

Chapter 13: Learning and Memory

The Nature of Learning

Four Principal Types of Learning

Two Principal Types of Memory

Memory Consolidation

Synaptic Plasticity

- Electrophysiological mechanisms

- Biochemical mechanisms

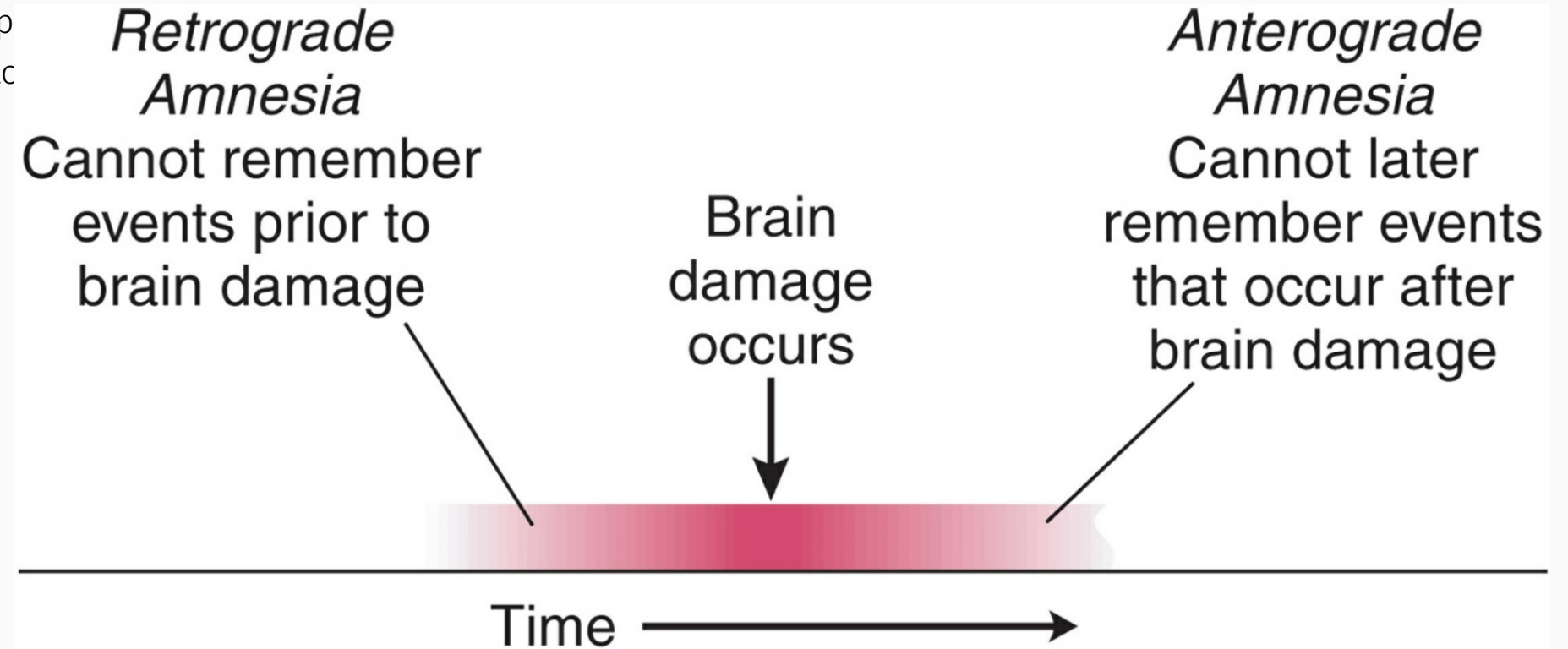
Neurobiological Mechanisms

Disorders

Disorders

Retrograde and Anterograde Amnesia.

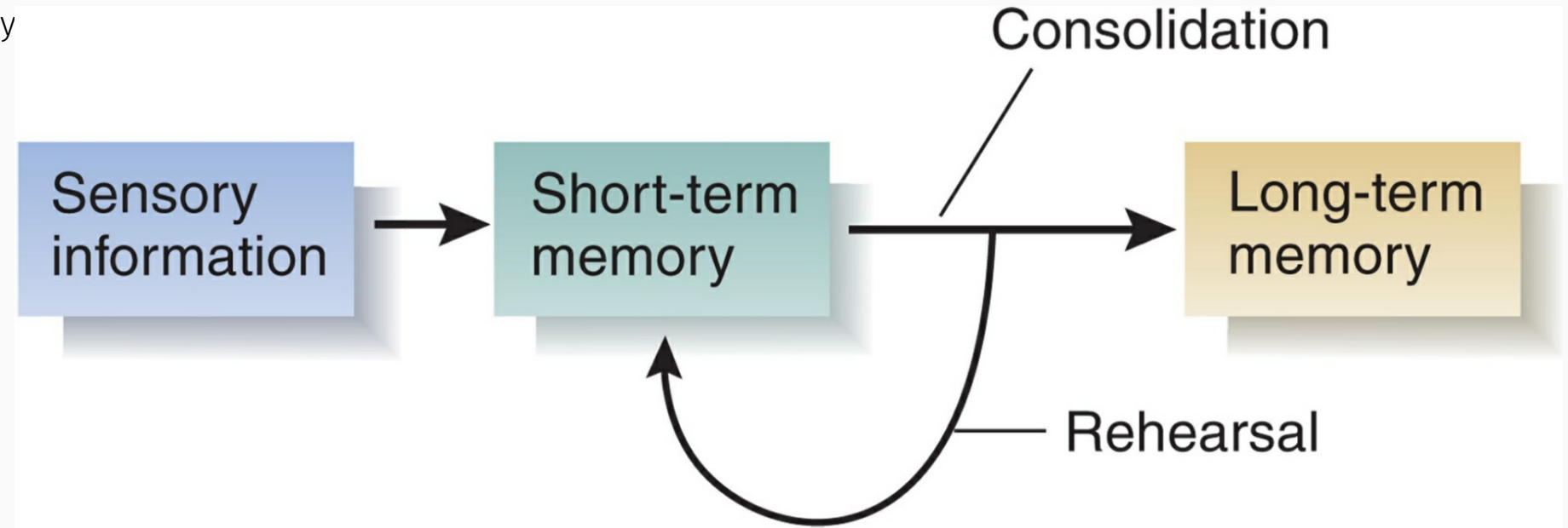
- retrograde amnesia = loss of memory p
- anterograde amnesia = loss of ability to



Disorders

Retrograde and Anterograde Amnesia - TBI.

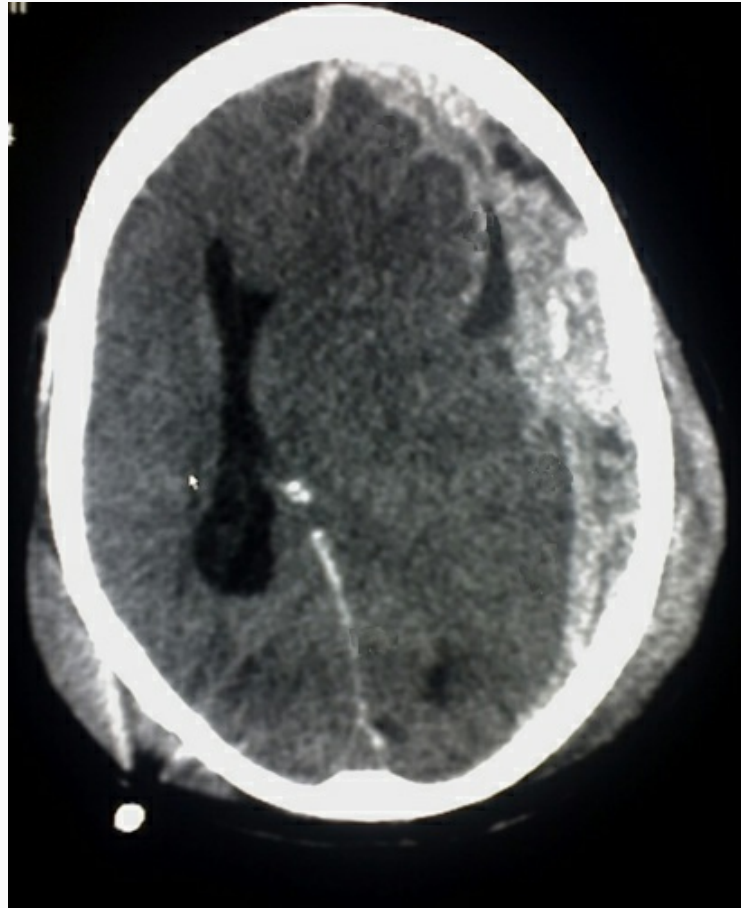
- concussion (mild traumatic brain injury)



Disorders

Retrograde and Anterograde Amnesia - TBI.

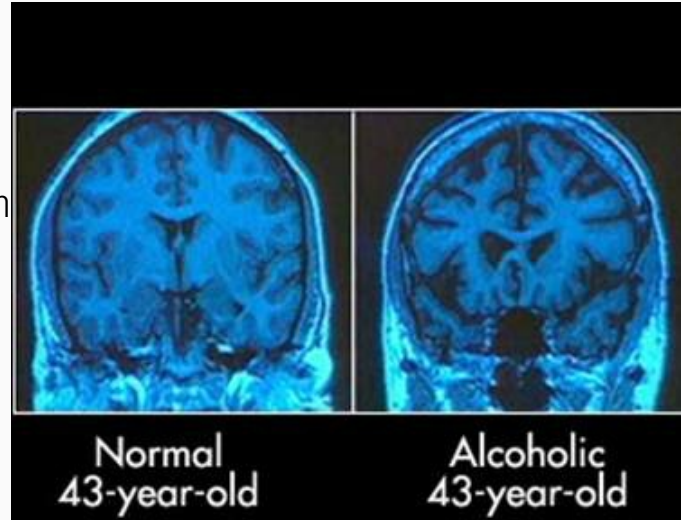
- traumatic brain injury (TBI)
- closed head injury, or open injury



Disorders

Anterograde Amnesia - Korsakoff's Syndrome.

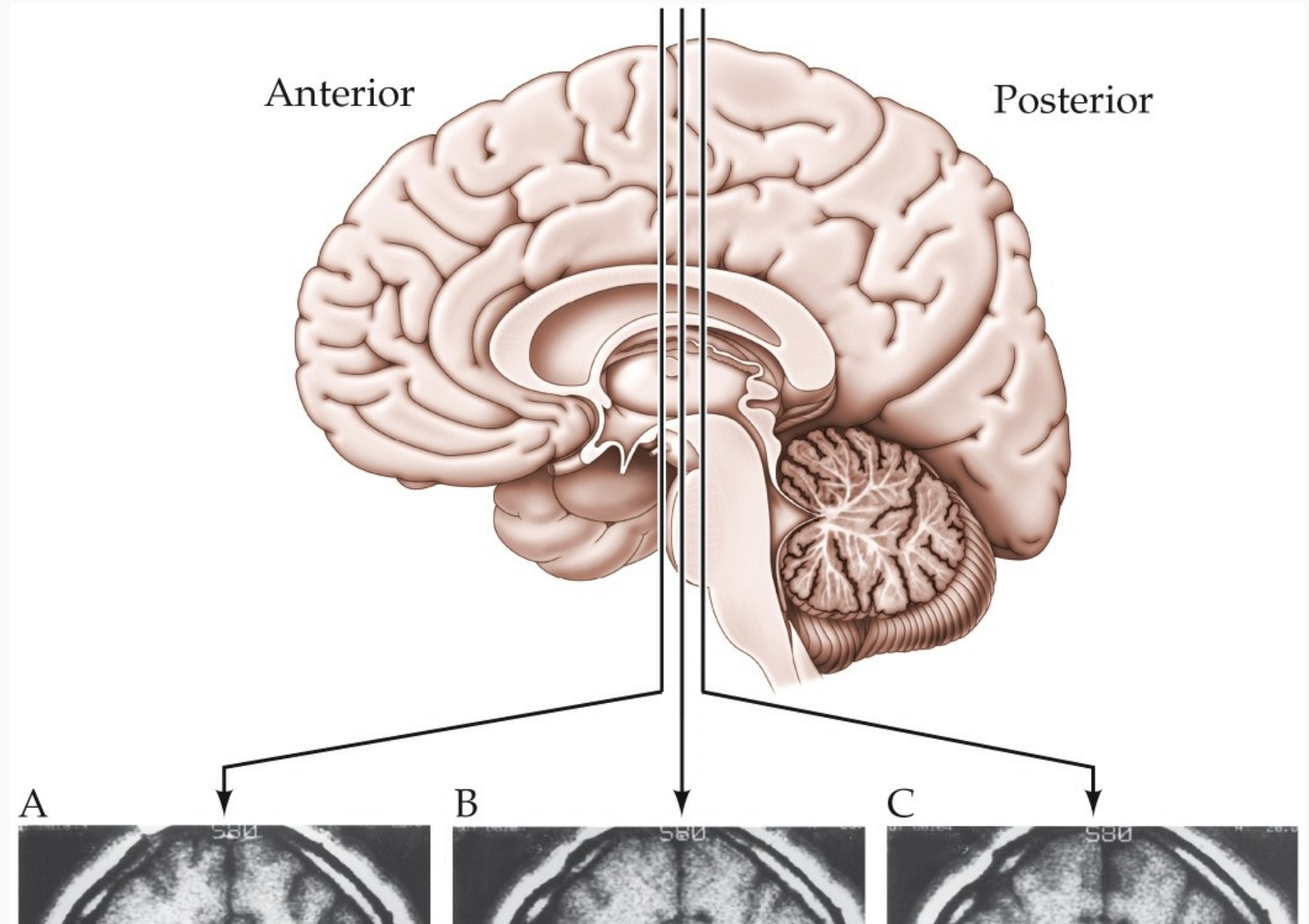
- usually due to alcohol abuse
- thiamine (B1) deficiency
- cortical atrophy
- destruction of mammillary bodies, damage to hippocampus



Disorders

Anterograde Amnesia - Korsakoff's Syndrome.

- denial of impairment
- confabulation



Disorders

Anterograde Amnesia - Patient H.M.

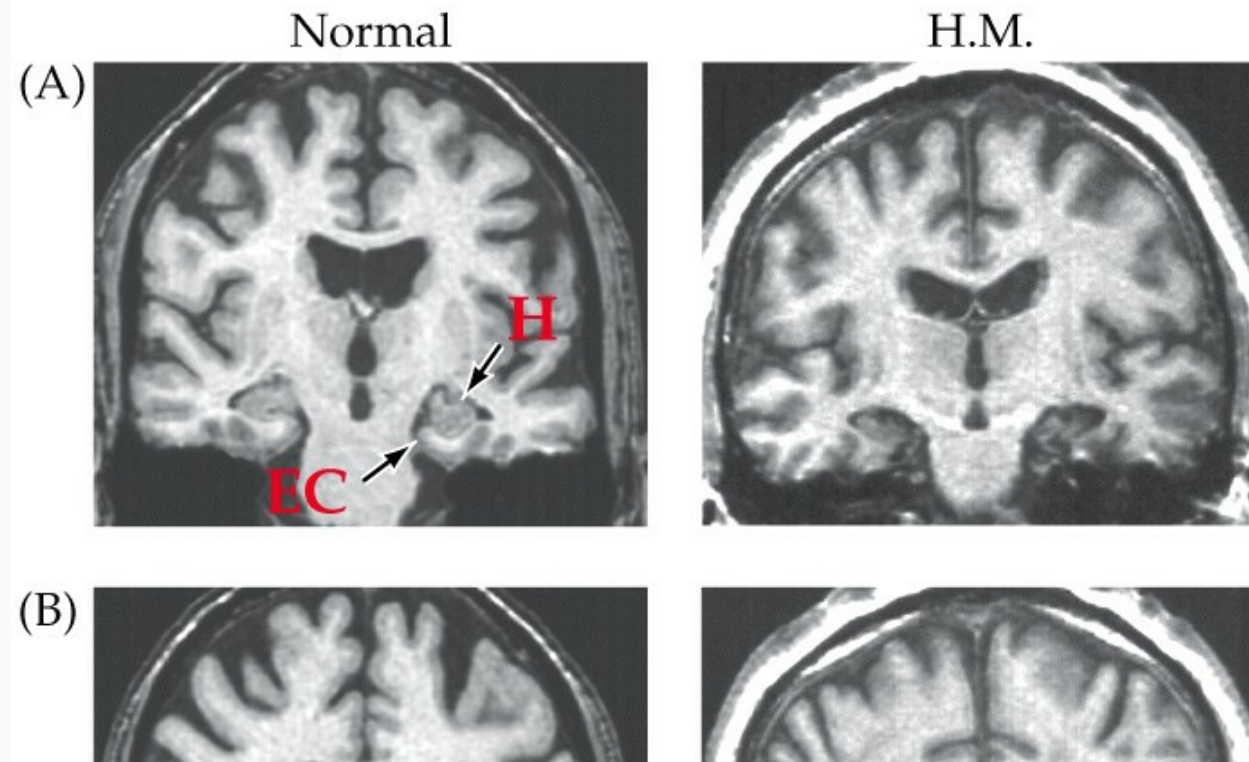
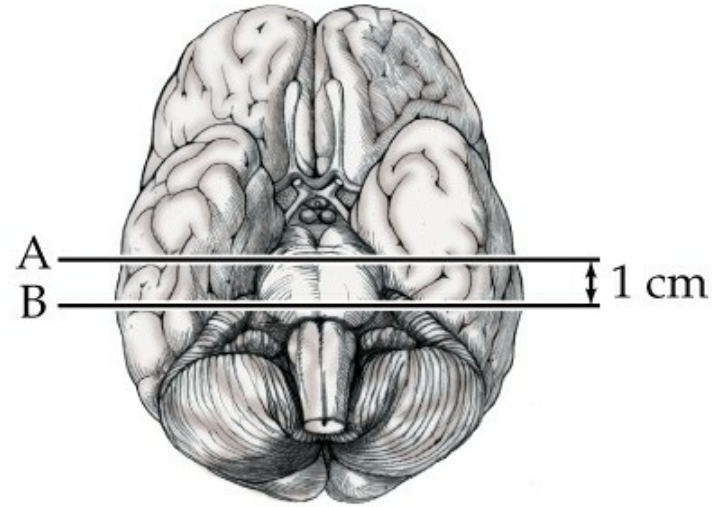
- born 1926, died 2008
- injured in 1935, intractable epilepsy
- medial temporal lobectomy in 1953
- severe anterograde amnesia, partial retention of memory
- intact procedural memory



Disorders

Anterograde Amnesia - Patient H.M.

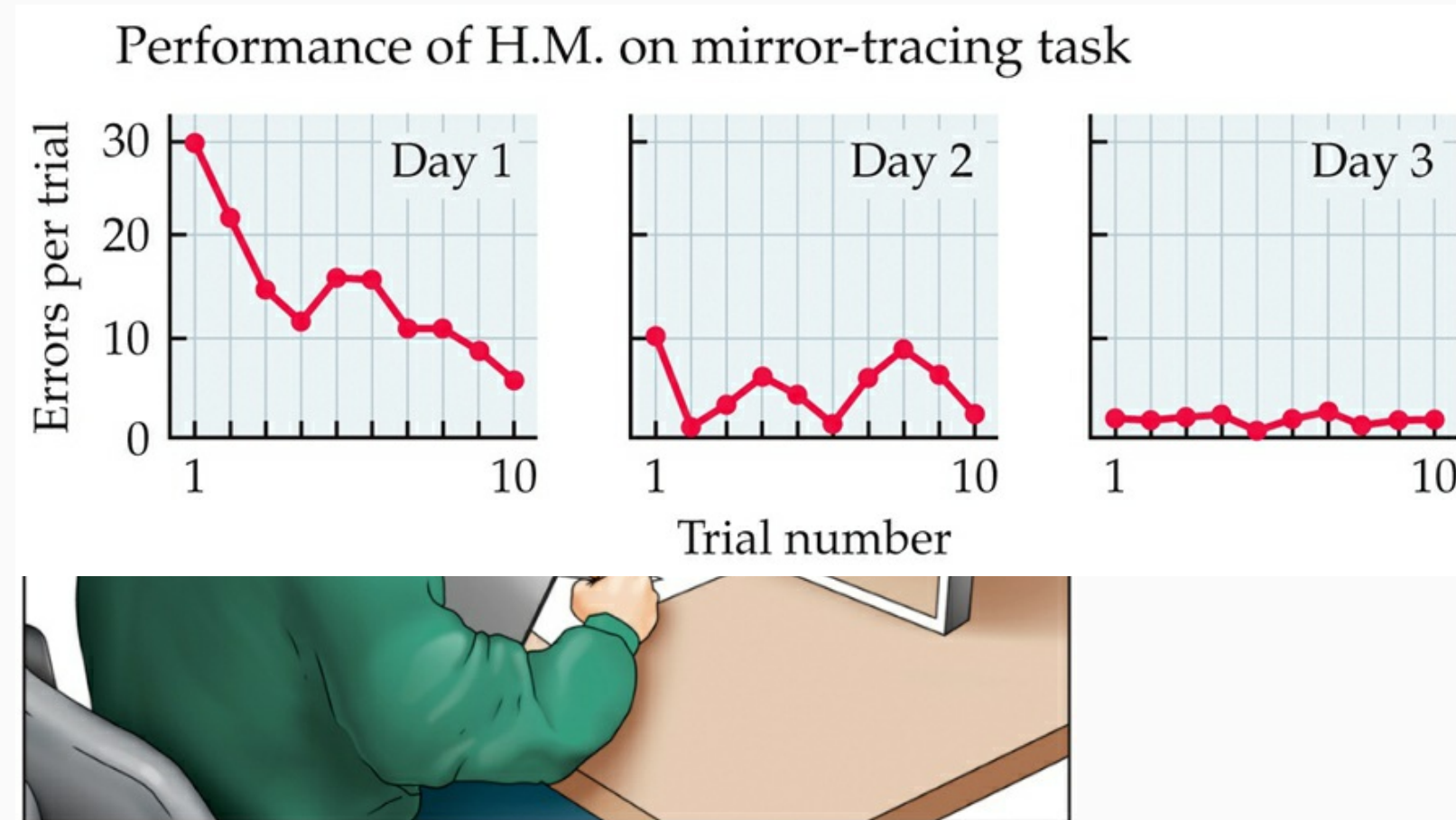
- bilateral surgical procedure removed:
- hippocampal formation
- entorhinal cortex
- most of amygdala
- part of anterolateral temporal cortex



Disorders

Anterograde Amnesia.

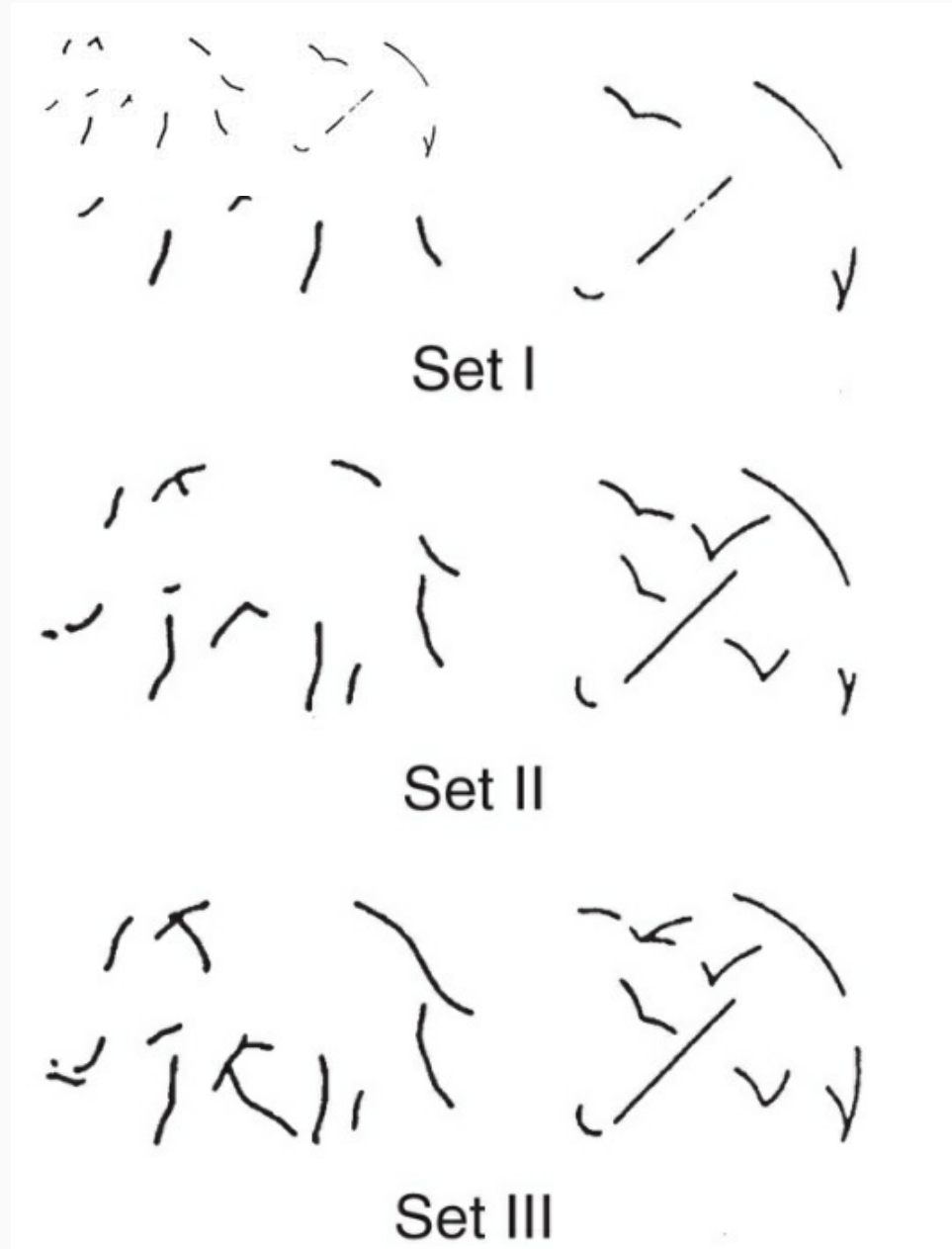
- unimpaired procedural memory
- unimpaired skill learning
- unimpaired perceptual learning
- unimpaired S/R learning
- unimpaired working memory



Disorders

Anterograde Amnesia.

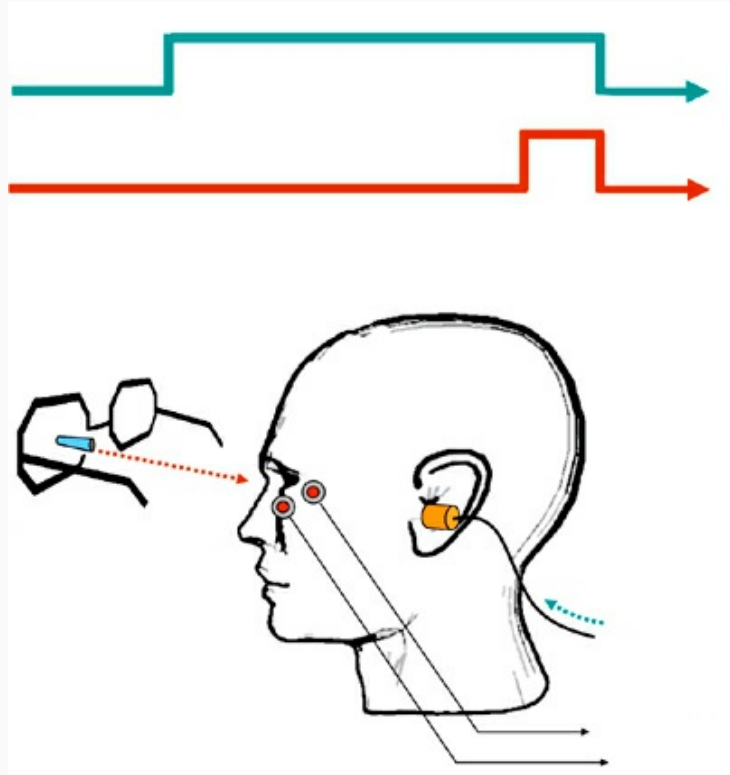
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Disorders

Anterograde Amnesia.

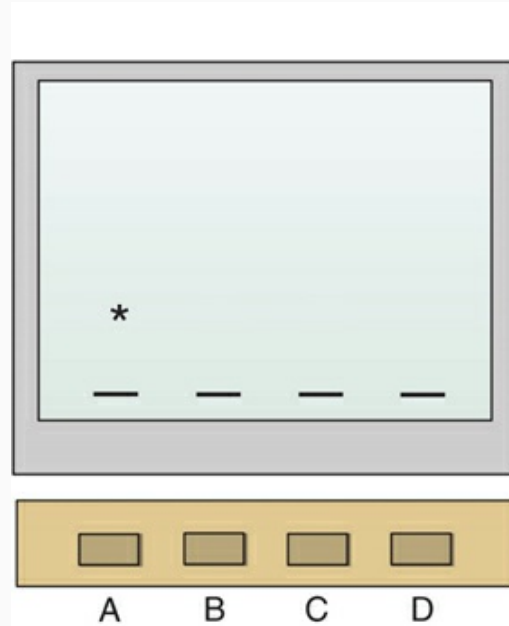
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Disorders

Anterograde Amnesia.

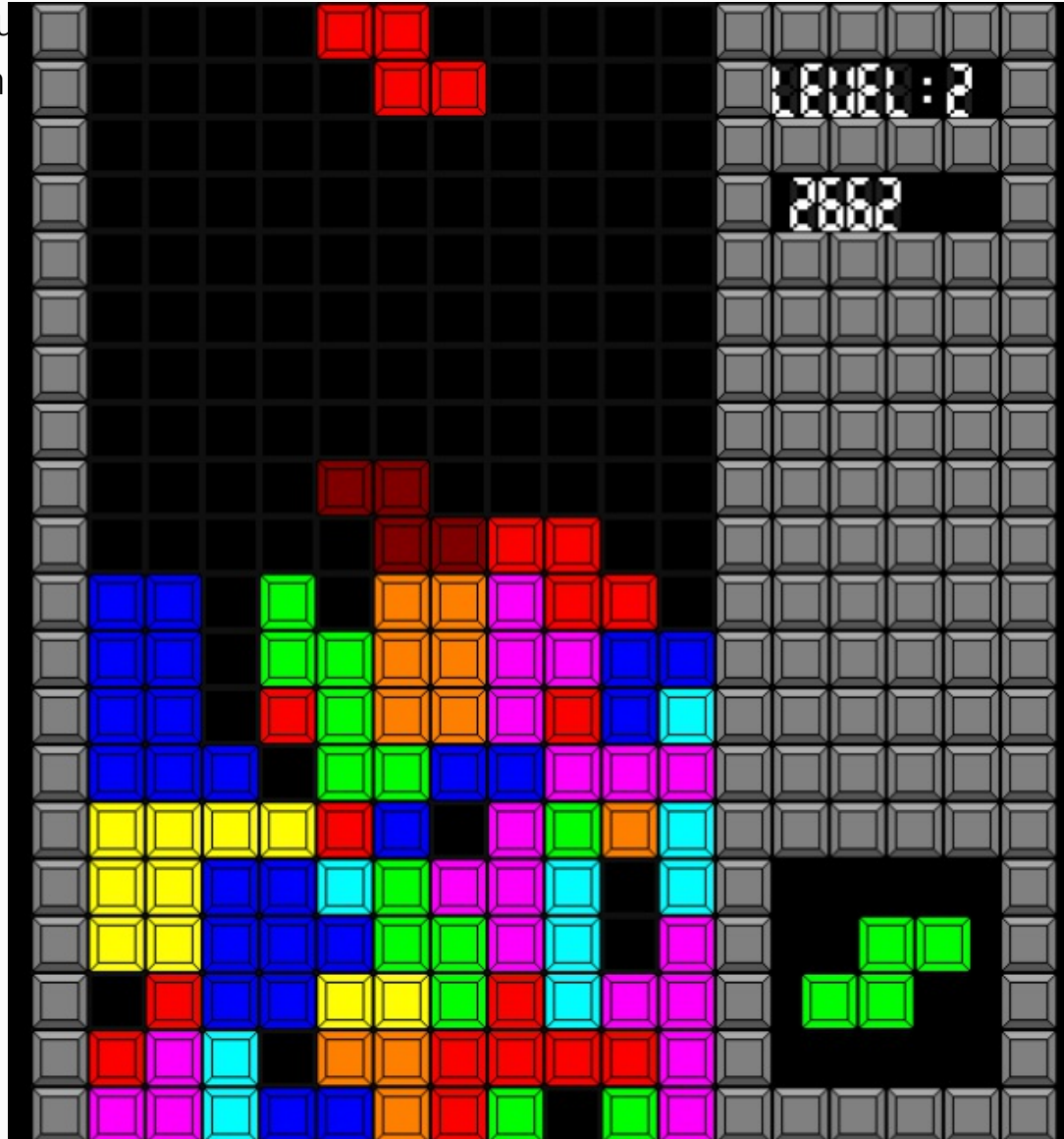
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Disorders

Anterograde Amnesia.

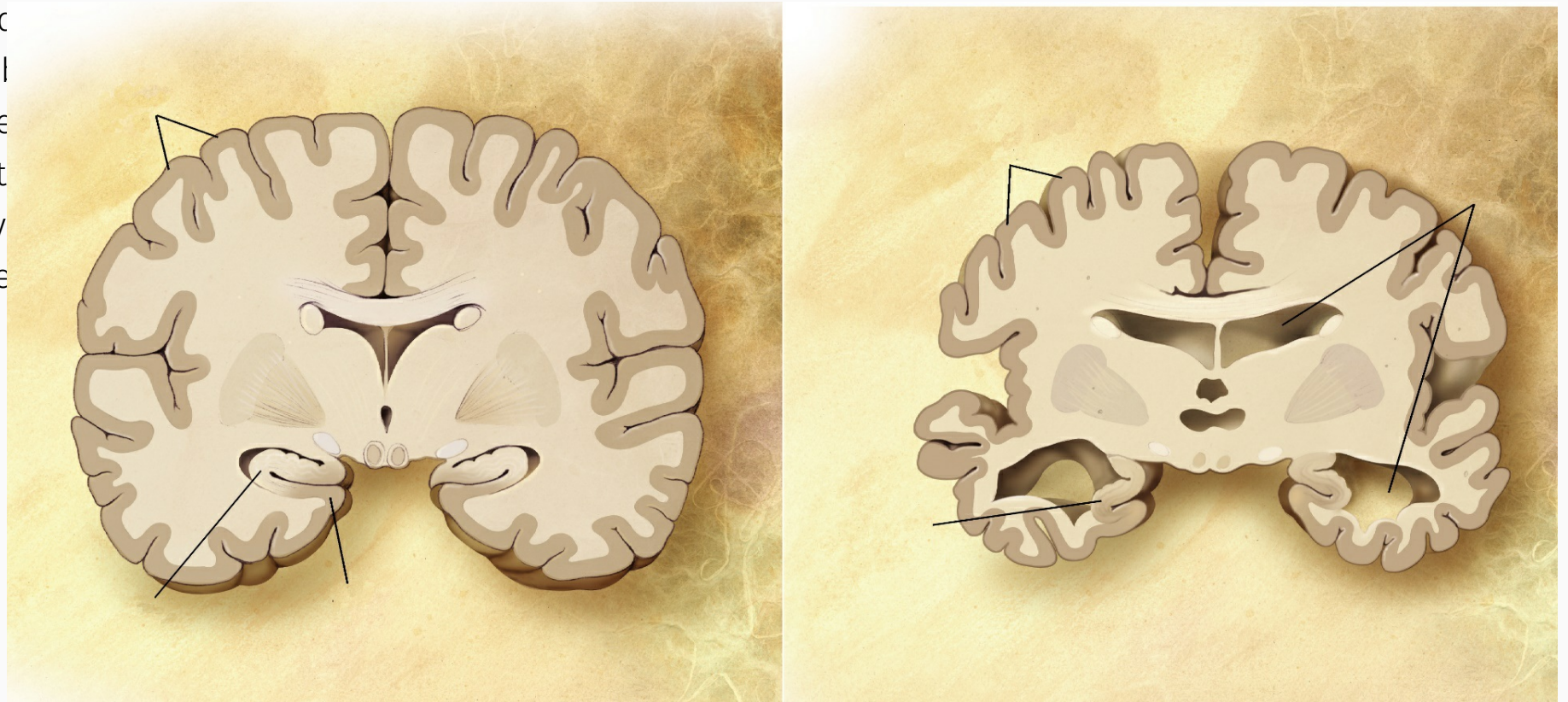
- consolidation of procedural memory du
- non-hippocampal/temporal lobe mech



Disorders

Alzheimer's Disease.

- most common form of age-associated c
- initial signs involve medial temporal lobe
- distant past memory relatively preserved
- impaired consolidation of new declarative
- progressive decline in multiple cognitive
- end stage patients are often mute, severely

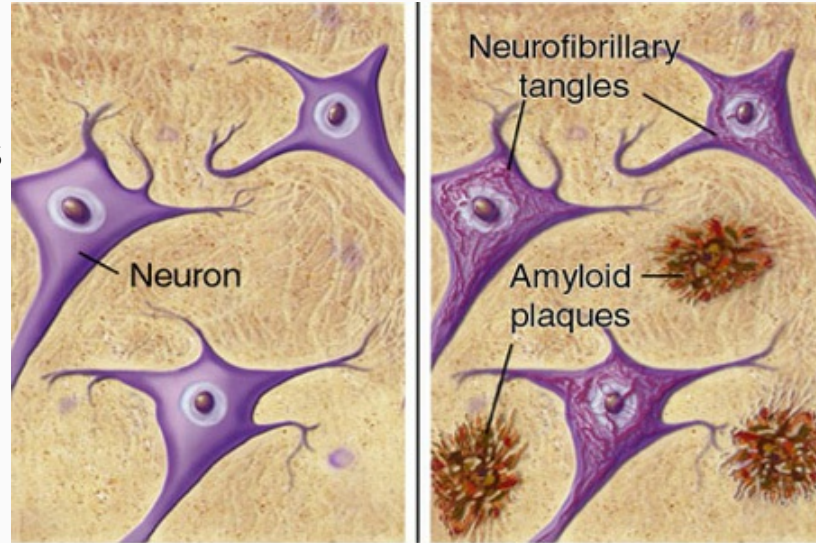


Disorders

healthy neurons diseased neurons

Alzheimer's Disease.

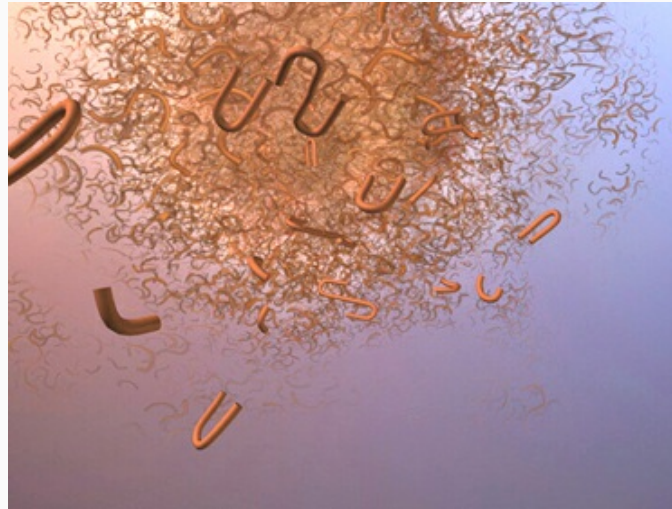
- extracellular amyloid plaques
- intracellular neurofibrillary tau tangles



Disorders

Alzheimer's Disease.

- extracellular amyloid plaques
- neurofibrillary tau tangles



Disorders

Alzheimer's Disease.

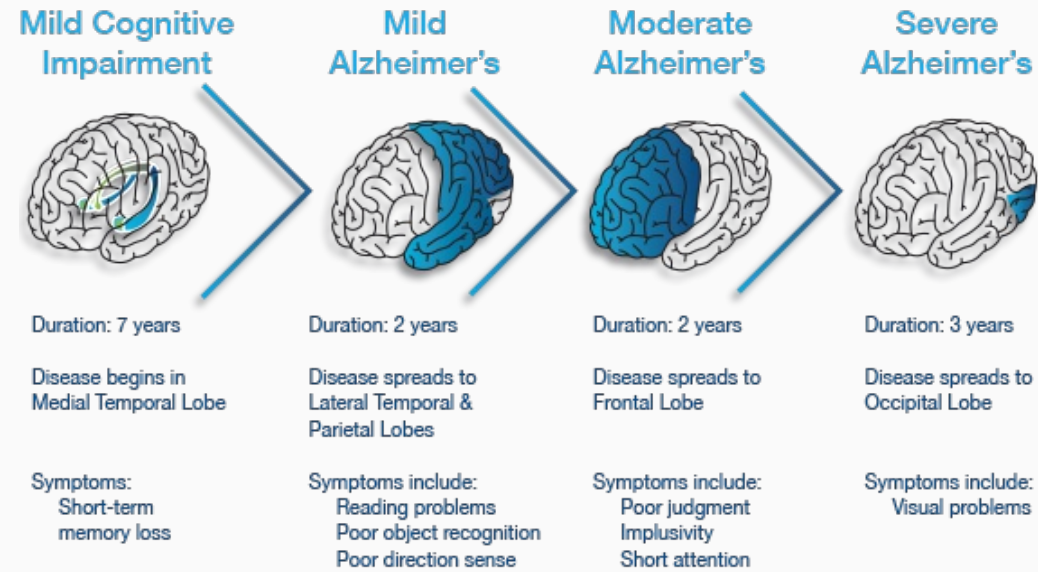
- extracellular amyloid plaques
- neurofibrillary tau tangles



Disorders

Alzheimer's Disease.

- initially in medial temporal lobe
- later widespread pathology



Disorders

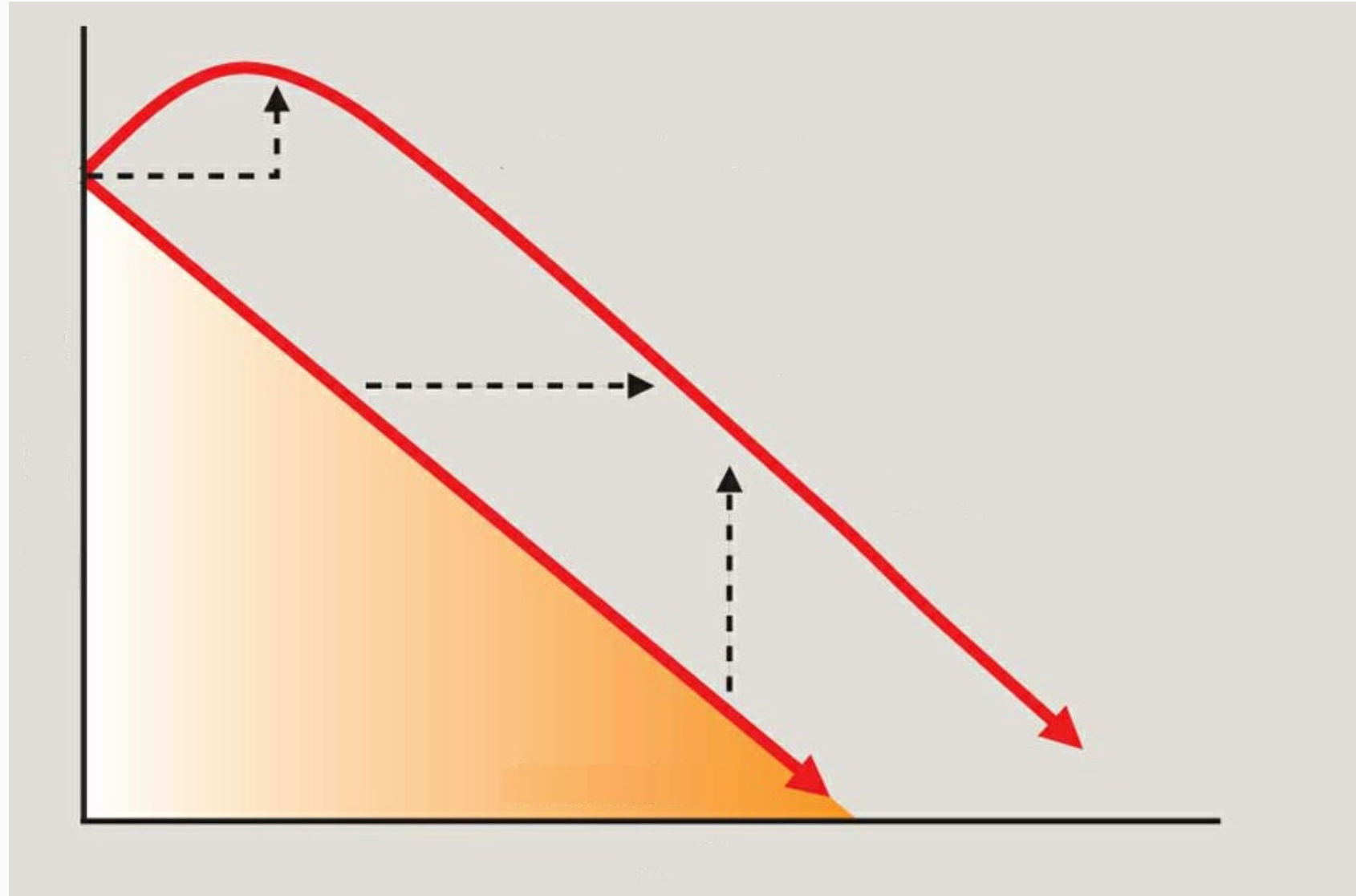
Alzheimer's Disease - Treatments.

- AChE inhibitor: donepezil (Aricept)
- NMDA receptor antagonist: memantine



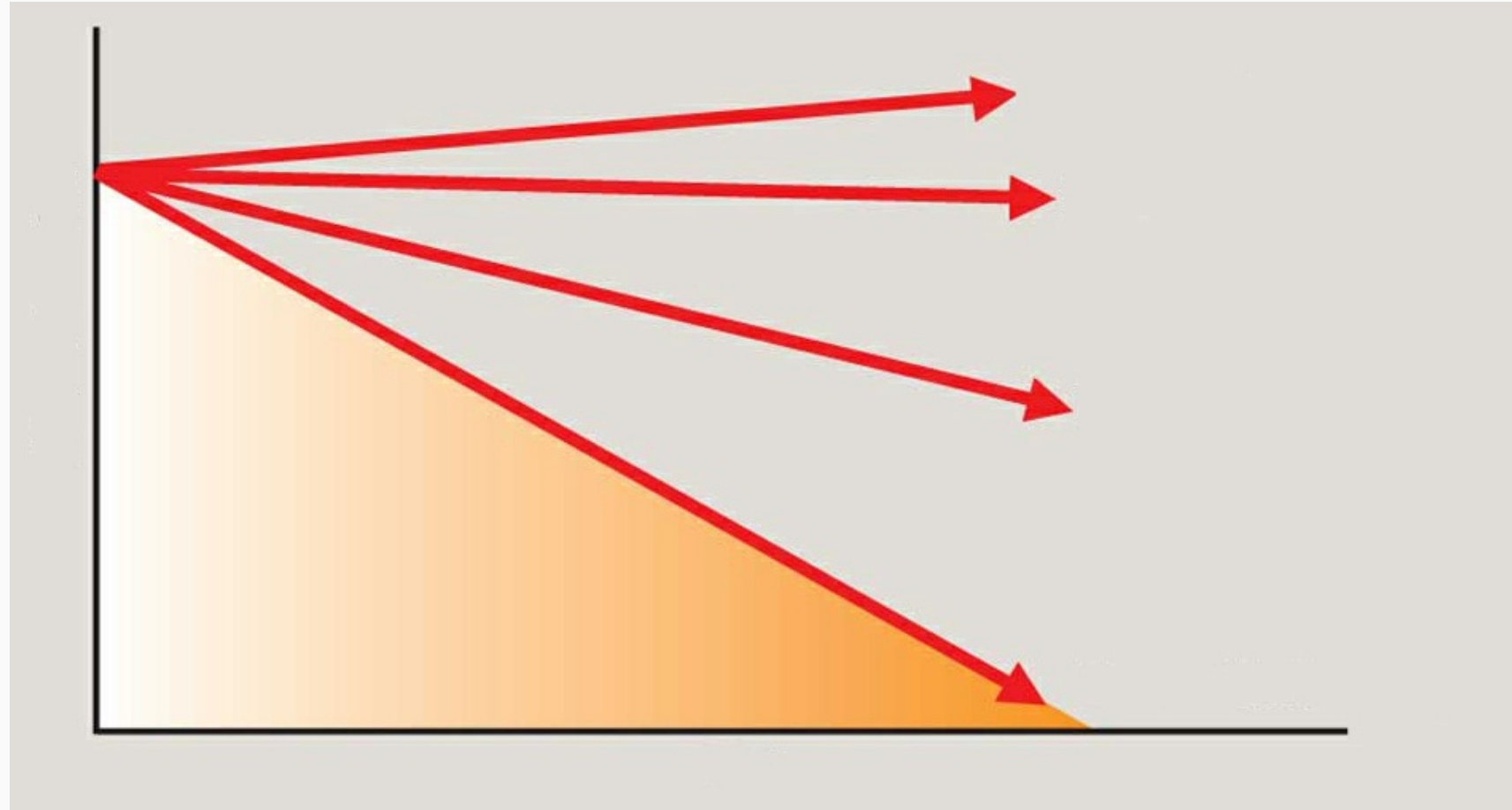
Disorders

Symptomatic Treatment for Alzheimer's Disease.



Disorders

Disease-Modifying Treatment for Alzheimer's Disease.



Disorders

Alzheimer's Disease

- Research.
 - focus on tauopathy

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