



INSTITUT DE RECHERCHE
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sur le cerveau

Brain and Mind
Research Institute

THE FUTURE OF ALZHEIMER'S DISEASE

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Memory: What is normal?

- ⦿ Some degree of memory loss may be normal as someone gets older
- ⦿ Having more difficulty with people's names
- ⦿ Forgetting why one has entered a room
- ⦿ Normal for answer to these questions to come later, after a few minutes, or sometimes hours
- ⦿ Memory is intact, but somewhat slower to respond

Memory: What is not normal?

- ⦿ Forgetting important details from recent conversations or events
- ⦿ Repeating questions or statements within the same day or conversation, without recollection of saying the same thing before
- ⦿ Memory loss which other people notice, when someone does not notice it in themselves

Memory: What is not normal?

- ◎ Memory loss which begins to impair independent daily functioning
 - Taking medications properly
 - Managing bills correctly
 - Shopping
 - Cooking / Cleaning
 - Driving a car safely

- Dressing
- Hygiene

What is Dementia?

- Dementia is a medical term which applies to memory loss which is significant enough to impair someone's daily independent functioning
- Mild Dementia
 - Some help required with bills and medications
- Moderate Dementia
 - Some help required with dressing and hygiene
- Severe Dementia
 - Help required with all daily functioning

What is Alzheimer's disease (AD)?

- ⦿ Alzheimer's disease is a build-up of specific proteins in the brain (amyloid and tau), which causes the brain to lose recent memories, and eventually other thinking functions
- ⦿ Alzheimer's disease is the most common cause of Dementia
 - Other causes: Stroke, Parkinson's disease, Head Injury

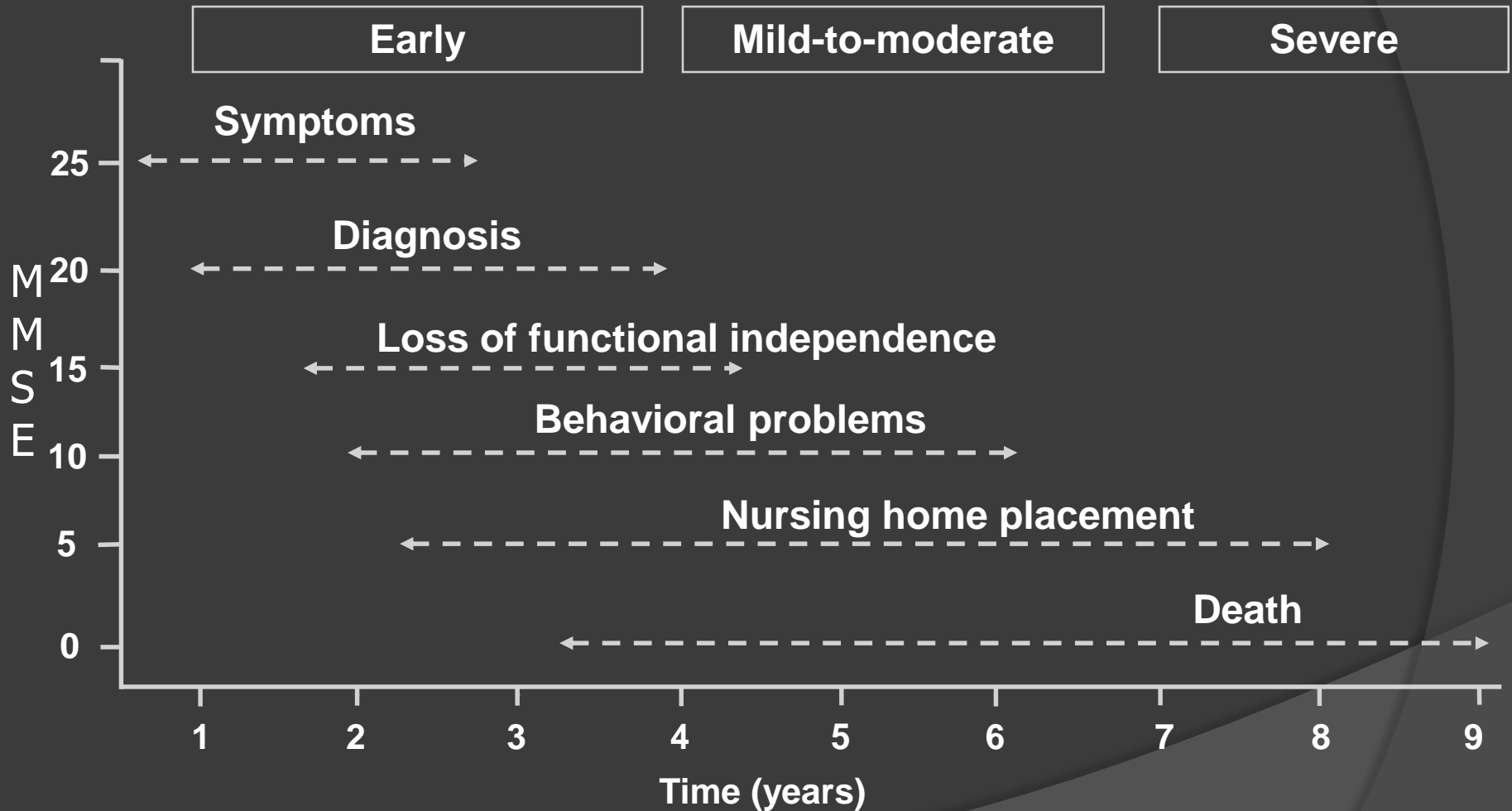
Dementia and Alzheimer's

Alzheimer's disease
is the cause



Dementia is the effect

How does Alzheimer's disease progress?

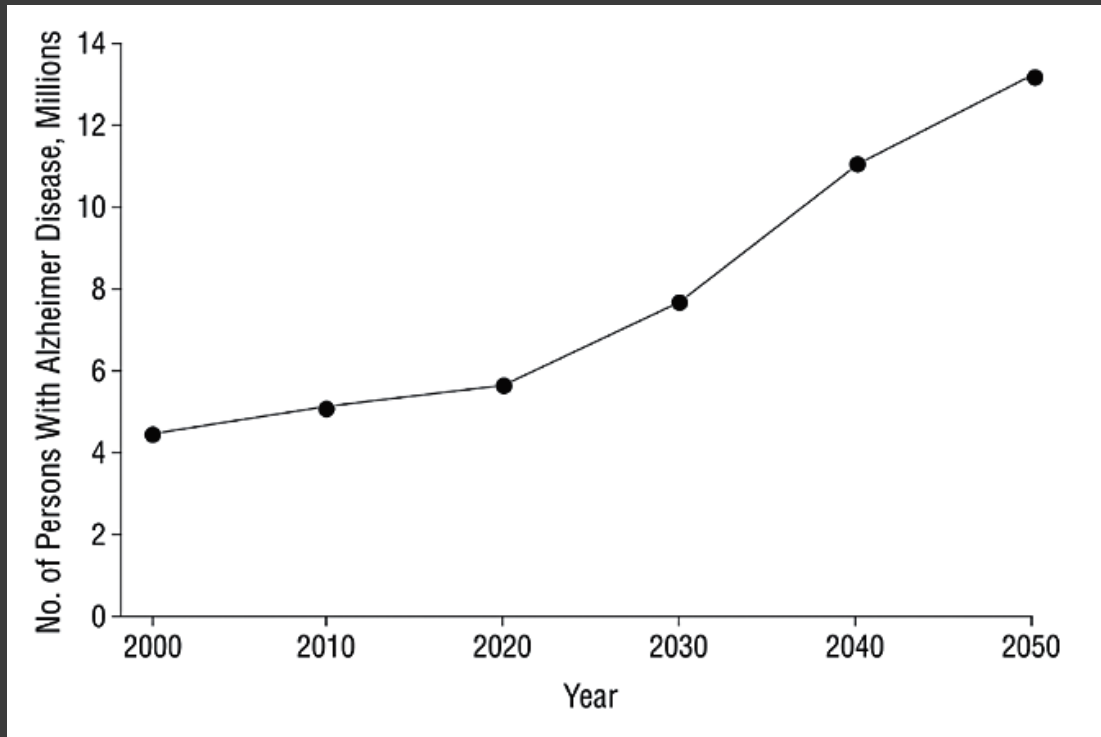


Prevalence of AD

- ⦿ Aged 65: 2.5%
 - ⦿ Aged 70: 5%
 - ⦿ Aged 75: 10%
 - ⦿ Aged 80: 20%
 - ⦿ Aged 85: 40%
-
- ⦿ Doubling of prevalence with every 5 years of age after age 65

The Threat of Alzheimer's

■ US prevalence



4.5 million (2000)
→ 13.2 million
(2050)

Hebert et al. Arch Neurol.
2003 Aug;60(8):1119-22.

The Threat of Alzheimer's

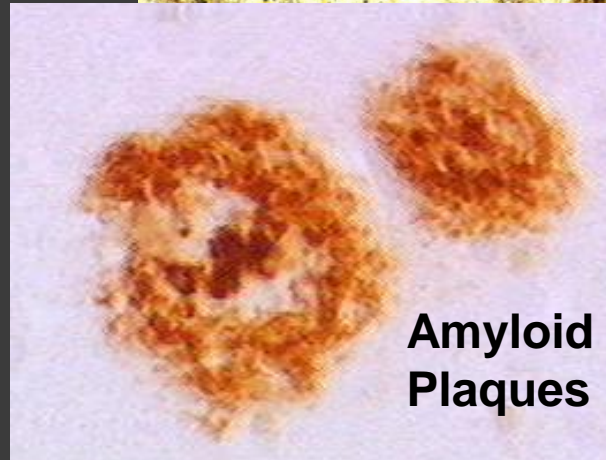
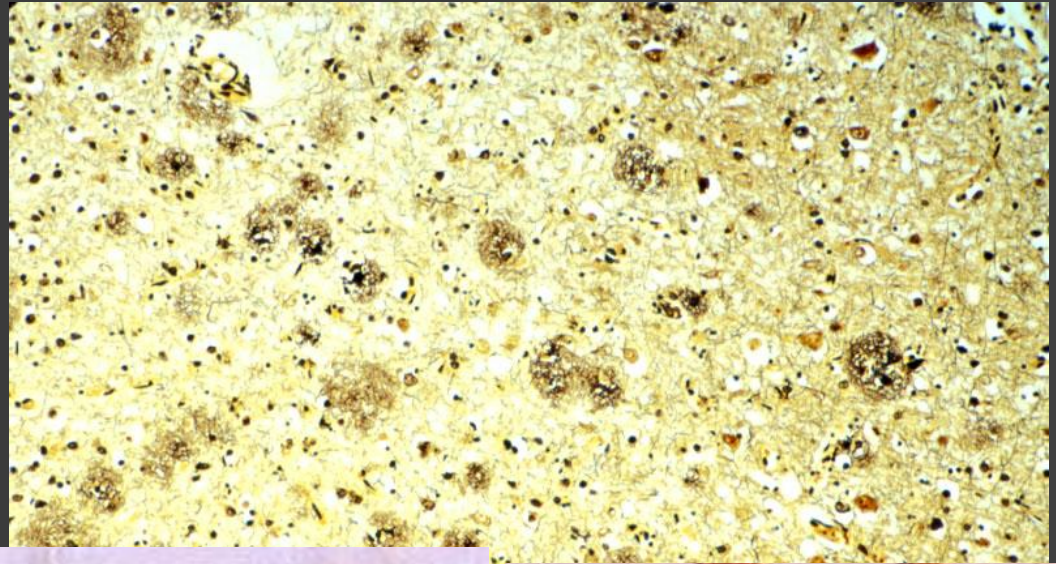
● In Canada

- Today: Estimated 564,000 Canadians have Alzheimer's or a related dementia
- In 15 years: Estimated 937,000 Canadians will have Alzheimer's or a related dementia
- Economic cost of care currently \$10.4 billion annually

Dr. Alzheimer's disease (AD)



1906

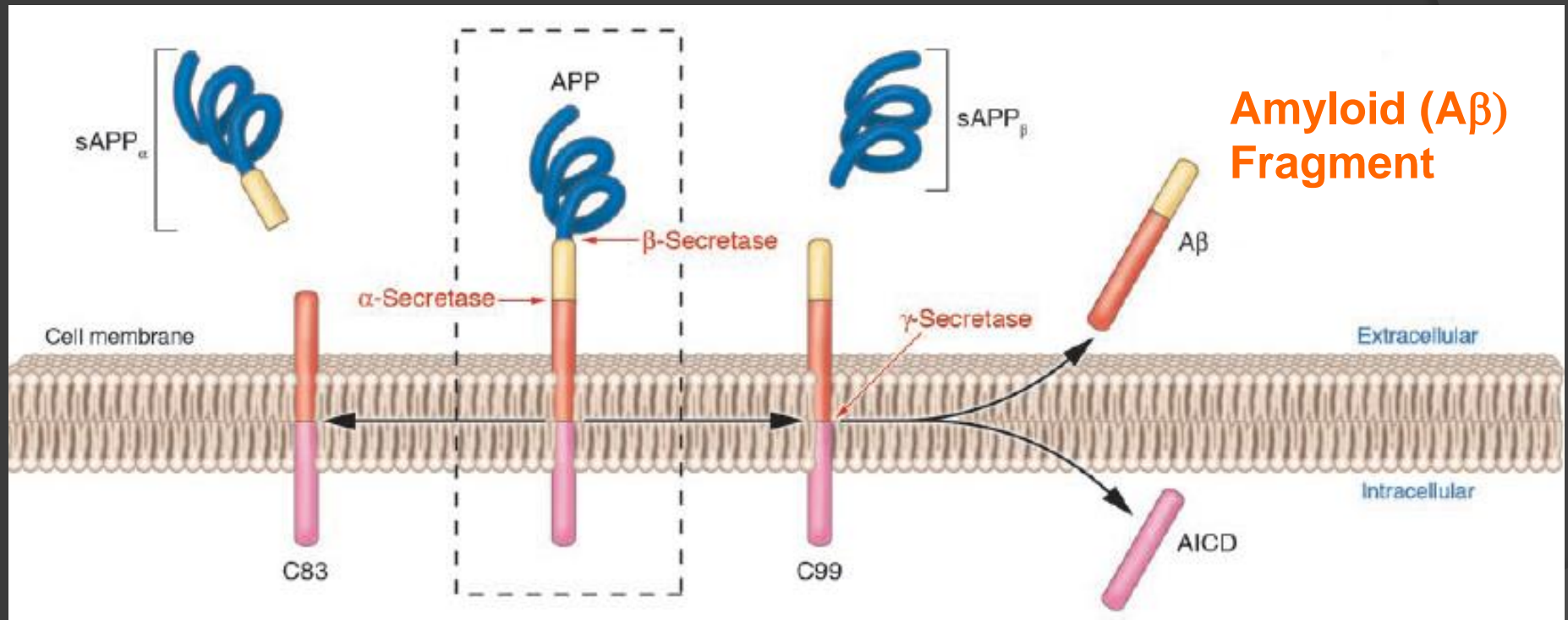


**Amyloid
Plaques**

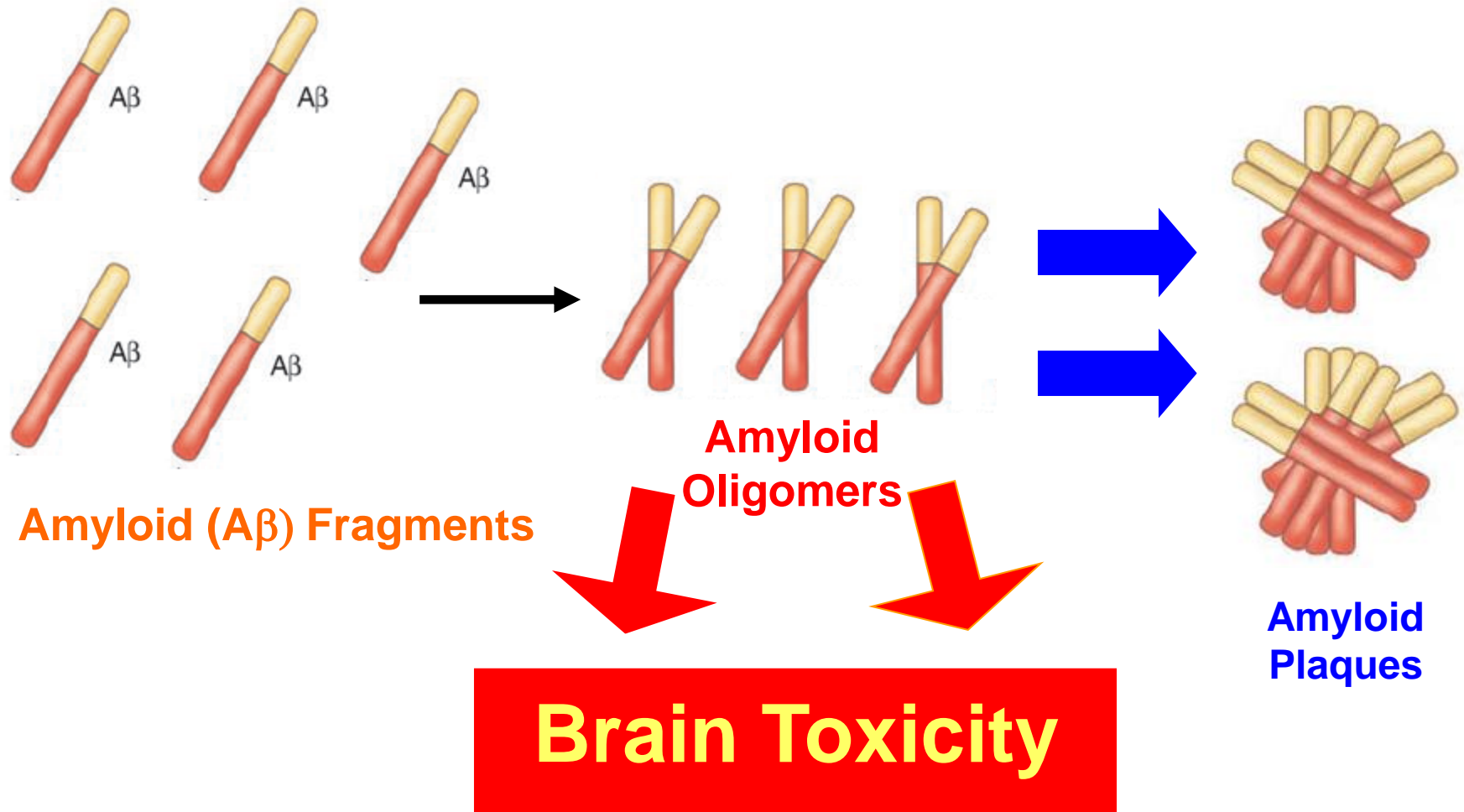


**Tau
Tangles**

The Creation of Amyloid

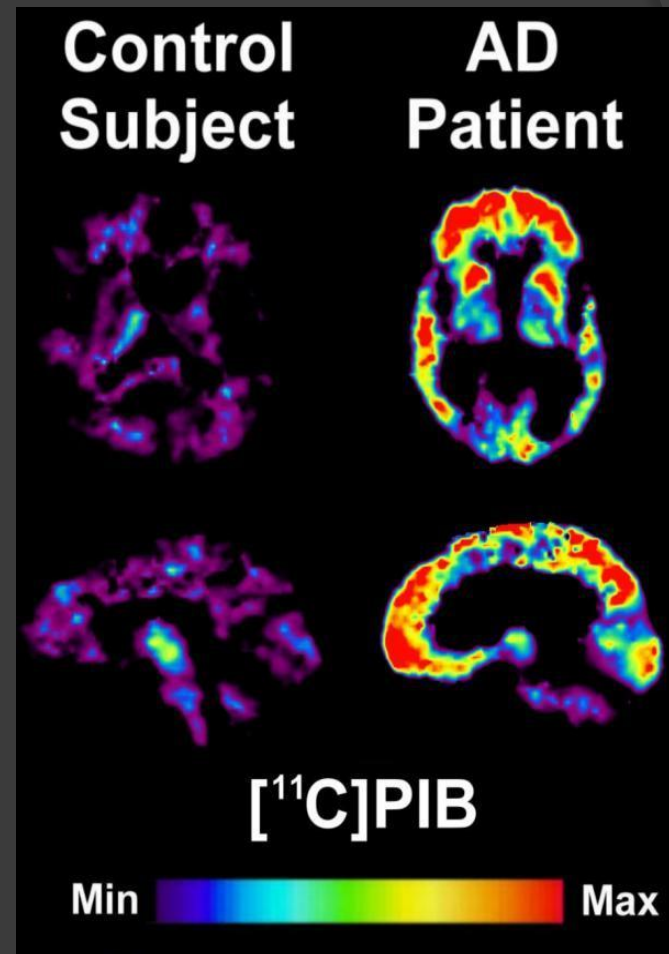


The Toxic Effect of Amyloid



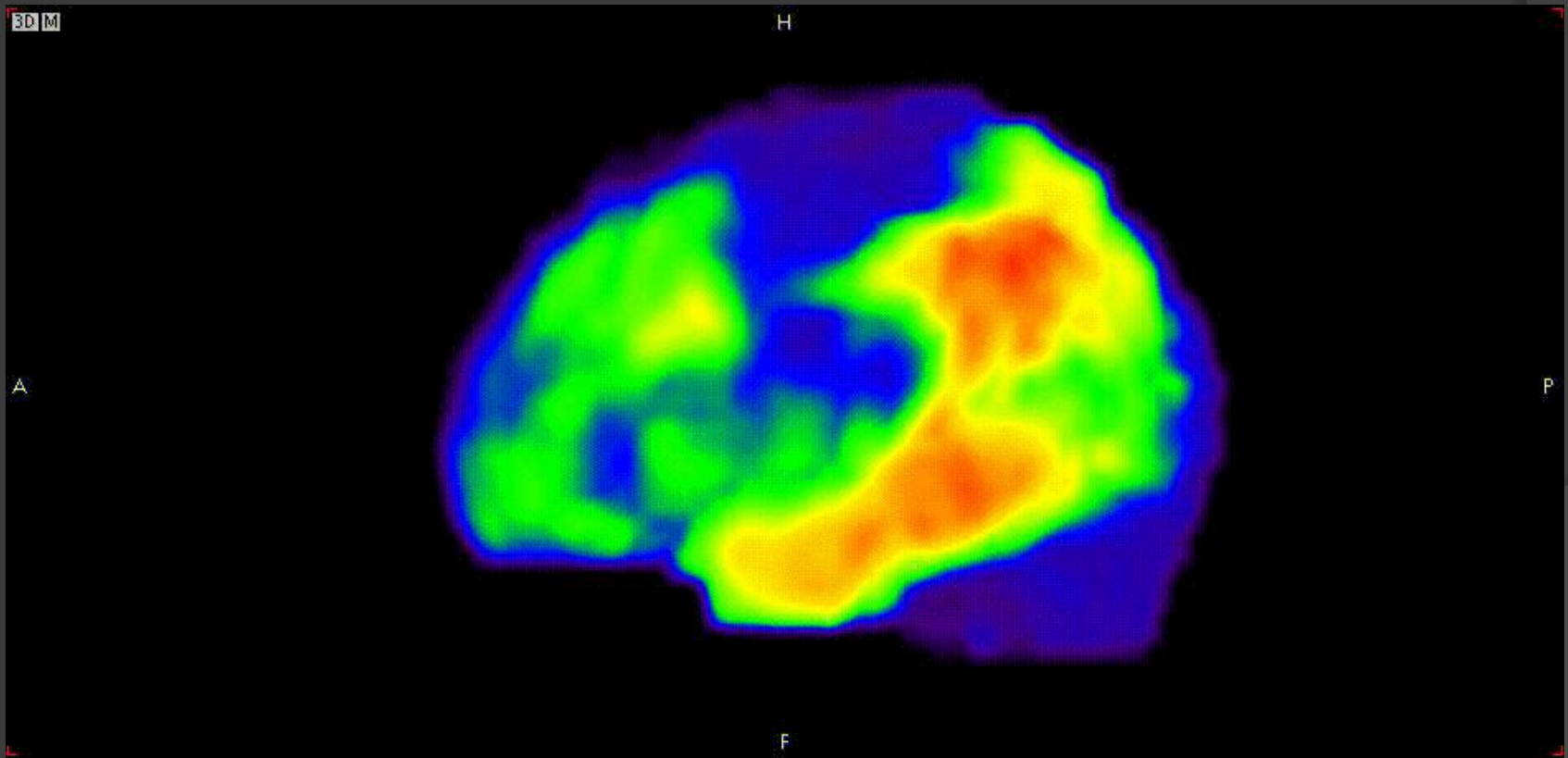
Visualizing Alzheimer's disease (AD)

- PET scan with Pittsburgh compound-B (injected intravenously before scan) allows amyloid protein to be visualized



Tau Imaging

- AV-1451 Tau-PET tracer (flortaucipir)



Is there any treatment for Alzheimer's?

- ① Mild Symptom treatment
 - Cholinesterase Inhibitors
 - Aricept/donepezil
 - Reminyl/galantamine
 - Exelon/rivastigmine
 - Available as a transdermal (skin) patch
- ① Moderate Symptom treatment
 - Ebixa/memantine

Can Alzheimer's disease be prevented?

- ◎ Control “vascular” (blood vessel) risk factors
 - High blood pressure (hypertension)
 - High cholesterol
 - High blood sugar / Diabetes
 - Stopping smoking
 - Loss of excess weight
- ◎ Mental and Physical exercises
- ◎ Social Involvement
- ◎ Balanced Diet

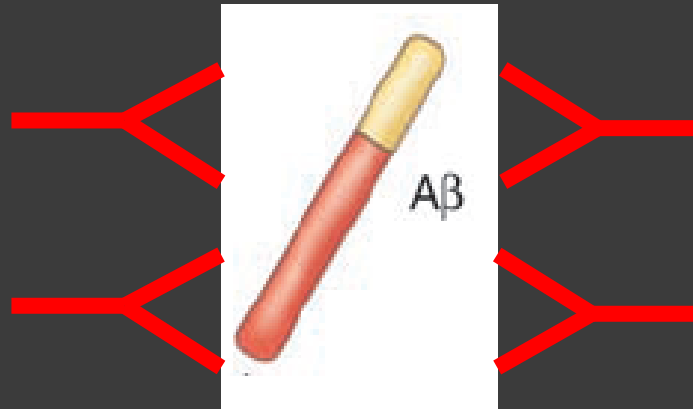
Is there hope for new treatments for Alzheimer's disease?

- Huge effort worldwide to discover new treatment
- Now attempting to remove amyloid and tau build-up which causes Alzheimer's disease



Anti-Amyloid Antibody

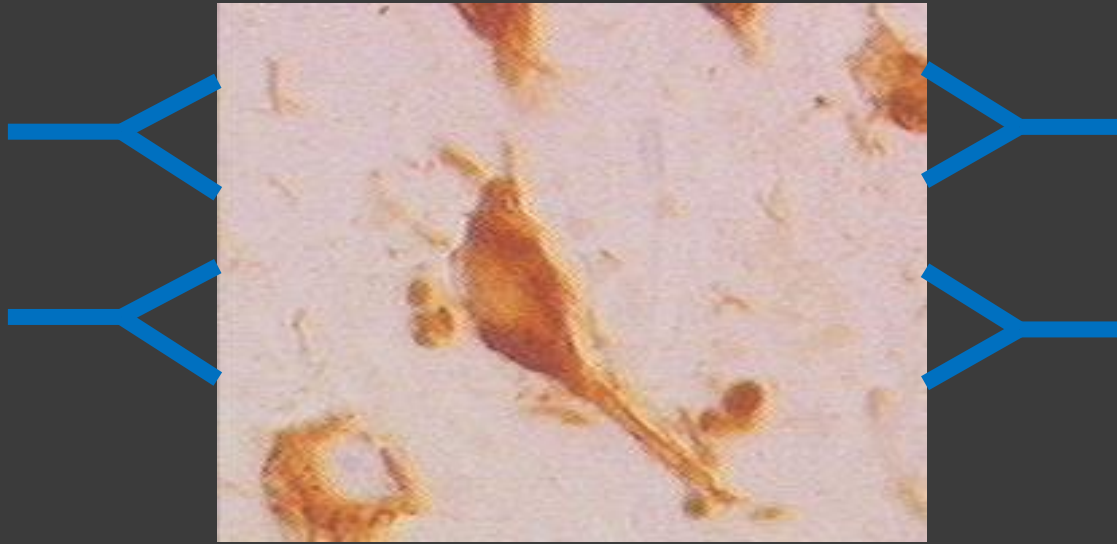
- Intravenous Anti-Amyloid Antibody



- Phase 3 studies been disappointing

Anti-Tau Treatment

● Intravenous Anti-Tau Antibodies



- Prevents clumping of tau protein tangles
- Phase 2 study underway at Bruyere Memory Program

Also Under Investigation

● Secretase Inhibitors

- Slows production of amyloid
- Phase 3 studies now underway

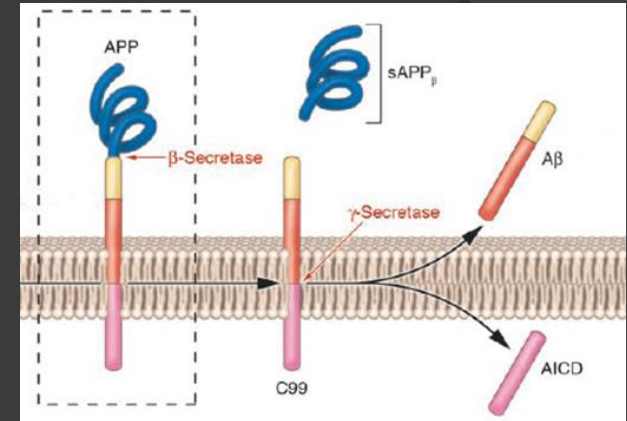
● PBT-2

- Captures copper and zinc in the brain, preventing clumping of amyloid

● Nerve Growth Factors

- Promotes regrowth of neurons

● Stem Cell Research



Also Under Investigation

- Early detection of cognitive impairment via computerized cognitive testing
- At-home cognitive testing via tablet gaming
- In-home monitoring for safer and more sustainable home living with dementia

Working Together



Bruyère Memory Program

- Located at Élisabeth Bruyère Hospital in Ottawa
- OHIP covered
- Referral from physician required

- Memory testing performed by nurse or neuropsychologist
- Appointment with memory-specialized physician arranged to review results



Conclusions

- Dementia due to Alzheimer's disease is a threat to individuals, their families, and to society as a whole, now and over the next generation

Conclusions

- Current treatments, such as cholinesterase inhibitors and memantine, have a modest cognitive benefit, and may delay time to serious disability or time to placement in a nursing home
- Management of vascular risk factors, and a healthy lifestyle, are recommended

Conclusions

- Treatment of the underlying amyloid and tau protein deposition in Alzheimer's disease is being tested
- New treatment options may be available within the next 3 years