

MILD COGNITIVE IMPAIRMENT

PSYC 280A

GROUP 3

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*3d rendered medically accurate illustration of the hippocampus.
Image Credit: Sebastian Kaulitzki / Shutterstock*

<https://www.news-medical.net/health/Hippocampus-Functions.aspx>

Mild cognitive impairment (MCI) is a condition where memory or thinking skills are worse than normal for one's age.

INTRODUCTION

- Damaged brain

- Ageing

- MORPHOLOGIC AND FUNCTIONAL

- measuring hippocampus volumes, gray matter, and temporal lobe changes
- Voxel-based morphometry (VBM) is a neuroimaging technique that investigates focal differences in brain anatomy

- MRI - diagnosis through clinical symptom and neuroimaging examination
- Rs-fMRI – Task test
- PET scan and fMRI prove the changes in the brain to determine different effects

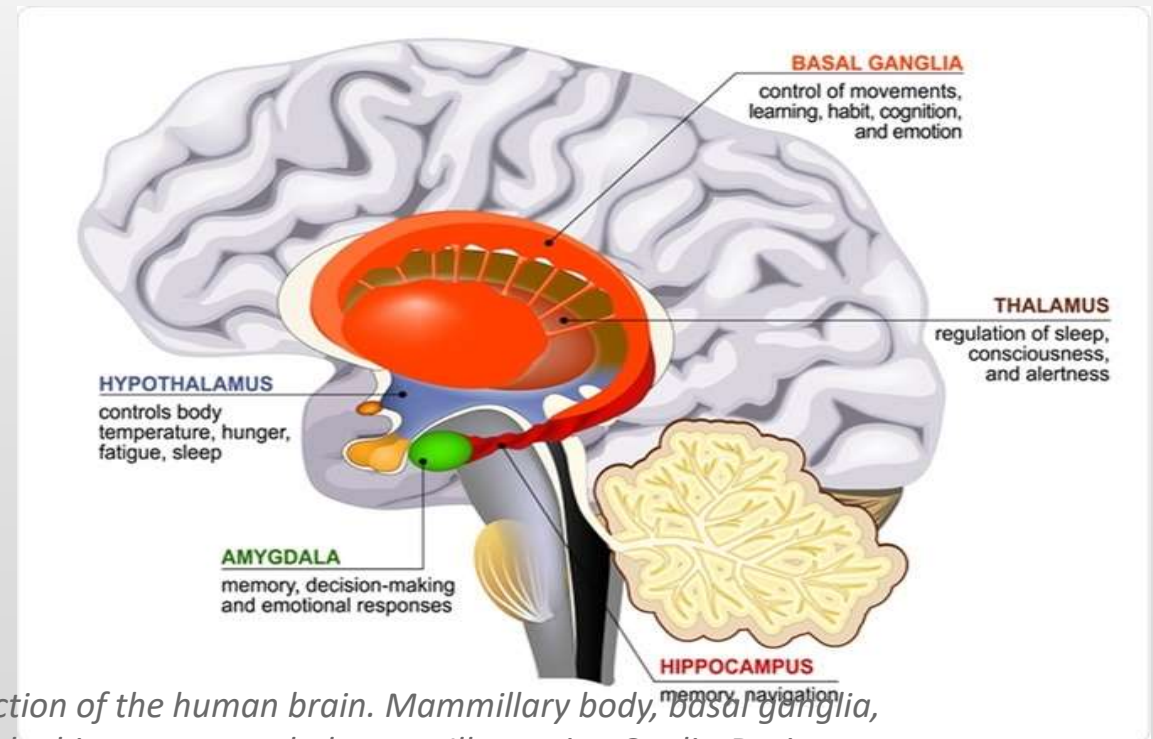
- Semantic Test – False Alarm – ageing

MCI - BRAIN

Mild cognitive impairment (MCI) is a condition where memory or thinking skills are worse than normal for one's age, but not severe enough to affect daily life.



3d rendered medically accurate illustration of the hippocampus. Image Credit: Sebastian Kaulitzki / Shutterstock

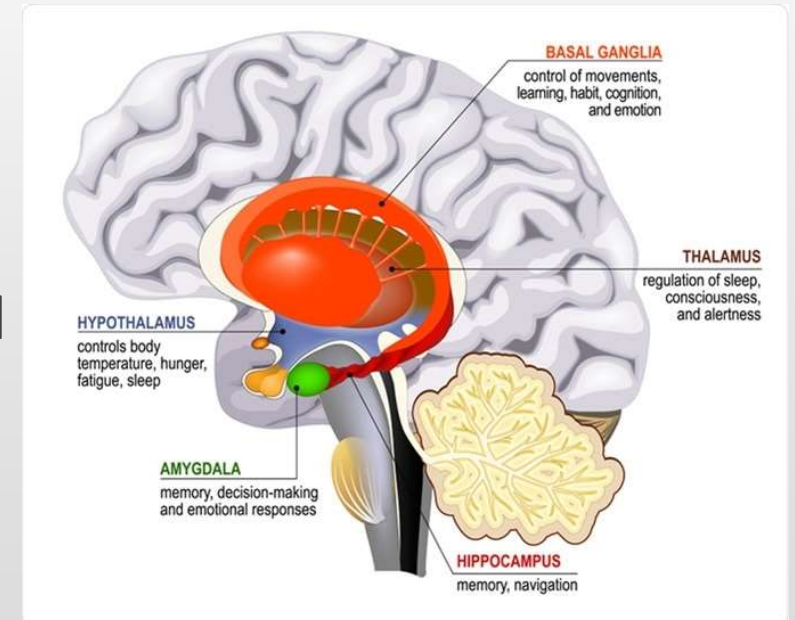


Limbic system. Cross section of the human brain. Mammillary body, basal ganglia, pituitary gland, amygdala, hippocampus, thalamus - Illustration Credit: Designua / Shutterstock

Hippocampal Volume, White Matter, and Cognitive Decline and Mild Cognitive Impairment (MCI)

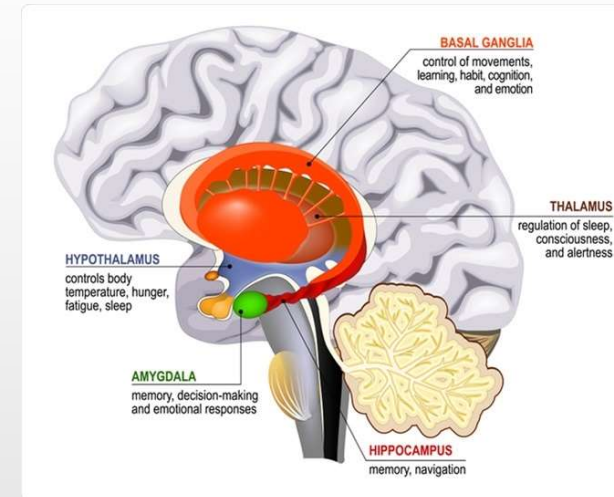
- MRI studies have highlighted a reduction of hippocampal volume in MCI and microstructural damage in the white matter that narrows the ventricles
- Brain and functional cognition, studying Alzheimer's disease (AD)
- warn an asymptomatic AD - includes the medial temporal lobe and hippocampus status

(Caillaud et al., 2019).



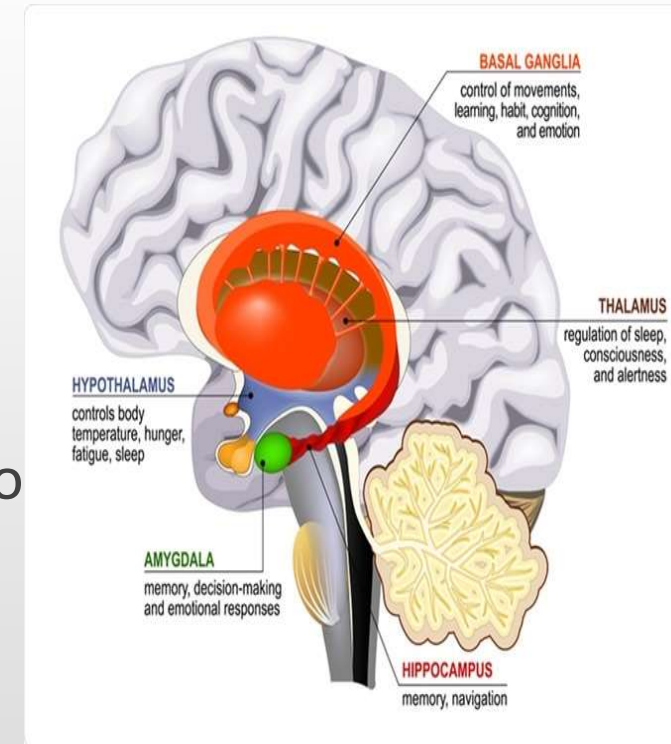
Relationship between normal ageing and early dementia due to abnormal cognitive function

- age-associated cognitive decline (AACD)
- numerous cases of rapid progression of dementia and (Alzheimer's disease) AD
- transitional period from normal ageing and diagnosis of early AD
- neuropsychological tests
- age-associated memory impairment (AAMI) related to daily memory changes
- Therefore clinically challenging to distinguish between function problems and normal function (Peterson, 2004).



Memory dysfunction and neuroanatomical structure

- significant relationship between recognition memory and volume media temporal cortical region (Hippocampus)
- rest unknown of the importance of dentate gyrus and substructure too small to distinguish with traditional neuroimage resolution
- **false alarms** because the Hippocampus's dentate gyrus is sensitive to recognition memory dysfunction
- Hippocampus is more sensitive to atrophy in individuals with MCI (Bennett & Stark, 2018)



Neural mechanism of cognitive impairment in PD (Parkinson's disease)

The morphometry displayed in PD patients reduced gray matter volume in the frontal cortex

voxel-based morphometry (VBM) and surfaced-based morphometry (SBM) changes in gray matter volume and the cortical relationship between structure and neurocognitive function

neurotransmitters alteration included **dopamine, acetylcholine and norepinephrine(NE)**

VBM revealed atrophy in frontal, parietal, and temporal cortices
12-14

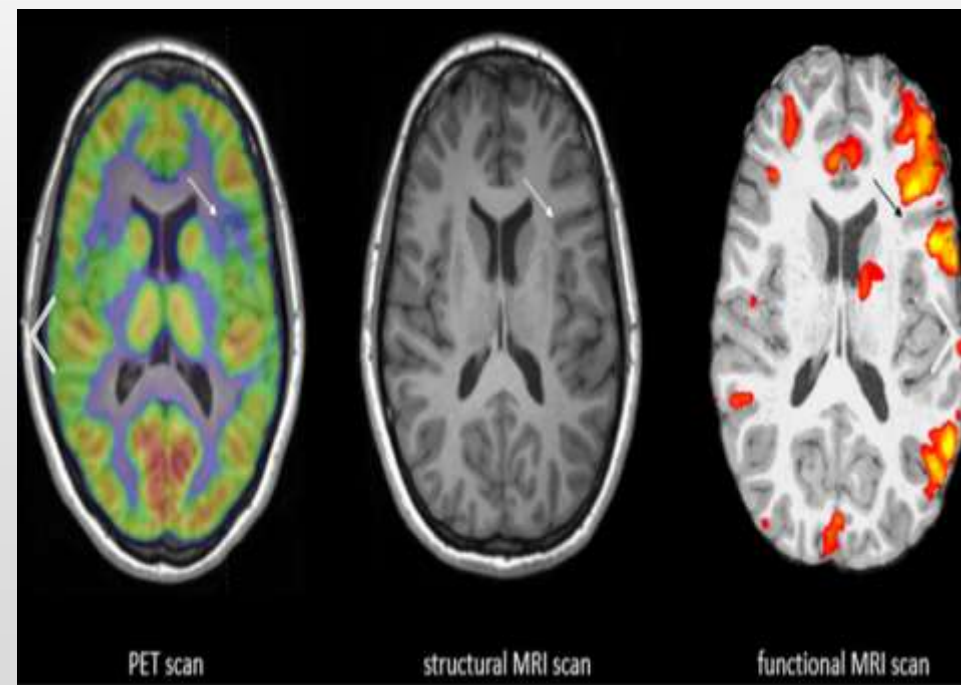
- MCI is familiar with non-motor signs, risk of developing dementia
- PD has motor and non-motor symptoms due to the loss of dopamine neurons in the substantia nigra

Gray matter abnormality in the frontal cortex is associated with impairment in executive function, attention, memory, and language abilities (Li et al., 2022)

Semantic dementia (SD) MIC

- patients were analyzed by **semantic tests**, oral picture name, oral sound name, picture associative, word associative matching, and Word-picture verification (Cui et al., 2021).

- SD reveals degeneration in the frontal lobe, which cause dementia in people under 65 years of age
- some patients show apathy and disinhibition
- Neuroimaging requires at least one MRI dominant significant atrophy in the anterior temporal lobe or photon emission computed tomography (PET).
- rs-fMRI, which captures the resting-state functional magnetic resonance imaging, reveals brain changes
- measures the fluctuation of blood oxygen level-dependent (Cui et al., 2021).



<https://kryptonite.global/blogs/difference-between-mri-fmri/>

Amnestic mild cognitive impairment (aMCI) focus on remote memories and temporal gradient (TG).

- The memory of the past event in public depends on hippocampal structures
- The aMCI involved in neuropathological change in Alzheimer's disease
- memory-related structures within the medial temporal lobe (MTL)
- aMCI is isolated from other cognitive functions, but it is possible to set aMCI as a model to study Hippocampal pathology. Personal semantics is involved in MCI.
- frontal neocortex is vital to retrieve personal memories, and the ventral lateral prefrontal cortex is conveyed in reconstruction in the self-memory system (Bizzozero et al., 2012)

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