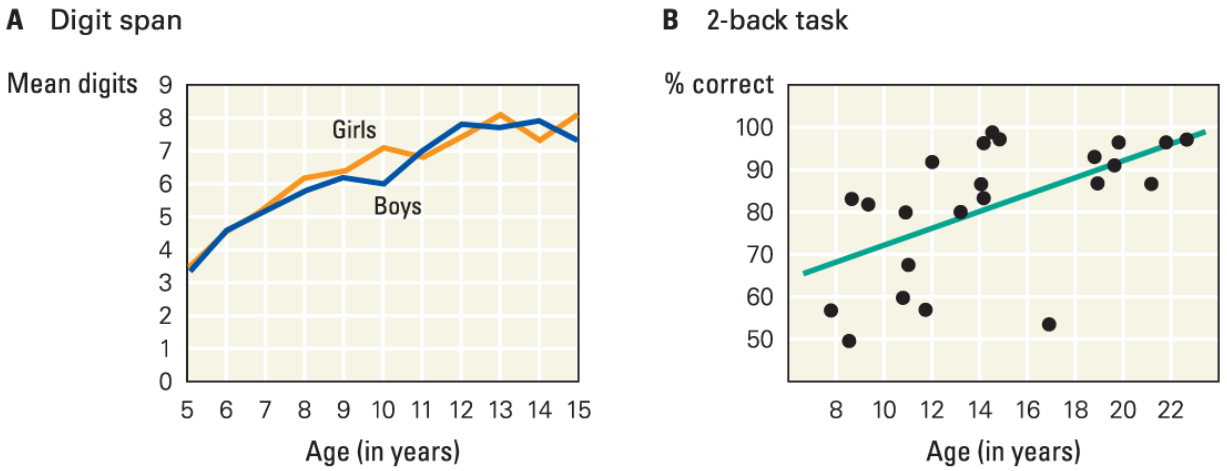
Class 17
L&M across lifespan

Thursday

3/11/22

Working memory

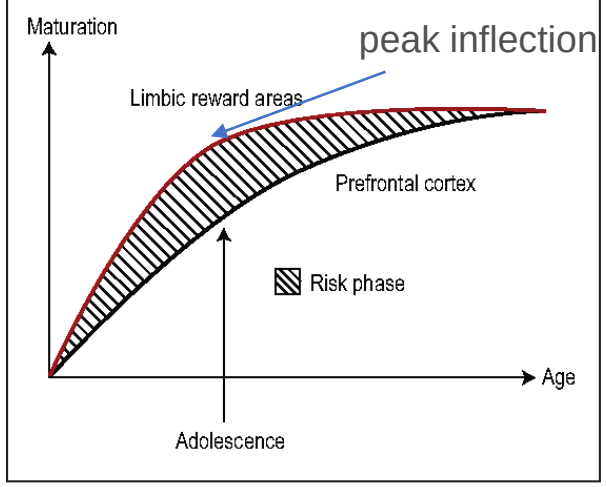
- Ten-year-old chess experts could remember more pieces than non-chess-playing adults,
- exposure to and familiarity with the material is important for working memory to develop



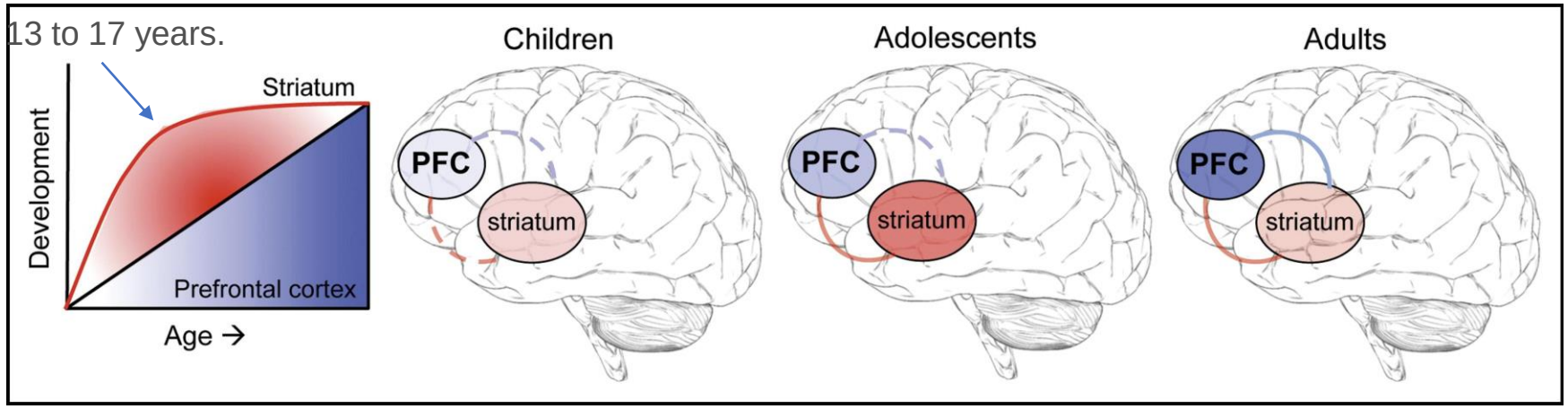
Gluck et al., *Learning and Memory*, 4e, © 2020 Worth Publishers

- n-back task
  - Requires spatial working memory (mental map of sequence of events)

peak inflection from 13 to 17 years.



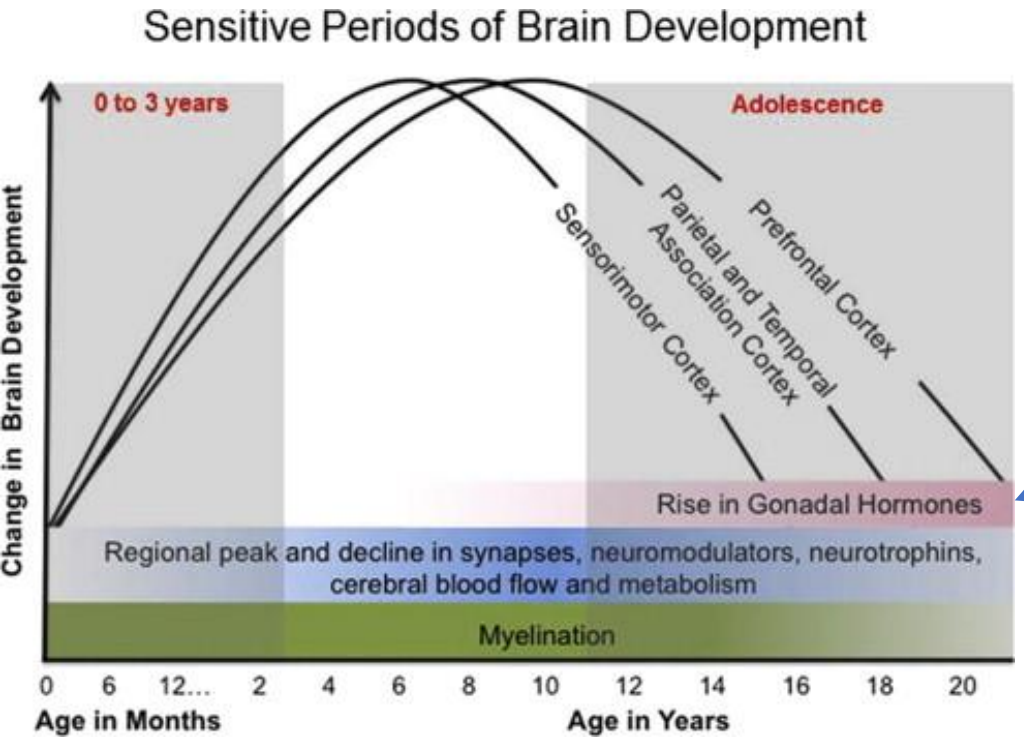
Nonlinear maturation processes of subcortical and prefrontal brain



https://www.jaacap.org/article/S0890-8567(10)00670-2/fulltext

Evolutionarily?

PFC maturation



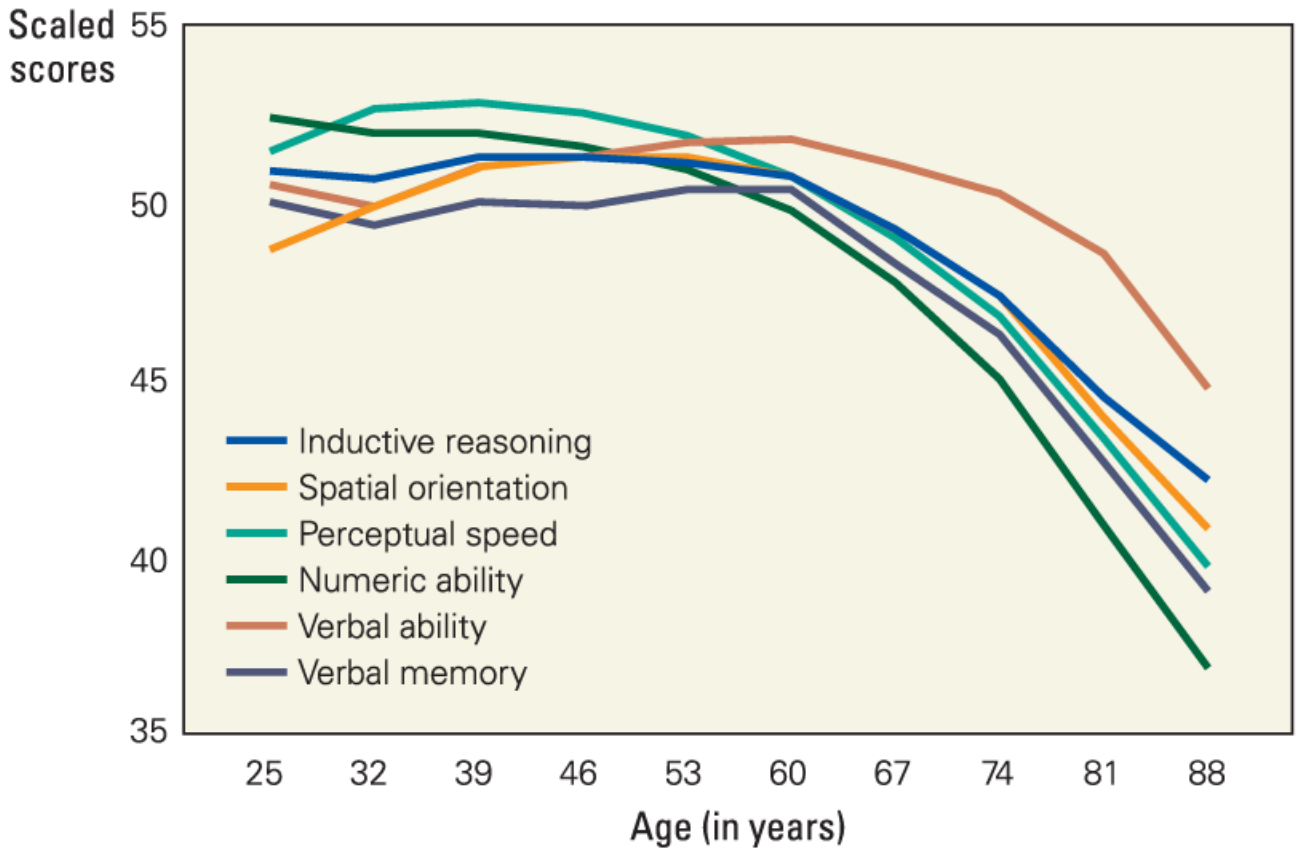
Post puberty
Higher testosterone

- Juvenile crime?
- Addiction
- Drug abuse
- Robbery
- Rape
- Inability to assess consequences (thrill, risk)

- The PFC has inhibitory control over many brain regions.
- Inhibitory control during adolescence is not matured

Driving/drinking Laws

Human Cognition Across the Lifespan



Gluck et al., *Learning and Memory*, 4e, © 2020 Worth Publishers

Working memory?
Last in first out

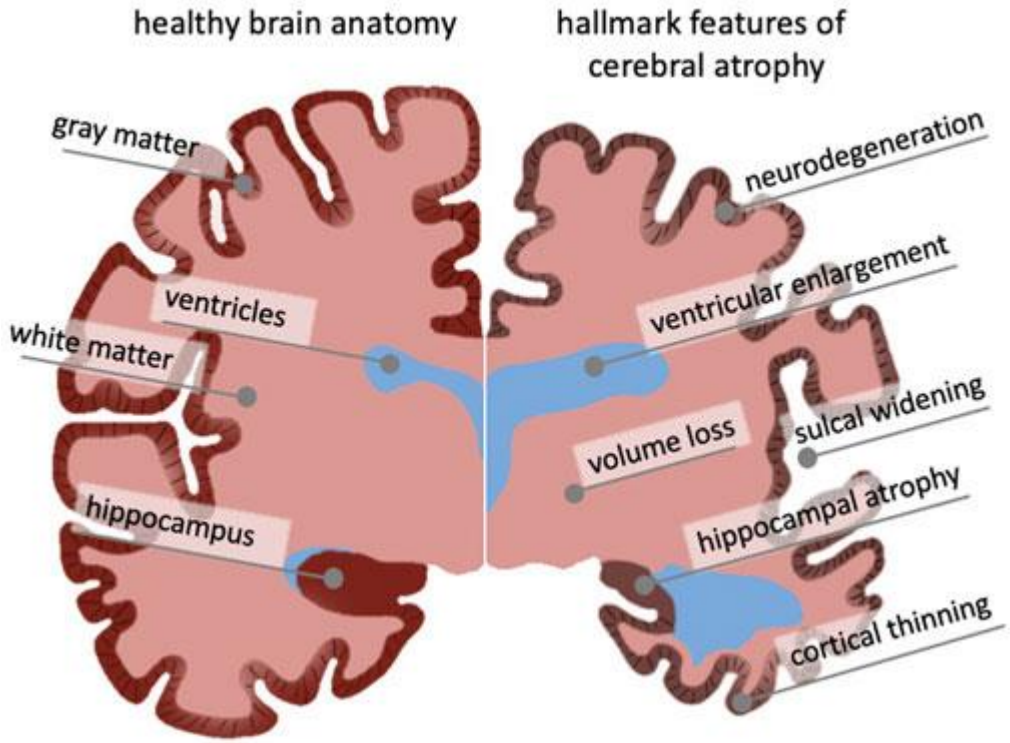
Proactive interference?

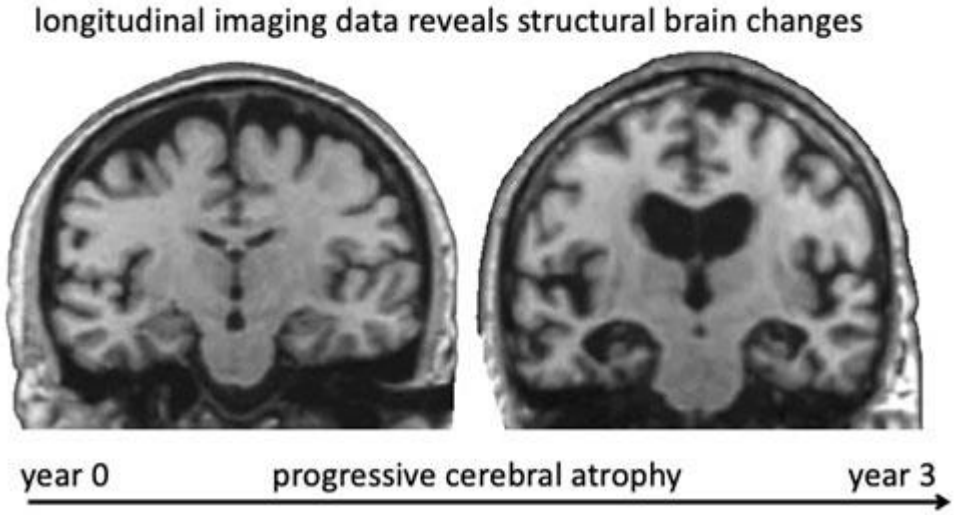
Non-Declarative Memory

- Conditioning is slower
- Motor skill learning is slower, eg. Computers
- Known skills are maintained – e.g. musicians, artists

Aging Brain

Prefrontal cortex
Hippocampus



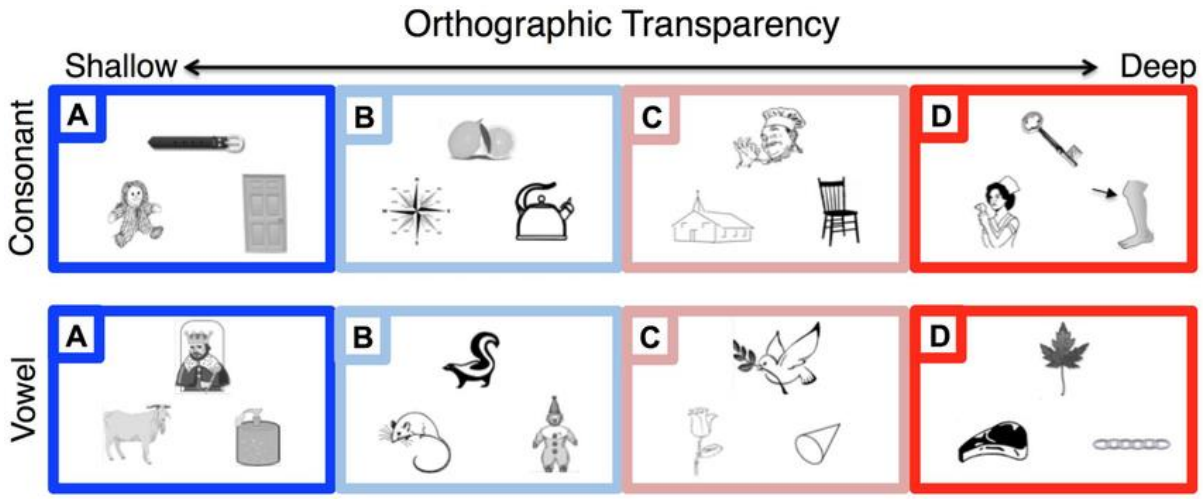


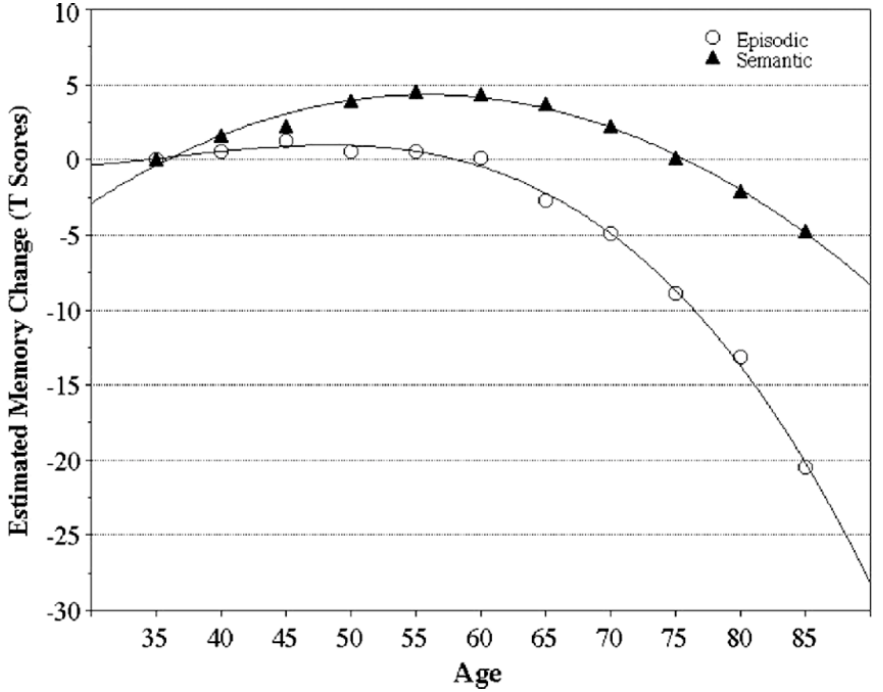
Episodic and Semantic ?

- Binding deficit (encoding & retrieval of where, what when info) – hippocampus
- Control deficit – working memory (organization, manipulation, evaluation of info) – PFC
- Episodic → familiarity > recollection

Semantic info

- Old = young (easy tasks, semantic judgement)
- Old < young (difficult tasks, phoneme judgement task)

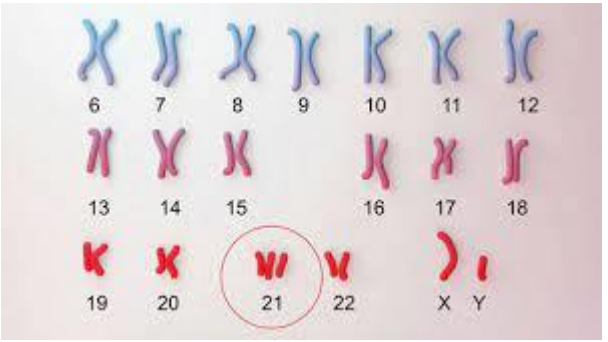




1. Recalling one’s wedding day
2. Remembering the items on this week’s shopping list (without writing them down)
3. Remembering how to make coffee
4. Learning the name of a new friend
5. Learning how to take photos with a new phone

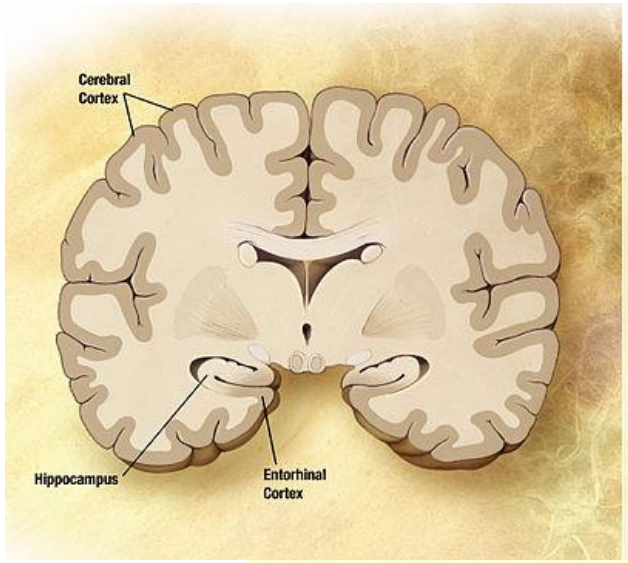
Down’s syndrome

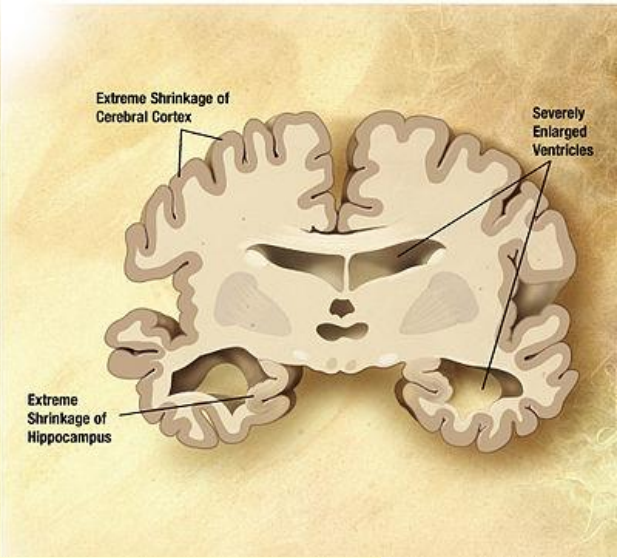
extra copy of chromosome 21
(called **trisomy 21**)
Congenital disorder

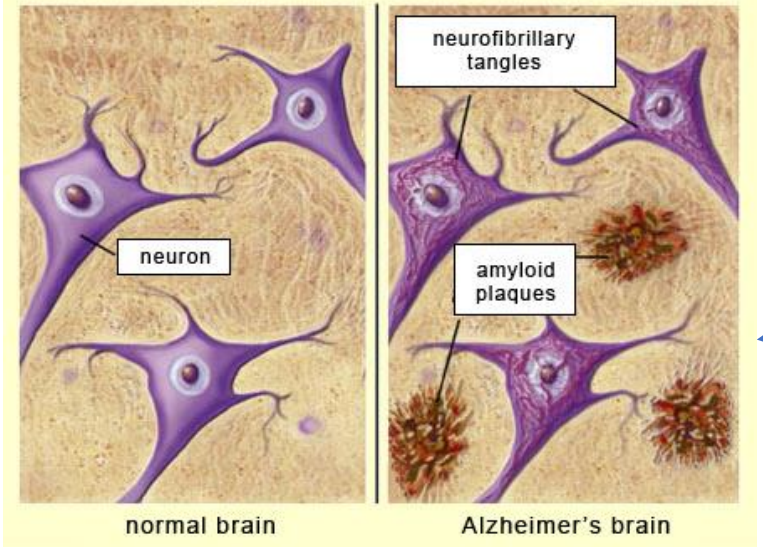


- Hippocampal, frontal cortex, cerebellum – smaller
- Episodic Memory ⬇
- delayed physical growth
- mild to moderate intellectual disability
- Reduced life expectancy (20-40 yrs)

Normally aging vs Alzheimer's disease



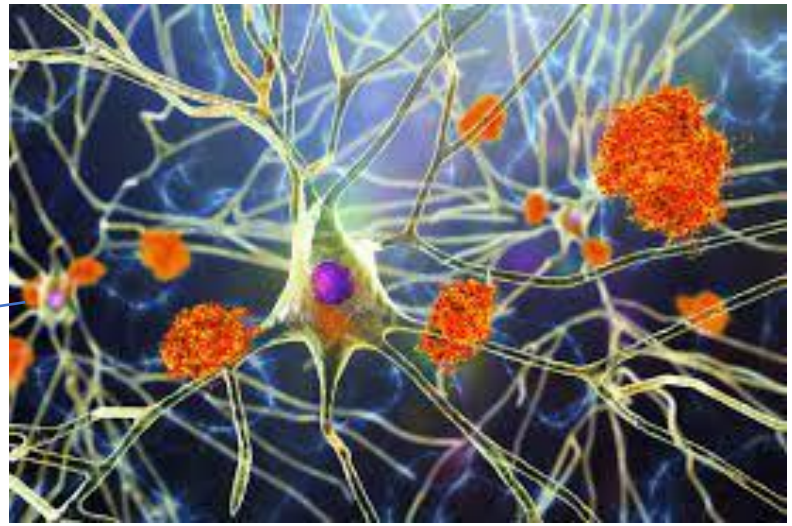




With aging

Unremoved proteins build up

accelerated



Alzheimer's disease (AD) → cause?

- Risk factors (not clearly established)
    - Inactive lifestyle
    - lack of exercise (physical + mental)
    - Loneliness, social isolation
    - diet (vit B12, vit D)
- Inflammation (chronic diseases – diabetes, hypertension, etc.)
- Genetic

AD causes → ?

- Dementia → extreme condition of Cognitive decline
- How do you diagnose?
- Treatment?