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ALCOHOL RELATED BRAIN DAMAGE

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OVERVIEW

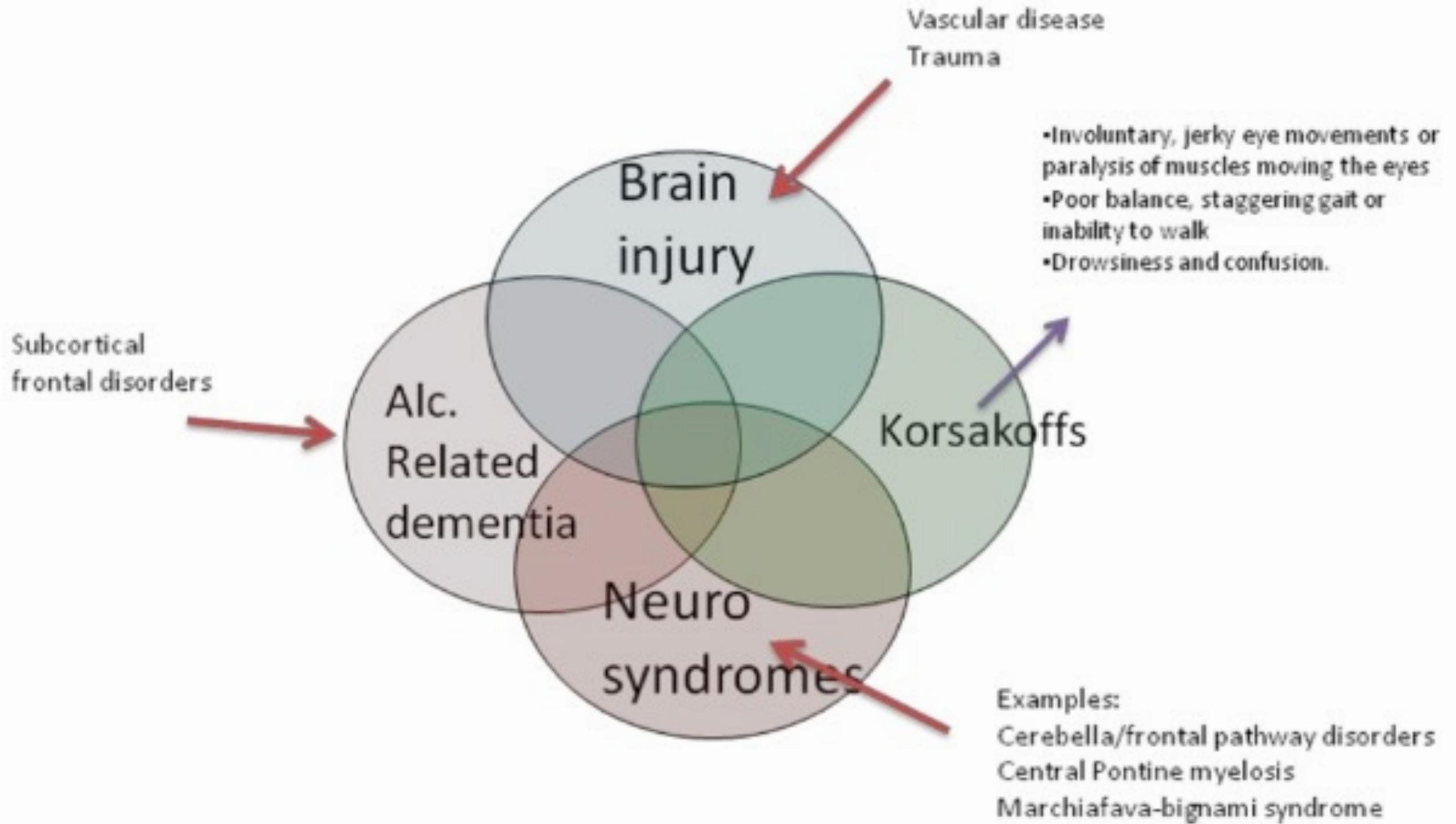
- Epidemiology & Definitions
- Basic Neuroanatomy
- Neuropathology
- WKS
- Part 2
- Management approach- Current Evidence
- Future

EPIDEMIIOLOGY

- Uncomplicated/Complicated
- Post Mortem- 1.5% Mammillary bodies and/or Cerebellar atrophy (US and Europe), Australia 2.8%, UK- 0.5%-1.5%
- Community data- Cox et al- Scottish data- 14.4/10,000
- Hospital Derived Data- Harvey et al and Smith& Atkinson 12.5%-24%
- Problem of under diagnosis and estimation of prevalence- lack of diagnostic threshold and expertise, ignorance of cognitive deficits, stigma, focus only on WKS leaving out Cerebellar/Frontal lobe and confusion with 'dementia'

DEFINITIONS

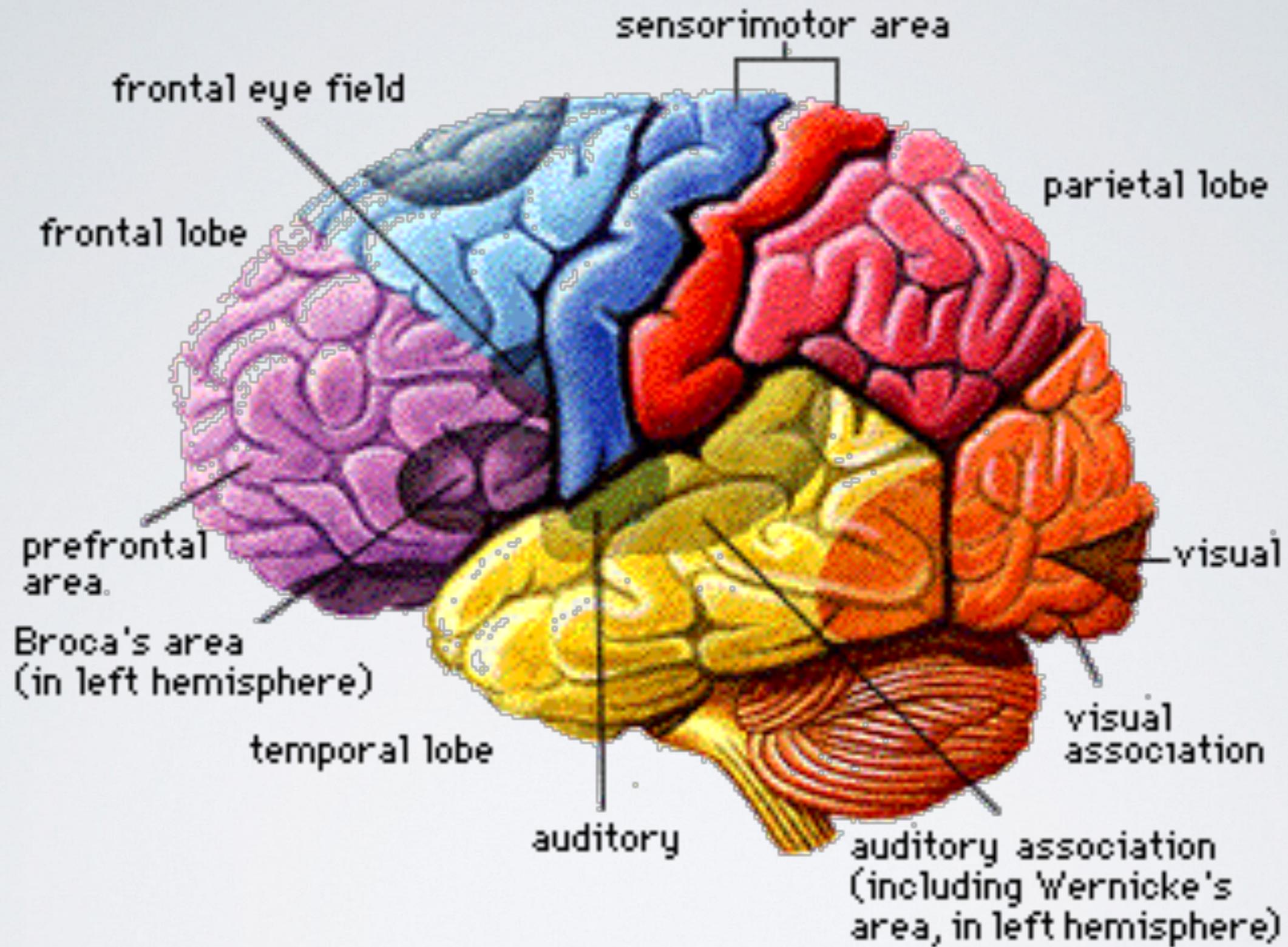
- Lishman, Oslin & Carey, Jacques & Stevenson- broad defn of ARBD with core features-
- Prolonged cognitive impairment
- Causative link to excessive alcohol ingestion and thiamine deficiency

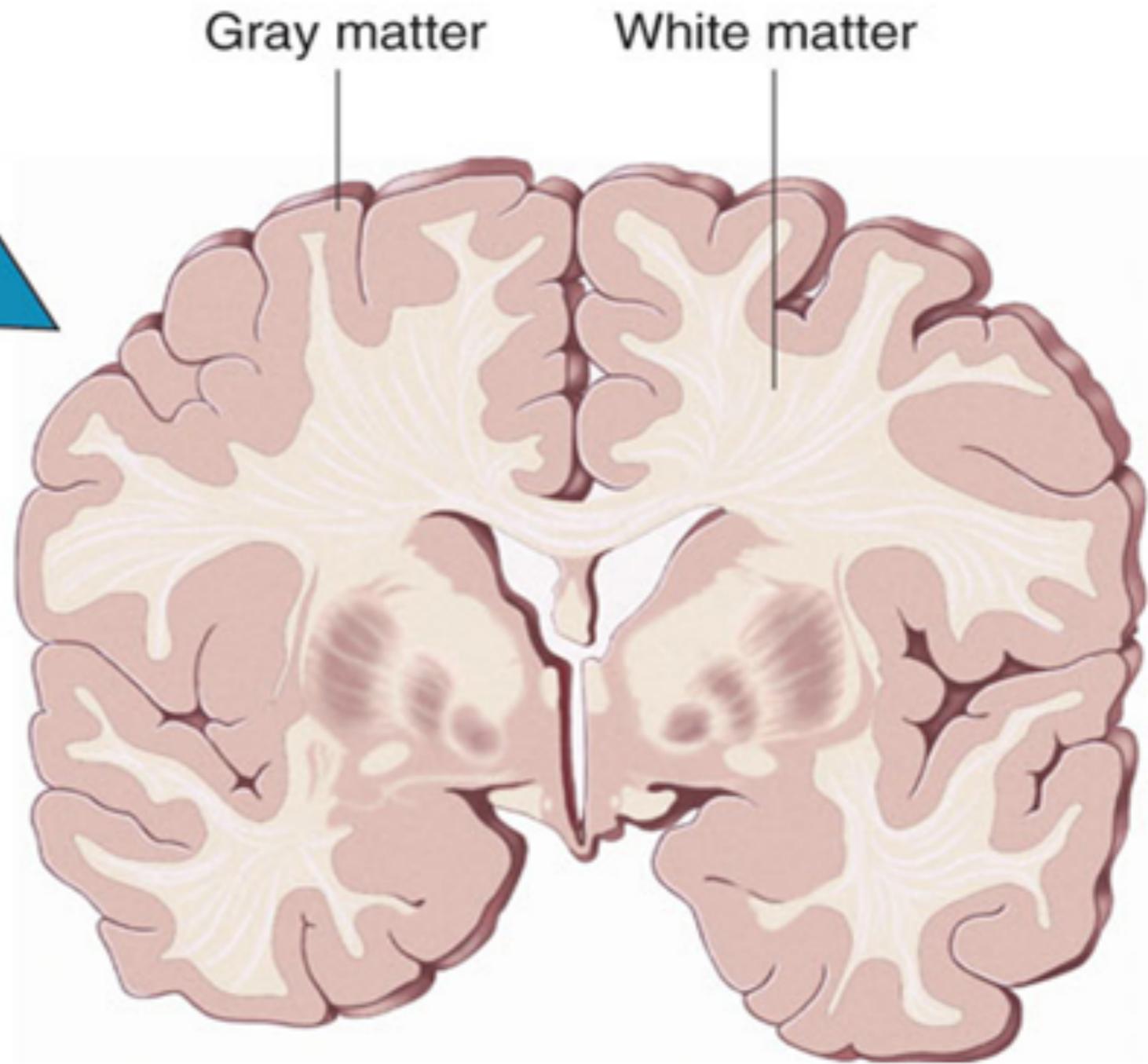
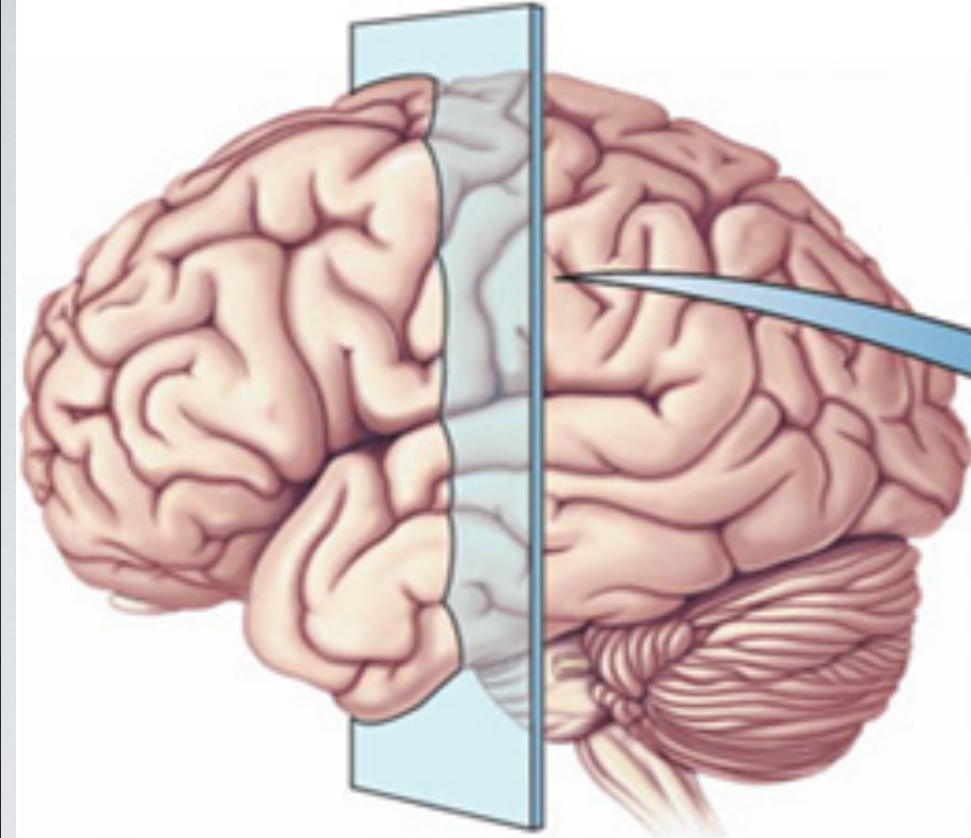


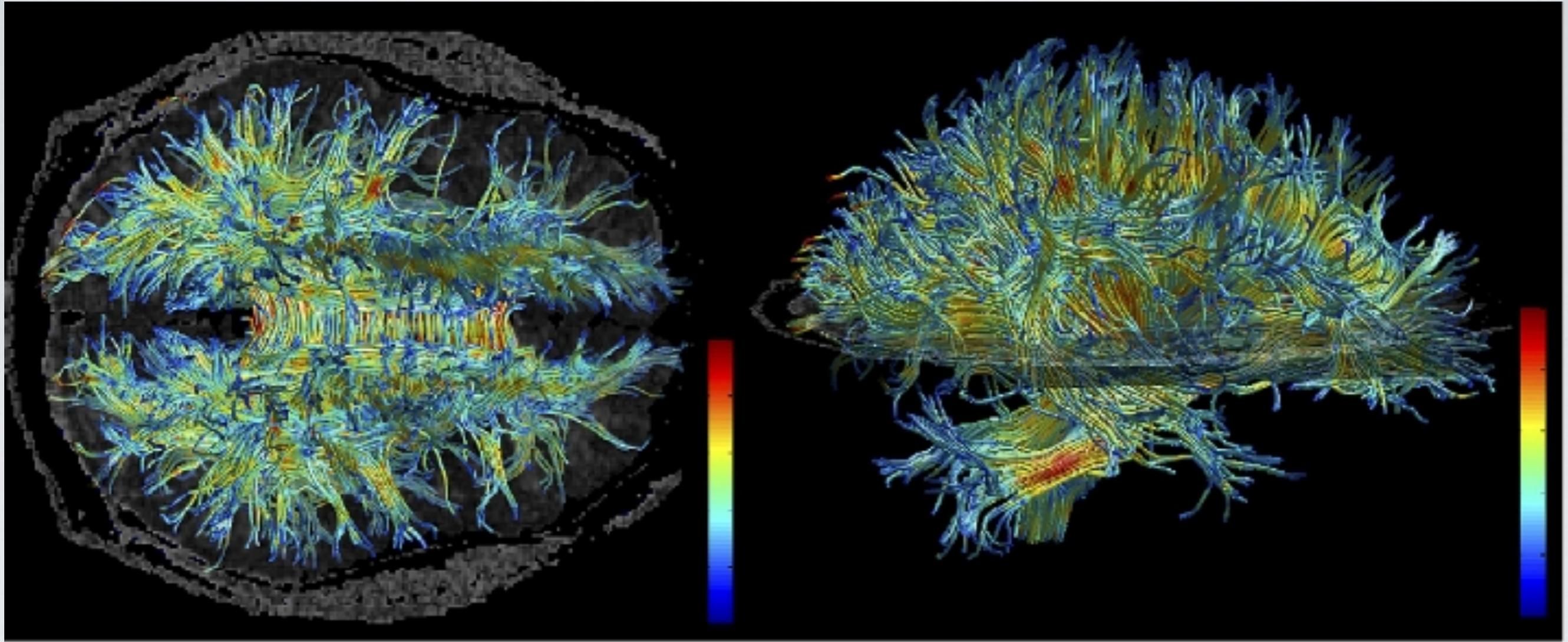


"Dang. I must've hit the juggler vein."

NEUROANATOMY

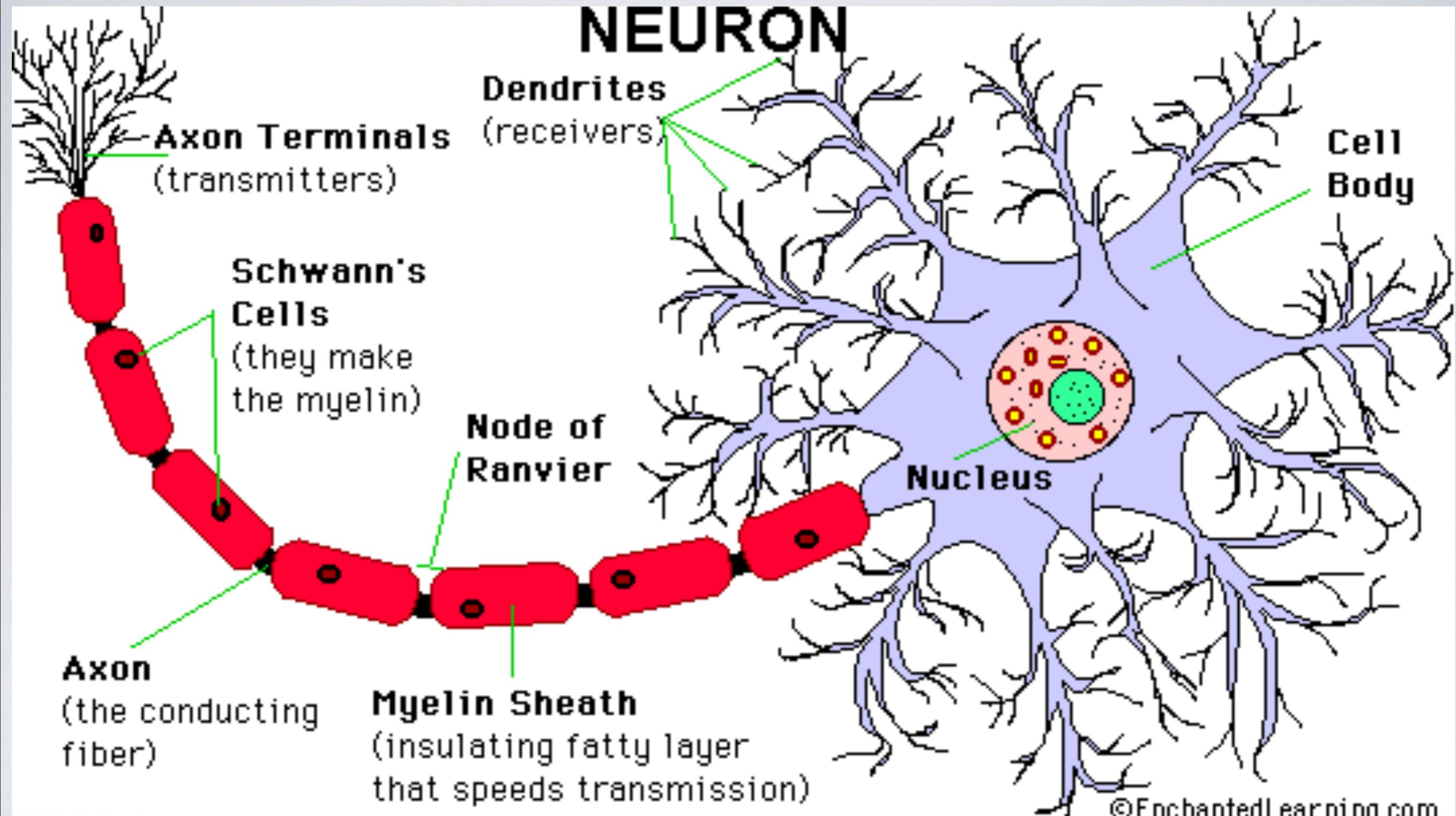






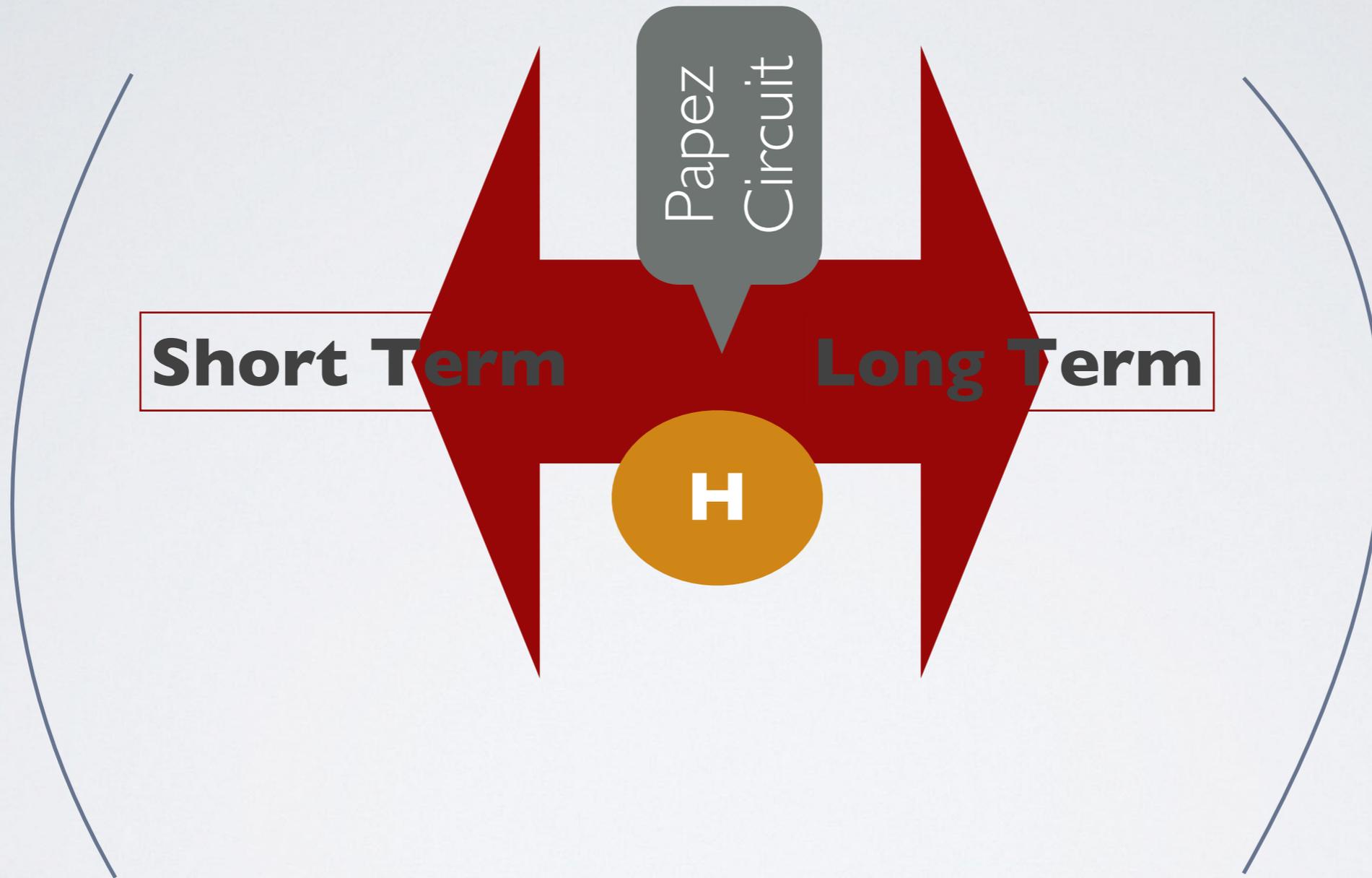
Wikipedia

NEURON



MEMORY

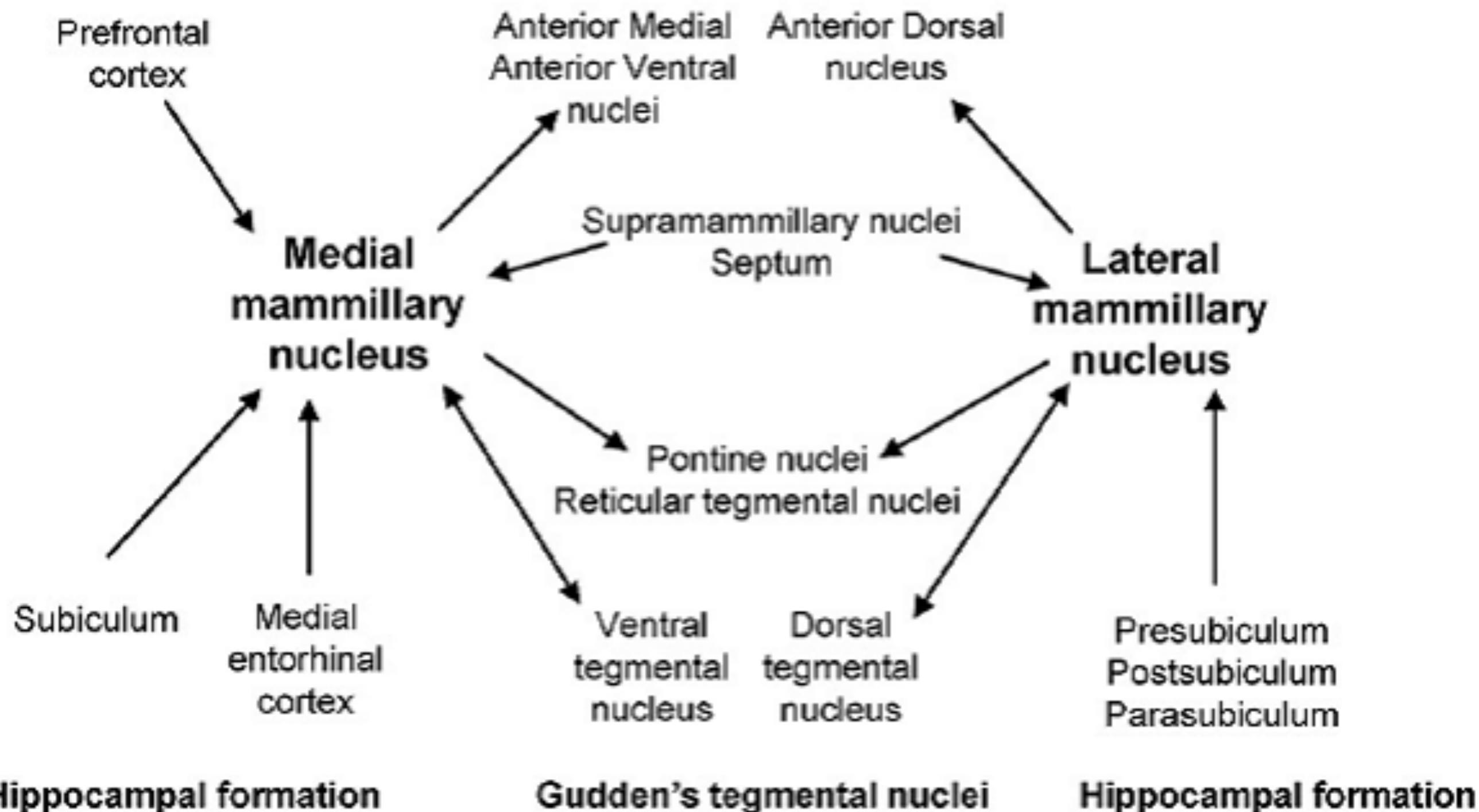
Prefrontal Cortex

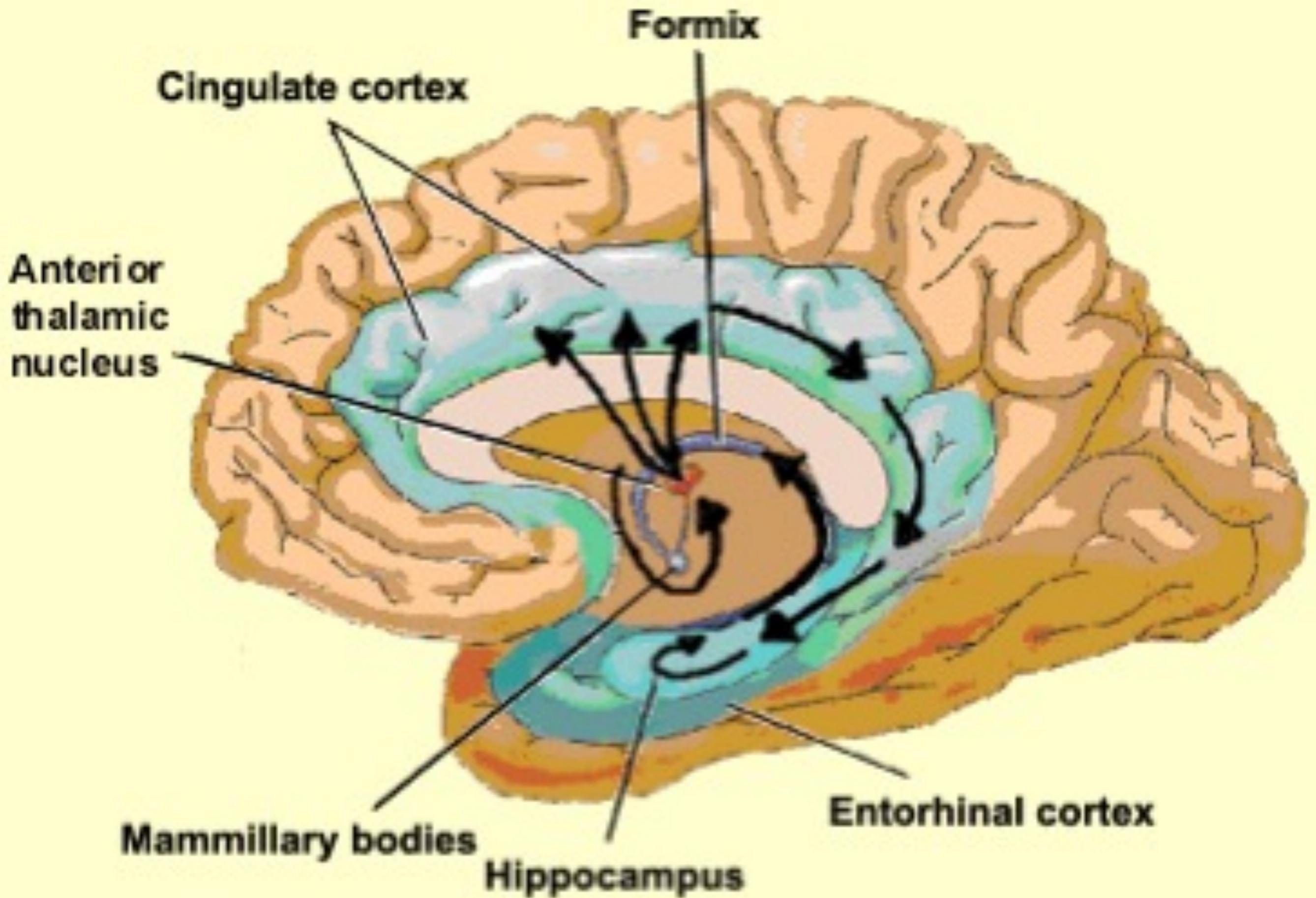


Cortex

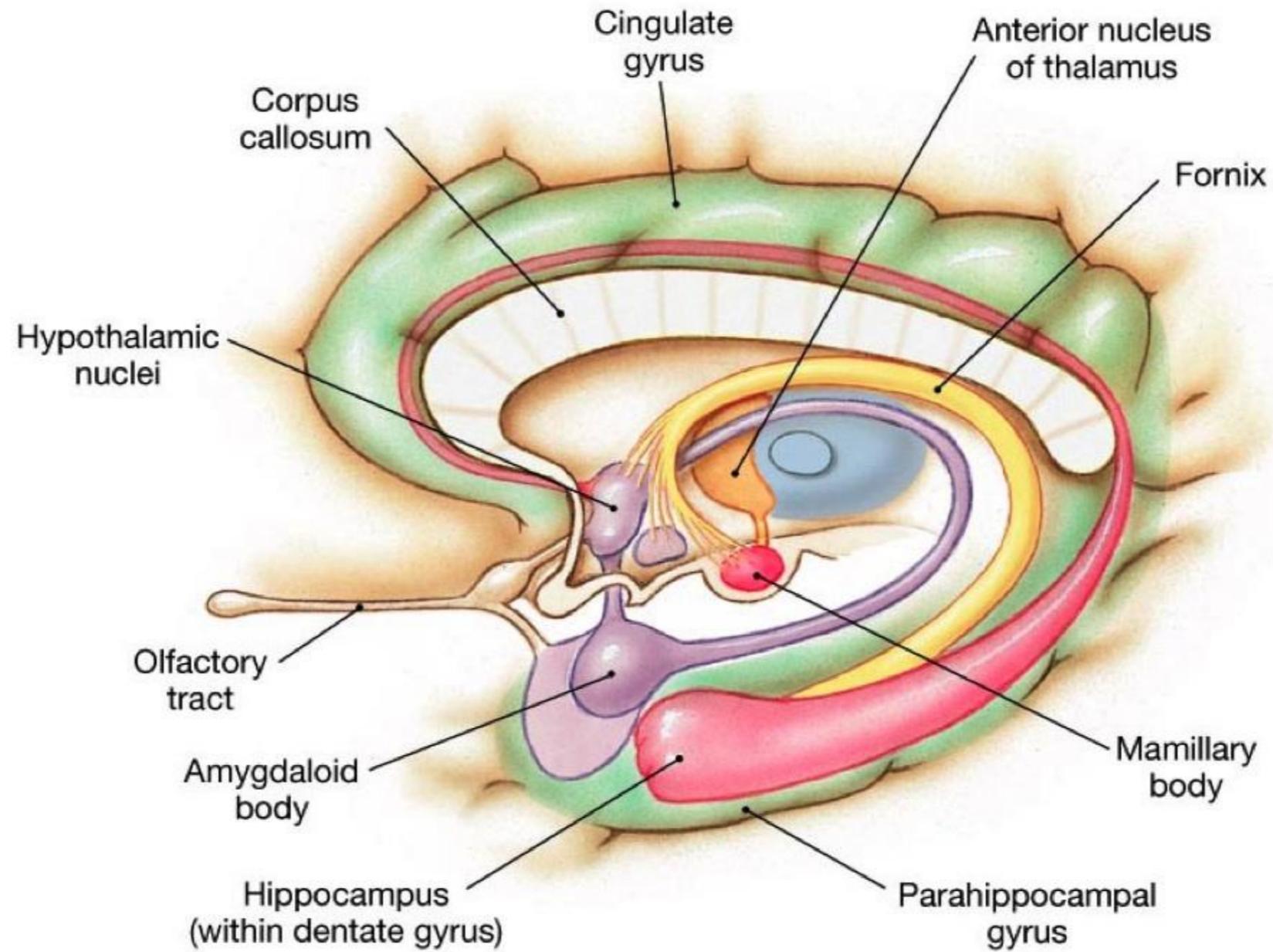
Schematic representation of Memory Consolidation, Raman Sakhuja 2013

Thalamus





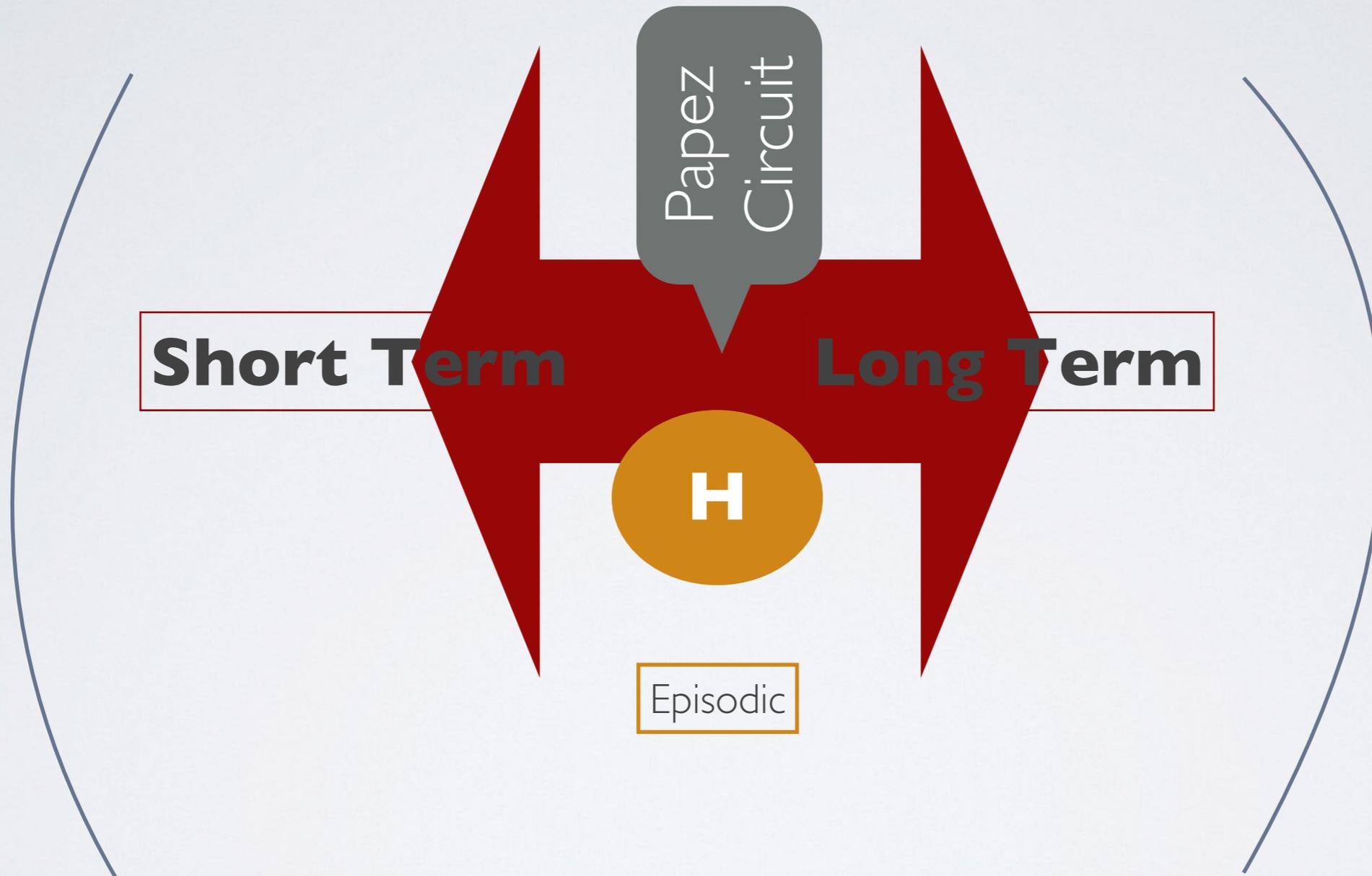
Mamillary Bodies



(b)

MEMORY

Prefrontal Cortex



Cortex

Schematic representation of Memory Consolidation (Episodic- Hippocampus), Raman Sakhuja 2013

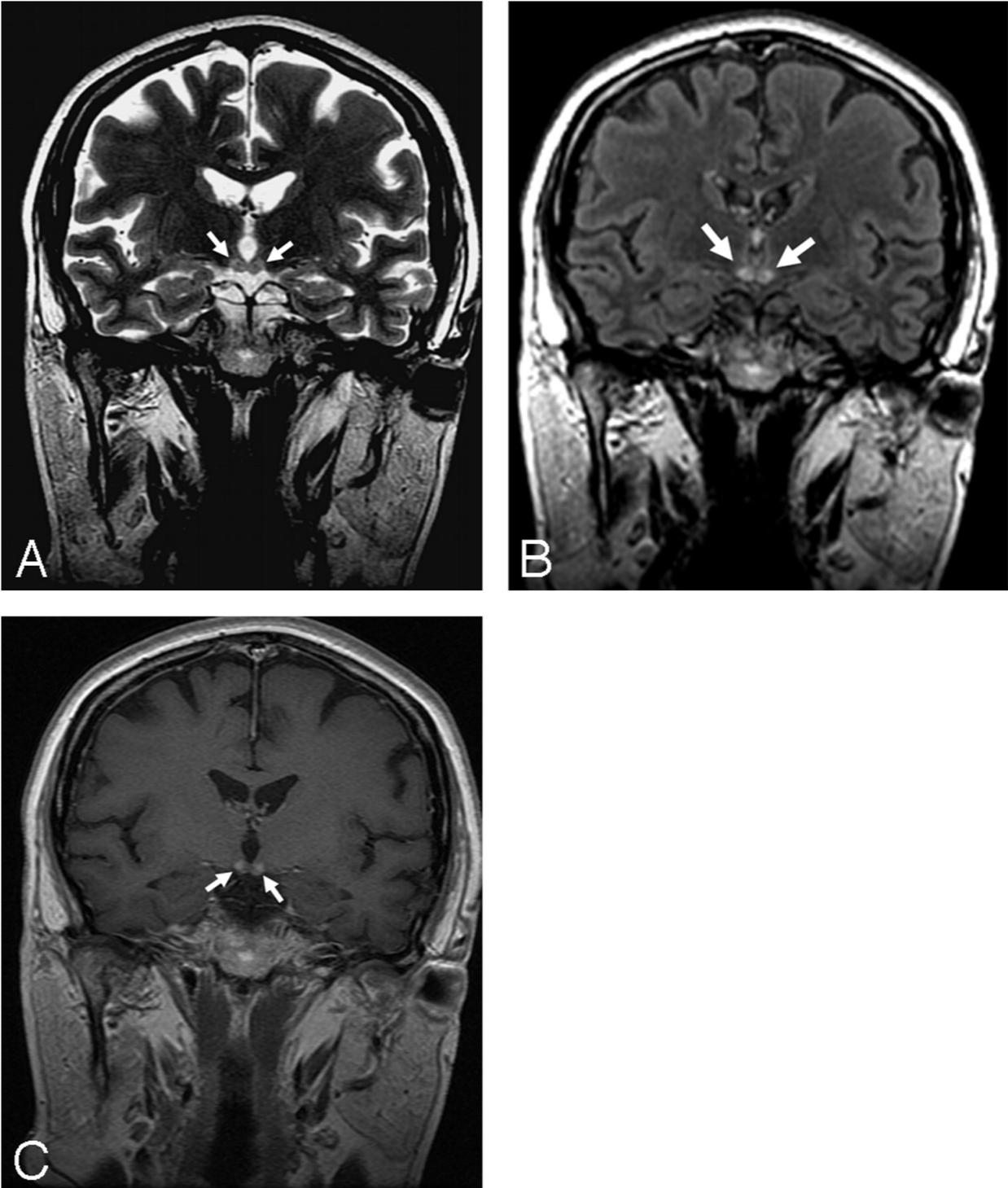
NEUROPATHOLOGY

- Gross- Decreased brain weight
- White matter changes- Prefrontal, Volume of corpus callosum, Cerebellar white matter volume
- ~ Disruption of myelination and axonal integrity(Harper et al 2005, Pfefferbaum and Sullivan 2005)
- Incomplete recovery after abstinence
- 2 mechanisms- Permanent and Transient
- Permanent- Neuronal loss in Cortical areas (Wallerian degeneration)
- Transient- Myelin sheath abnormalities (Thiamine Pyrophosphate dependent)- Reversible (Pfefferbaum 1995, Gazdzinski 2005)

NEUROPATHOLOGY

- Thiamine- Axonal Conduction
- Thiamine Pyrophosphate- Cofactor in various enzymes esp. Alpha- ketoglutarate- Myelin sheath (lipid) and Carbohydrate metabolism
- Acute deficiency- areas dependent on Thiamine- Occular Nuclei, Superior Vermis of Cerebellum, Diancephalon region

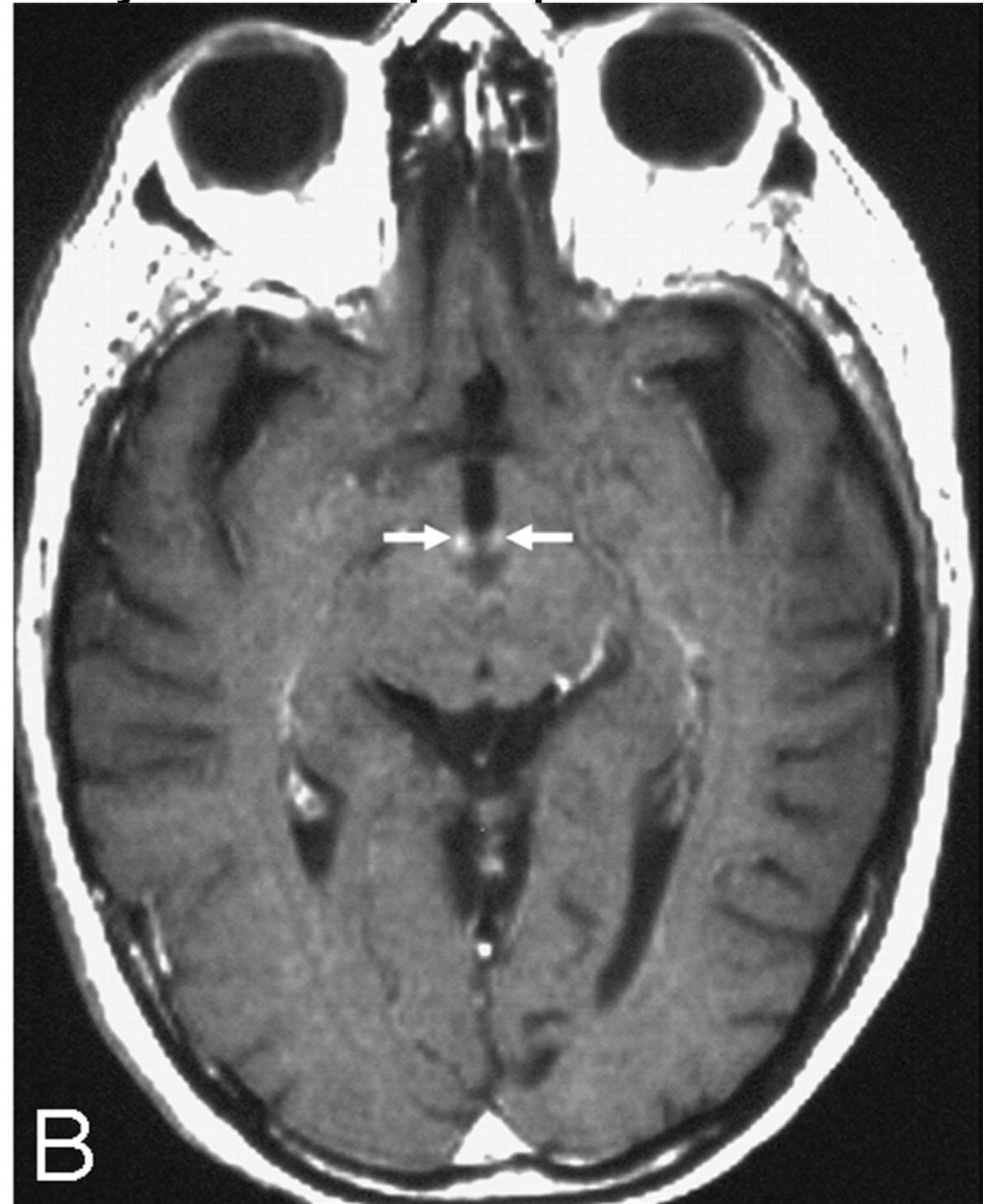
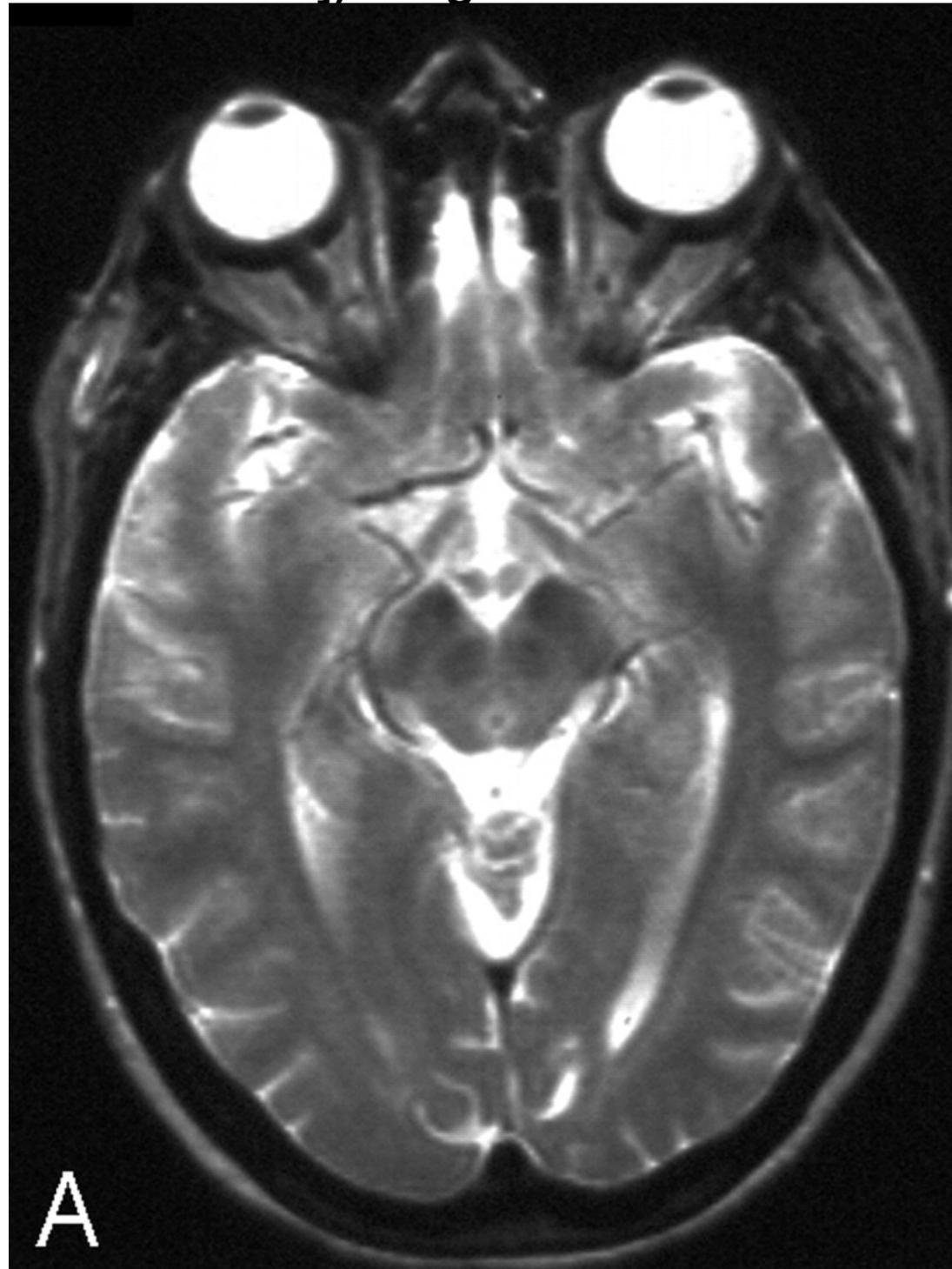
A 53-year-old woman with an history of chronic alcohol abuse presented with the classic neurologic triad of Wernicke encephalopathy.



Zuccoli G et al. AJNR Am J Neuroradiol 2007;28:1328-1331

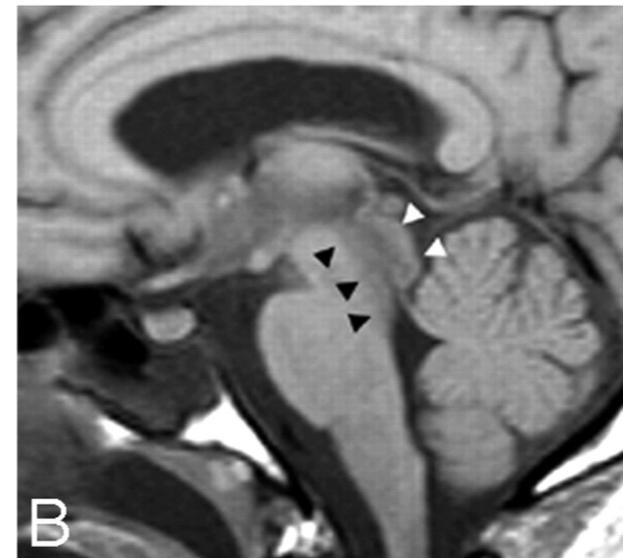
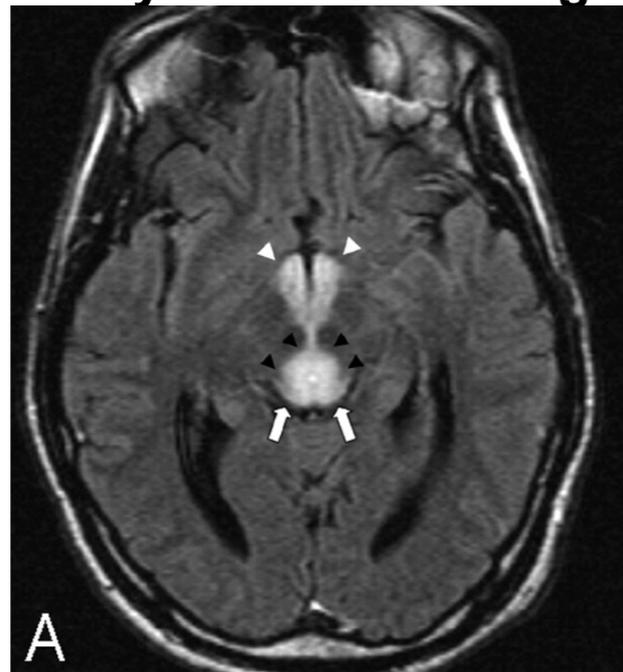


A 45-year-old woman with a history of alcohol abuse had changes in consciousness and ocular abnormalities. A, No signal intensity alterations are seen on axial T2-weighted (2500/90/2 [TR/TE/NEX]) image at the level of the mamillary bodies and periaqueductal ...



Zuccoli G et al. AJNR Am J Neuroradiol 2007;28:1328-1331

A 33-year-old man presented with sudden and progressive changes in consciousness after prolonged voluntary food starvation. A, Axial FLAIR (11000/140/2 [TR/TE/NEX]) image shows marked hyperintensity of the tectal region (white arrows), periaqueductal area (b...



Zuccoli G et al. AJNR Am J Neuroradiol 2007;28:1328-1331



WERNICKE- KORSAKOFF SYNDROME

- Acute/Subacute Syndrome
- Thiamine deficiency
- Common in Alcohol Misuse Disorders
- Prevalence 0-2.8% Similar Internationally (Harper et al)
- Males higher
- 25% Long term institutional care

WKS

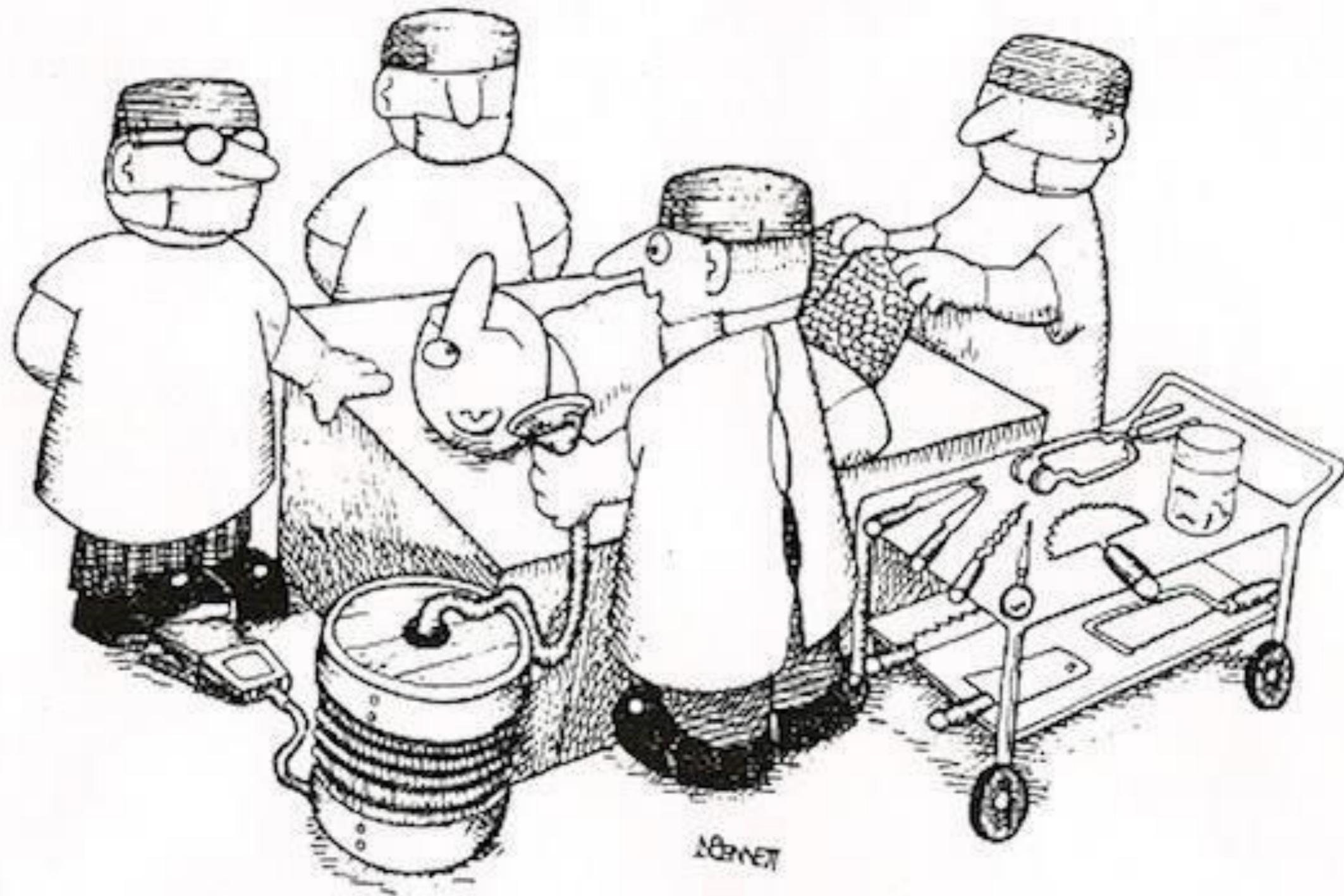
- WE- Triad Confusion, Ataxia, Nystagmus (Ophthalmoplegia)
- Triad- 16- 35%
- ~ Apathy, Inattention, Indifference to surroundings, Disorientation
- Eye signs- LR and SO palsies
- Peripheral neuropathy

WKS

- KS- Amnestic Syndrome
- Anterograde- 7 item test
- Retrograde- Episodic (Declarative)- Hippocampus/Mammillary Bodies- time sequence lost
- Gaps covered by Confabulations- Momentary/Fantastic

WKS

- Thiamine replacement
- Parenteral- High doses to cross BBB
- Intravenous Pabrinex- 2 Pairs TDS X 3 days followed by IM/IV 3-5 days
- Ocular signs- respond within hours
- Vertical Nystagmus- Months
- Fine Horizontal Nystagmus ~ indefinite
- Ataxia ~ 40% Complete recovery but 60%- wide based, slow gait
- Global confusion- gradual improvement



"We're the London Consort of Surgeons, and we perform authentic operations using period instruments"

Primary
Care

Dementia

A&E

Social
Care

ARBD

General
Hospital

Mental
Health

DATs

Neurorehab

CURRENT CONSIDERATIONS

- Thiamine- High doses starting from the first point of contact (Banana Bag)
- In high risk- Thiamine FIRST, then glucose (exception- life threatening hypoglycaemia)
- In withdrawal- treat concurrently
- Secondary prevention strategies- maintenance of Oral Thiamine, co-morbid deficiencies and medical conditions (CHF- WKS), long-term social care and guardianship consideration
- Ongoing assessment of progress- inpatient stay required
- Balanced diet resumption
- Onward referral- **Conundrum?**

OPTIMISM

- Neuroradiology
- Lithium- neuroprotective role- x WE to KS (Luo J, 2010)
- Anthocyanins (Chen G & Luo J, 2010)
- Acetylcholinestrerase Inhibitors- Donepezil (Cochrane et al, 2005)
- Memantine (Rustembegovic A et al, 2003)
- Rivastigmine- Negative (Luykx et al, 2008)
- Thiamine fortified bread (Australia- lowered prevalence- Harper et al, 1998)



NON INVASIVE NEUROMODULATION (NINM)

- TMS (Transcranial Magnetic Stimulation)
- tDCS (Transcranial Direct Current Stimulation)

TMS

- Several studies on Depression, Stroke rehab, Parkinson's, Memory
- Role of DLPFC in memory- Left for memory organisation and Right for storage (STM/WMM)
- DLPFC- High frequency 10 Hz rTMS- increased performance on WM (MIT- Preston & Wassermann et al, 2009)
- Kohler S, Paus T et al (2004)- fMRI- rTMS study- improvement in episodic memory with Left Frontal Stimulation
- DLPFC- rTMS- Hippocampal NEUROGENESIS

tDCS

- Brasil-Neto 2012- Anodal tDCS- improved performance on memory tasks-
- MI - Motor memory
- LDLPFC- Working memory
- Broca's area- Language

FUTURE- WALES

- **Database- Need in Local Population**
- **Where are these patients?**
- **Who's baby is it?**
- **What services are there?**
- **Do we need special services?**