- Accuracy 90%+ v amyloid imaging^{1,2,3}
- GFAP (Glial fibrillary acidic protein) – marker of astroglia
- NFL (Neurofilament light chain) – marker of neuro-axonal injury eg in MS & other neurological diseases

¹Nakumara A et al, Nature, 2018;554:249-54; ²Li Y et al; Neurology, 2021; ³Palmqvist S et al JAMA 2020

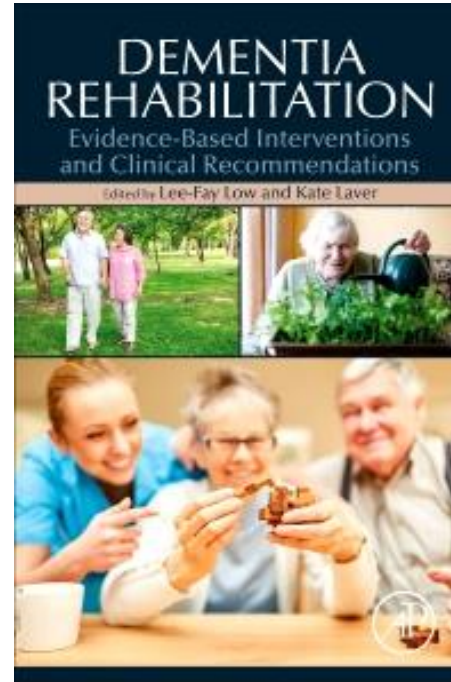
And after diagnosis... what then?

- Help, advice, management plan
- How to live positively with dementia
- Support eg Dementia Australia



Evidence for rehabilitation

- Medications
- Behavioural support
- Carer support
- Cognitive focused interventions
- Occupational therapy
- Exercise
- Psychological interventions
- Peer support
- Speech pathology
- Dementia friendly communities



Forward
with dementia ●●●

A guide to living with dementia

ForwardwithDementia.org



What's new in treatment?

Current practice: drugs to bolster chemicals important for nerve cells to talk to each other eg donepezil (Aricept)

New: Disease modifying treatments for Alzheimer's

- **m**onoclonal **a**nti**b**odies against the A β protein
aducanum**mab**, lecanem**mab**, donanem**mab**

Aducanumab = Aduhelm

- **Controversially FDA approved in 2021**
- **Benefits not convincing, significant side effects**
- **Expensive**
- **Now superseded by ...**

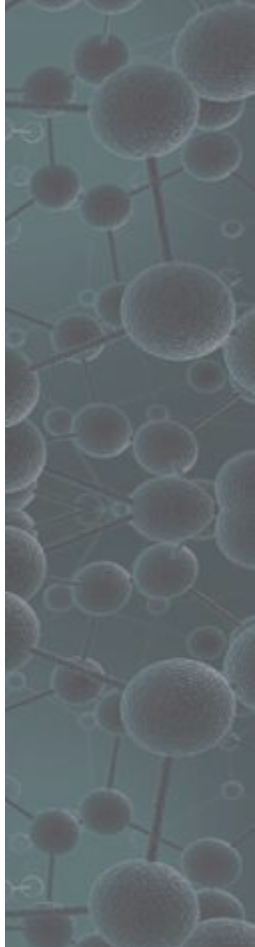


Lecanemab = Leqembi (Eisai, Biogen)

- **Approved in early 2023 by FDA and recently by CMS (for Medicaid/Medicare)**
- **27% less cognitive decline over 18 months**
- **Removes amyloid from brain**
- **Side effects – brain swelling, microhaemorrhages**
- **Usually settles spontaneously, but 3 deaths**
- **Expensive (US\$26,000 pa)**

Donanemab (Eli Lilly)

- Findings published July 2023
- Awaiting FDA approval
- Similar benefit (about 30% reduction in cognitive decline) and side effects including 3 deaths vs 1 death in placebo group



Other considerations with mABs

- Alzheimer's as cause of dementia must be confirmed by amyloid PET Scan (\$2,500) or lumbar puncture
- 3 MRI Scans in first six months to check for swelling or microhaemorrhages
- Too risky if Apolipoprotein E e4/e4 or on anticoagulants; benefit in women less
- 2nd or 4th weekly IV infusions, 18m or more??

What's new in prevention?!

Now 12 potentially modifiable environmental factors accounting for 40% of population attributable risk of dementia



Prevention vs delay onset



Smallpox vaccine

Never too late, never too early



**Mixed aerobic + anaerobic
better**



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Cognitive training

CRYPTIC by06 20,301

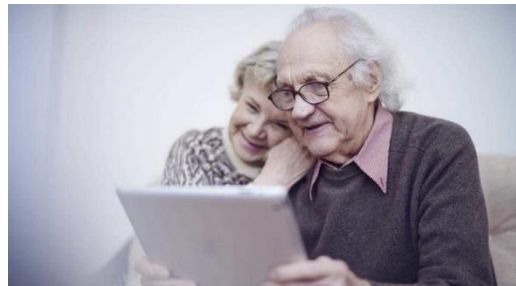
ACROSS

- 1 I'm kidding about her (10)
- 3 Great 2 ball game, just 11 steps (5)
- 5 How many spectators stand on 4 acres, 100 metres, see 10
- 10 There's evidence for change; inhibition, usually ignored (5)
- 11 Ladies like a good one (7)
- 12 Public services director's opening and closing phrases repeat (10)
- 13 Poor to better, never offering less back after the need (5)
- 14 Campaign rallies, both dark, Gordon, 2011 (10)
- 15 Call girl, Elizabeth II, rhymes (5)
- 16 Dignified, dignified, rhymes for 100 metres (10)
- 17 Come on, people (10)
- 18 Down on my hands, followed local, adult (7)
- 19 Big, casual, off road, casual, 100 metres (10)
- 20 Ladies be, 100 metres (10)
- 21 High on the hill, 100 metres, being 100 metres (10)
- 22 How long was the 100 metres, 100 metres, 100 metres, 100 metres (10)
- 23 Ladies be, 100 metres (10)
- 24 Ladies be, 100 metres (10)

DOWN

- 1 Country, created on an 100 metres, on an 100 metres (10)
- 2 Check her books, 100 metres (10)
- 3 Make one hundred, 100 metres (10)
- 4 100 metres, 100 metres (10)
- 5 100 metres, 100 metres (10)
- 6 100 metres, 100 metres (10)
- 7 100 metres, 100 metres (10)
- 8 100 metres, 100 metres (10)
- 9 100 metres, 100 metres (10)
- 10 100 metres, 100 metres (10)
- 11 100 metres, 100 metres (10)
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- 22 100 metres, 100 metres (10)
- 23 100 metres, 100 metres (10)
- 24 100 metres, 100 metres (10)

5	3		7				
6			1	9	5		
	9	8					6
8				6			3
4			8		3		1
7				2			6
	6					2	8
			4	1	9		5
				8			7



High blood pressure



Diabetes



Obesity in Mid-Life



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Mind your diet

- Mediterranean
- Antioxidants



What is Mediterranean-style diet?

- Abundant plant foods
- Fresh fruit as typical daily dessert
- Olive oil as principal source of fat
- Dairy products (cheese, yogurt)
- Fish and poultry - low to moderate
- 0- 4 eggs week
- Red meat - low amounts
- Wine - low to moderate amounts
- Total fat = 25% to 35% of calories
- Saturated fat \leq 8% of calories



Anthocyanins – purple diet to protect against dementia



Alcohol



**In moderation may
have benefits against
dementia, but.....
...increases risk of
cancer**



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Natural therapies



Tumeric/ curcumin



Omega-3



**Ginkgo
leaves**



Brahmi



Ginger family

Hearing loss

**3 studies, follow-ups 9-17 years
30% increased risk per 10dB
worse hearing**



Hearing loss



Hearing aids reduce risk

Social isolation → dementia, depression, mortality



Protective

- Friends & family
- Living with others
- Confidante
- (Never lonely)

Samtani S, Mahalingam S 2022,2023

Sleep



Air Pollution



Systematic review, 13 longitudinal studies, 1-15 year follow-up'- exposure to PM_{2-5} , NO_2 and CO all associated with dementia risk↑ (Peters R, J Alz Dis 2019)

“Air Pollution Robs Us of Our Smarts and Our Lungs”

GIBBENS S, *National Geographic*, 2018

9/10 people breathe in polluted air

RESEARCH PARTICIPANTS NEEDED!

Are you aged 70 – 90 and live in Sydney's Kingsford-Smith or Wentworth suburbs?

We need you!

Join CHeBA's groundbreaking research to help us understand risk factors and protective factors in relation to brain health.

Want to know more? Visit www.mas2.org



Scan QR code to express your interest!

Or email us at mas2@unsw.edu.au



What are the benefits?

- You will receive **exclusive access to healthy ageing webinars** from our team at UNSW
- You will receive a **summary of your memory and physical health**



MEMORY & AGEING
STUDY 2



UNSW
SYDNEY

UNSW Ethics approval: HC220681

Prevention studies

- **FINGER – modest benefits on cognition**
- **Maintain your Brain – largest online prevention trial – positive over 3 years**
- **Cognition improved significantly more in active coaching group than viewing online curated information**

Four modules



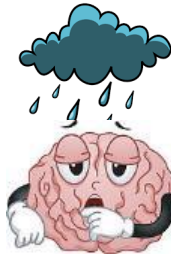
Physical activity



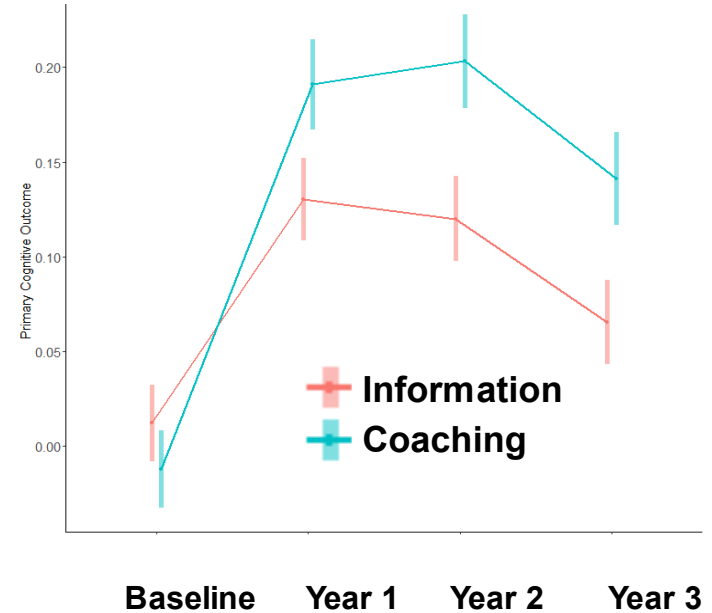
Diet & nutrition



Brain training



Depression/Anxiety



What's new in dementia?

- **Diagnosis of Alzheimer's**
- **Post-diagnostic care**
- **Living positively with a dementia**
- **Drug treatments for Alzheimer's**
- **Prevention, delay onset of dementias**



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