

BSS International Sleep Medicine Course 2026

15th - 18th September | Newcastle



British Sleep Society



UK Multidisciplinary Sleep Professionals



Nederlandse vereniging voor
SLAAP- EN WAAKONDERZOEK
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Conflict of Interest Disclosures for Speakers

☐

1. I do not have any potential conflicts to disclose.

☒

2. I wish to disclose the following potential conflicts of interest:

Type of Potential Conflict	Details of Potential Conflict
Grant/Research Support	Takeda, MedTronic, OpZuid (EU), Salvia, Dutch Brain Foundation, ZonMw, Leiden University Fund
Consultant	TEVA, Lundbeck, Jazz, Centessa, Bioprojet
Speakers' Bureaus	-
Financial support	-
Other	-

☐

3. The material presented in this lecture has no relationship with any of these potential conflicts, **OR**

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- 1.
- 2.
- 3.



Sleep & Neurology

Rolf Fronczek, MD, PhD, Neurologist/Somnologist

Section N

- Epilepsy
- Parkinsonian Syndromes
- Dementias
- Stroke
- Headache
- Multiple Sclerosis
- Neuroinfectious
- Neuromuscular
- Pain





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ATLANTIC
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Amsterdam
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LUXEMBOURG

FRANCE

SWITZERLAND

LIECHTENSTEIN

AUSTRIA

HUNGARY

CZECHIA
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SLOVAKIA

POLAND

GERMANY

DENMARK

SWEDEN

NORWAY

LATVIA

LITHUANIA

KALININGRAD
(RUSSIA)

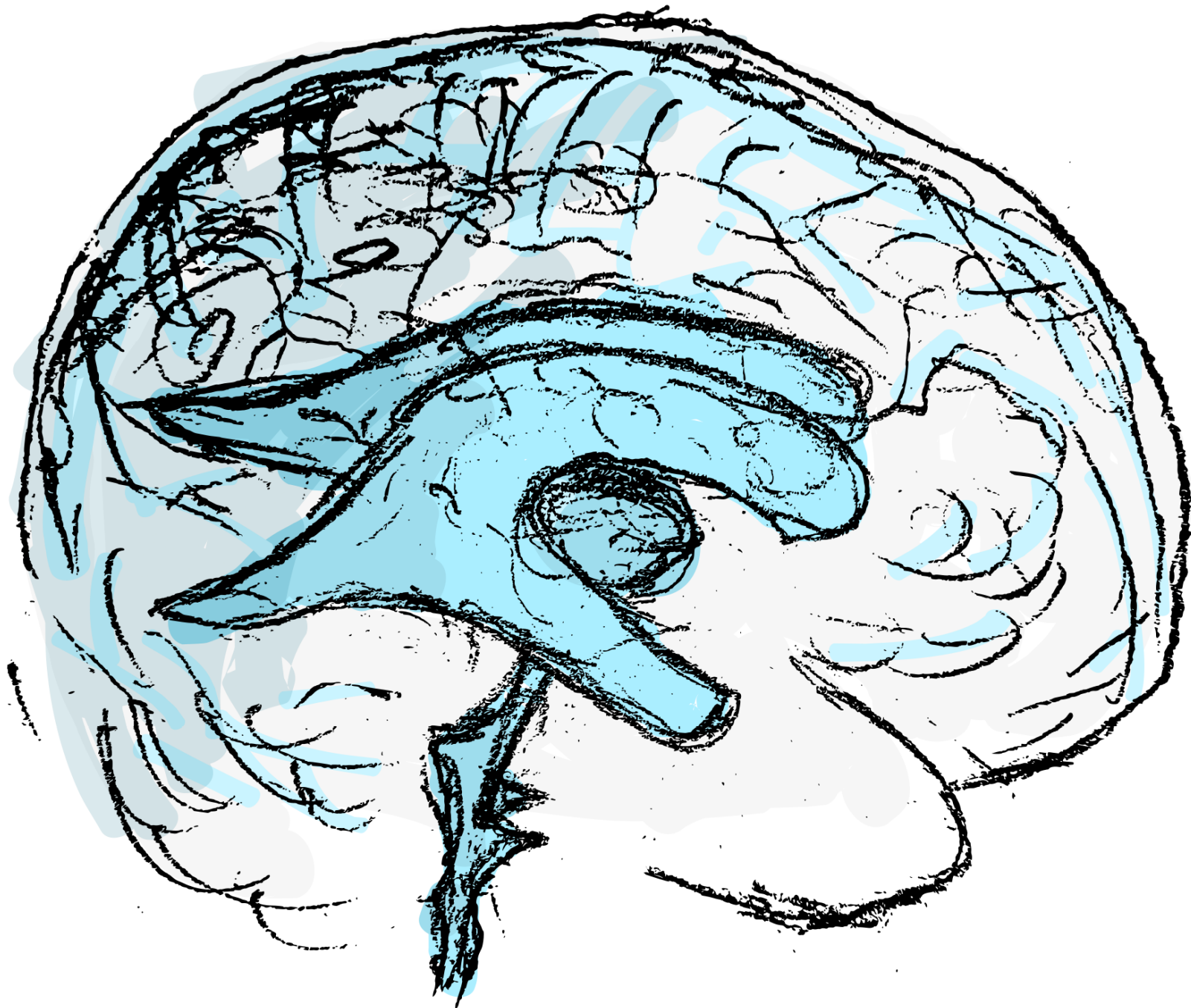
Baltic Sea

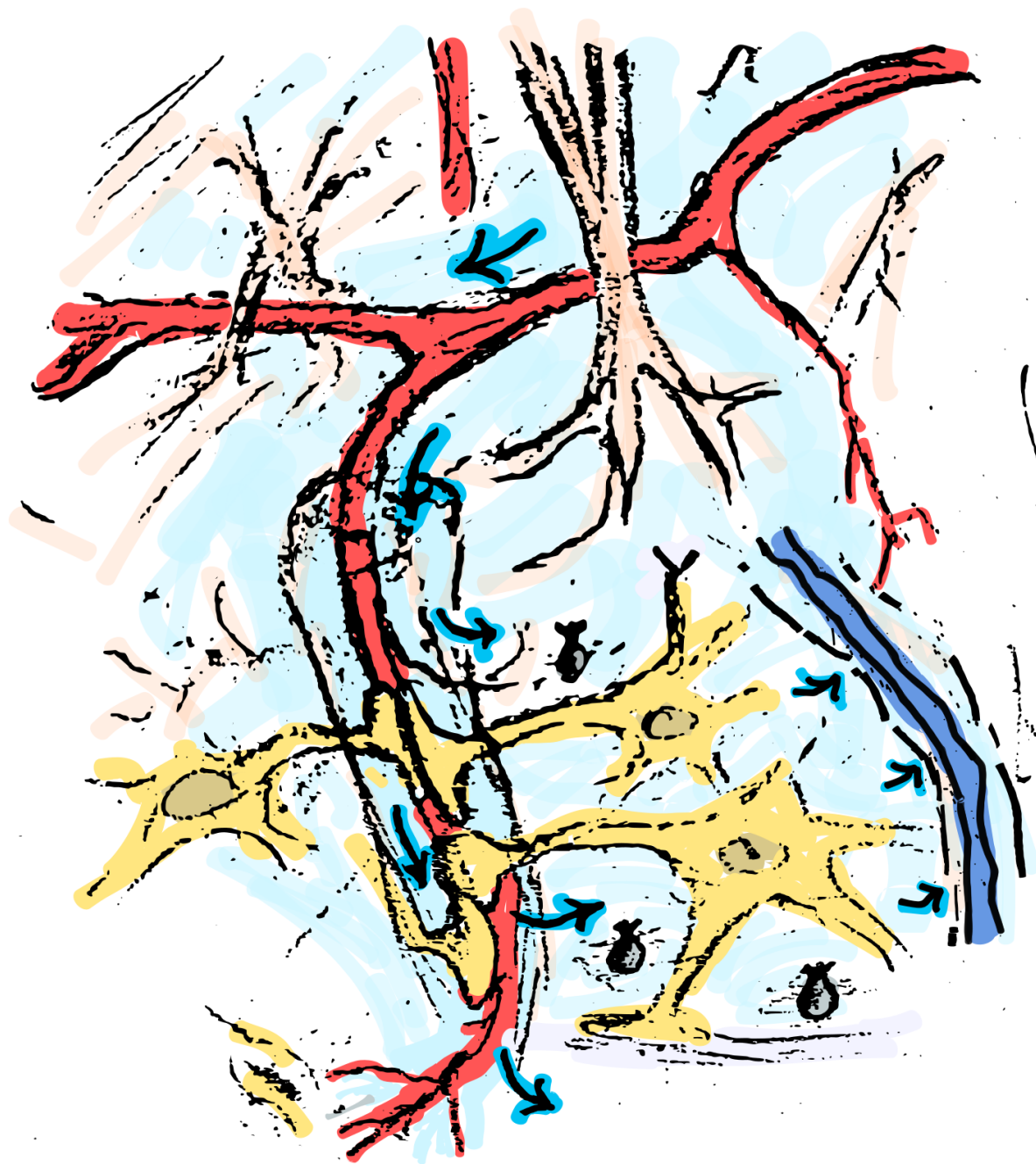
Ocean

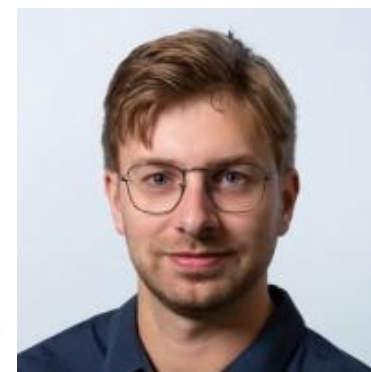
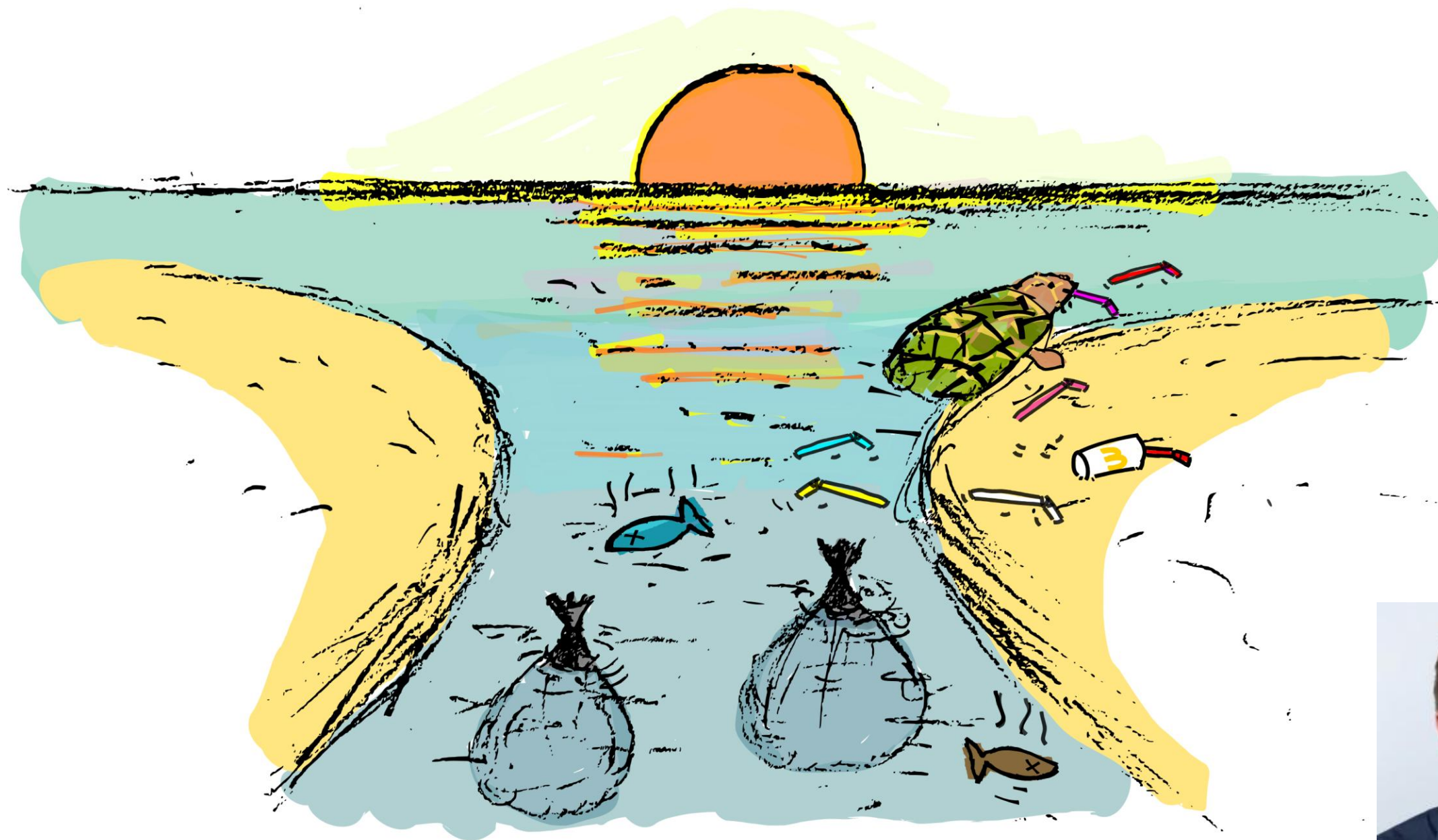
River



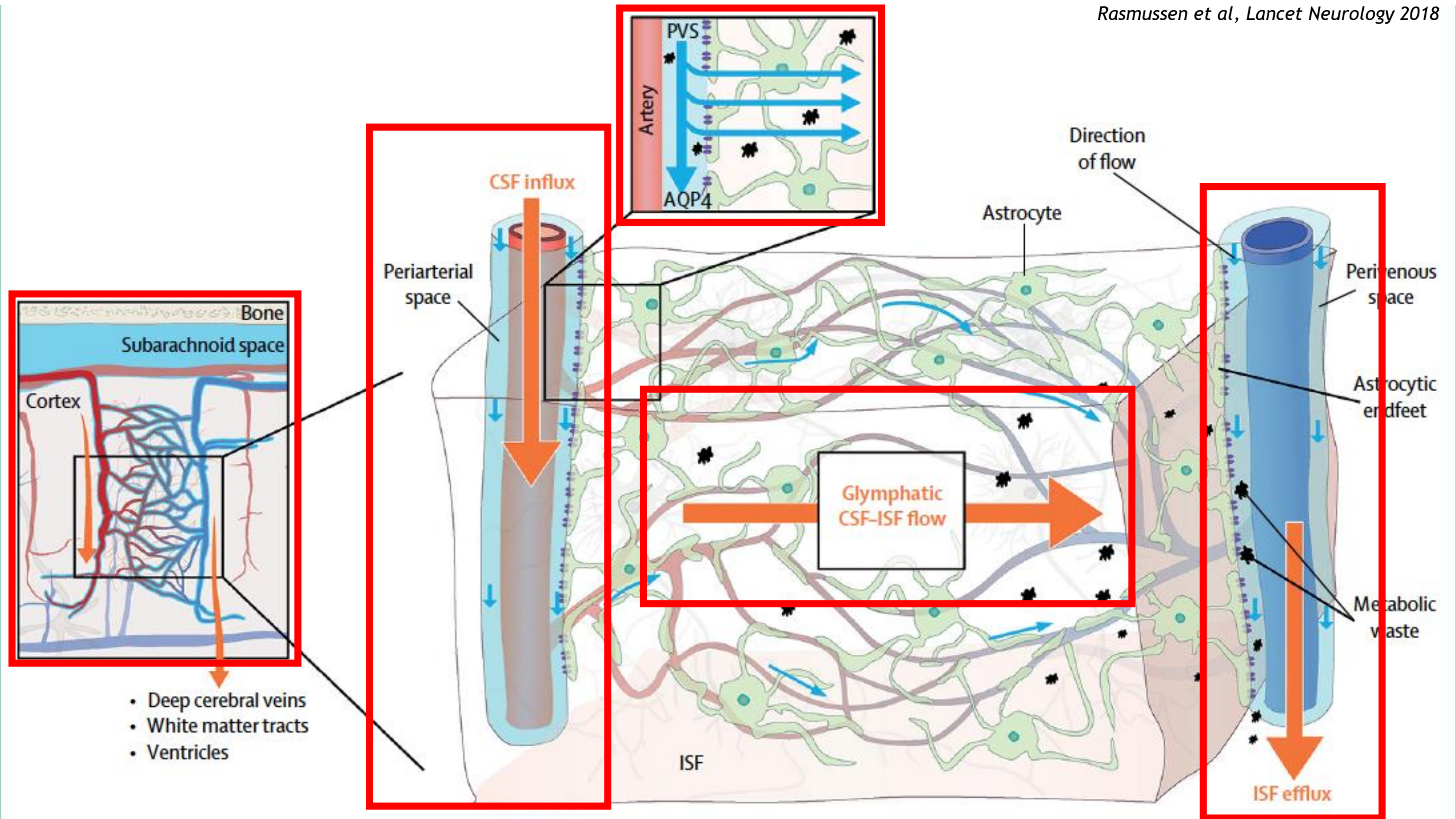




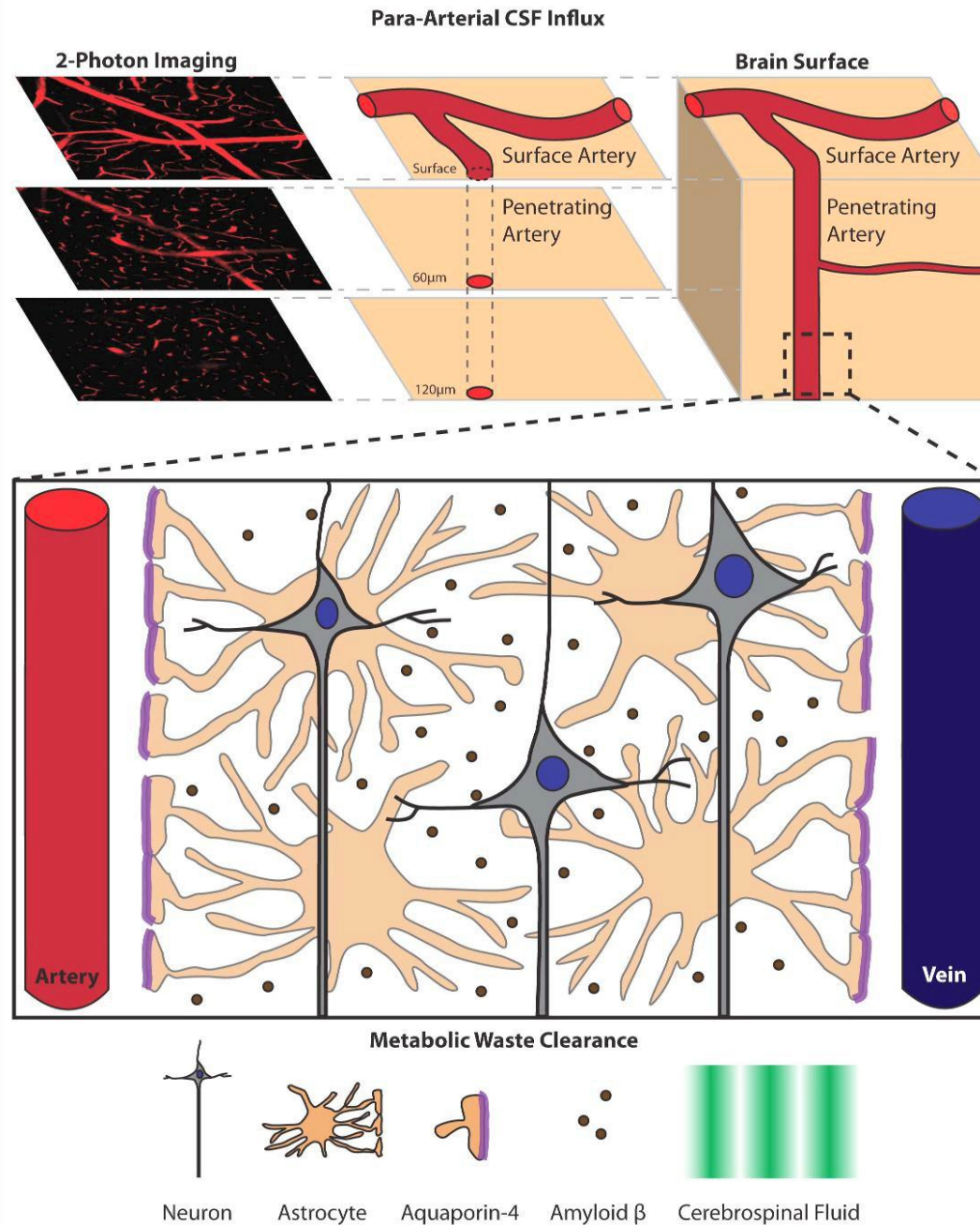


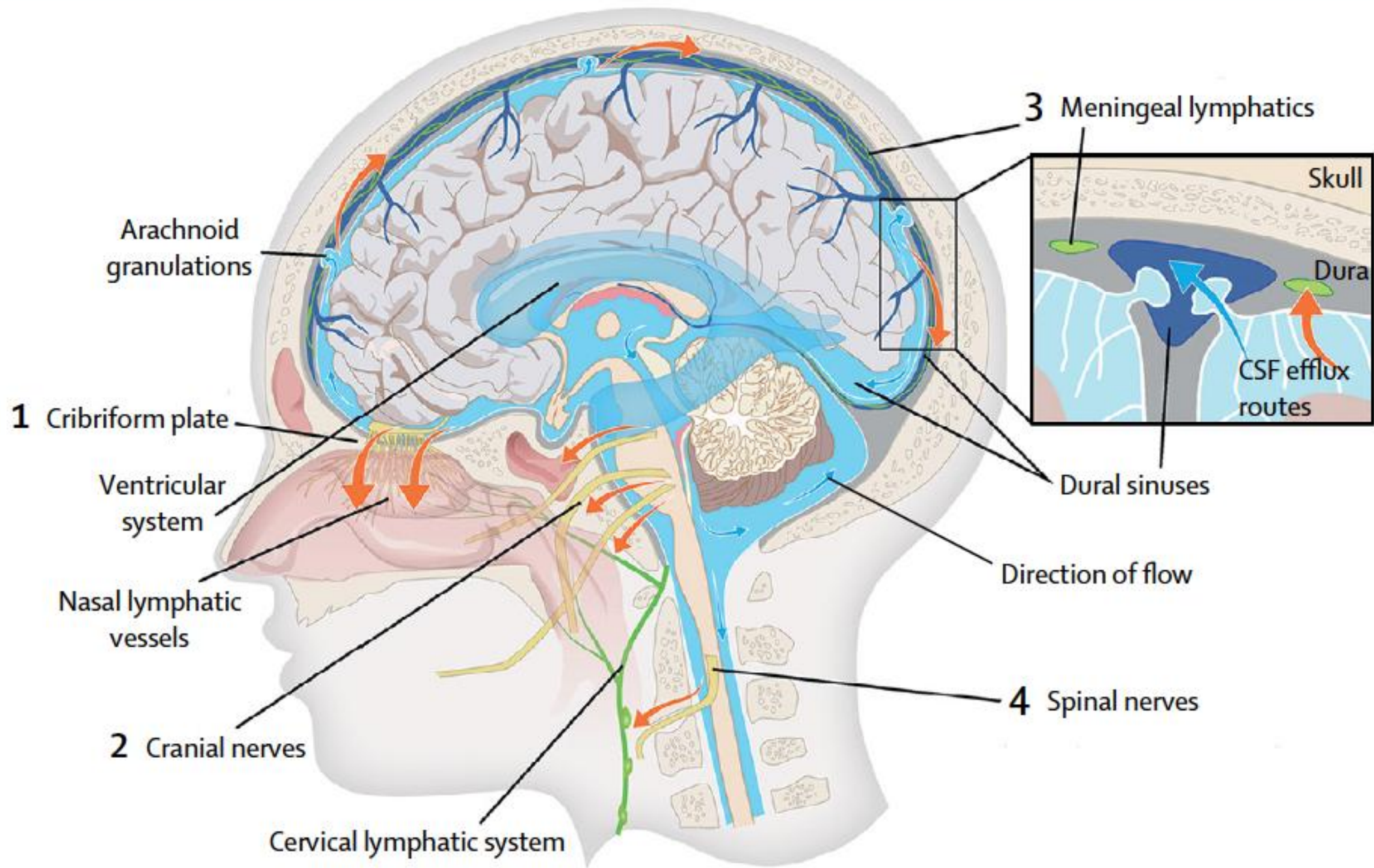


Courtesy of Ingmar Eiling, LUMC, Leiden

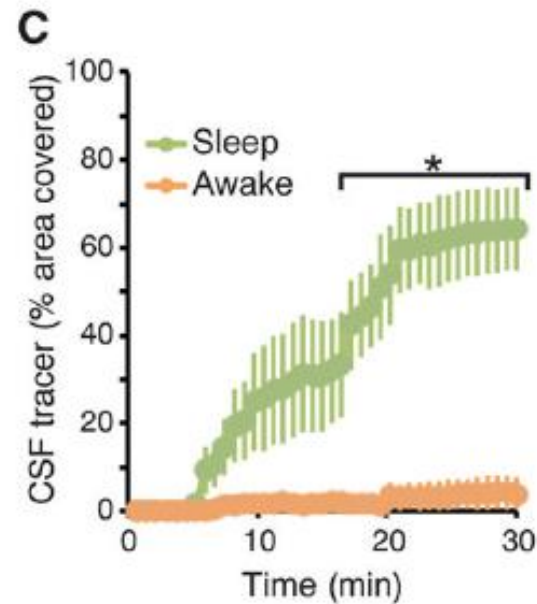
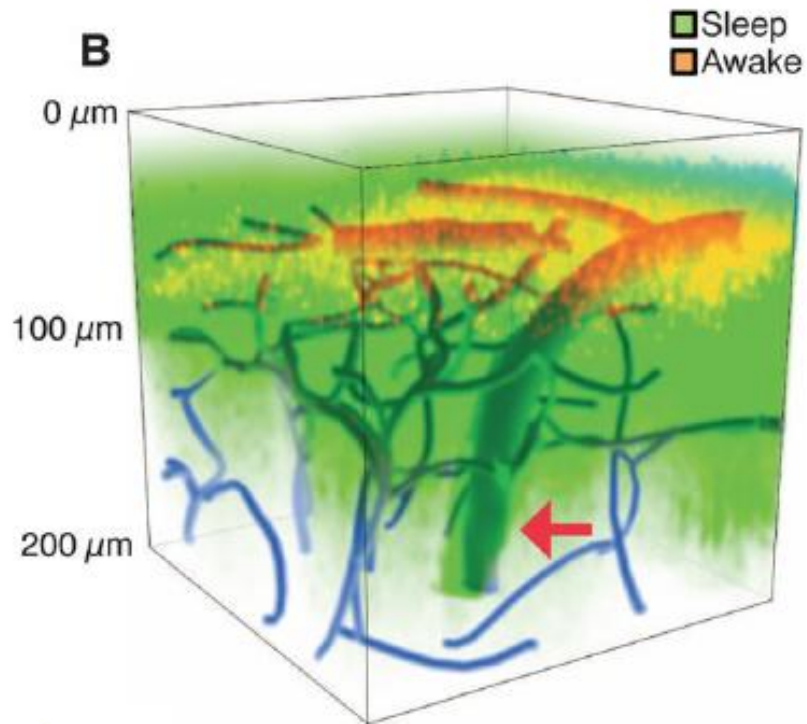


The Glymphatic Pathway

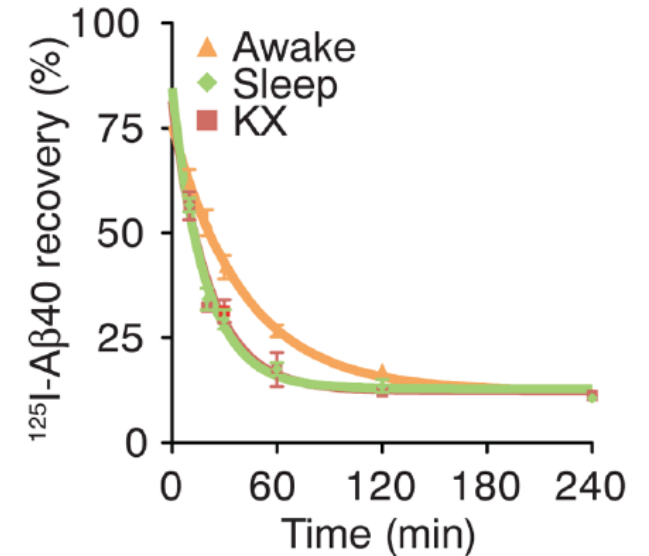




Glymphatic pathway and sleep

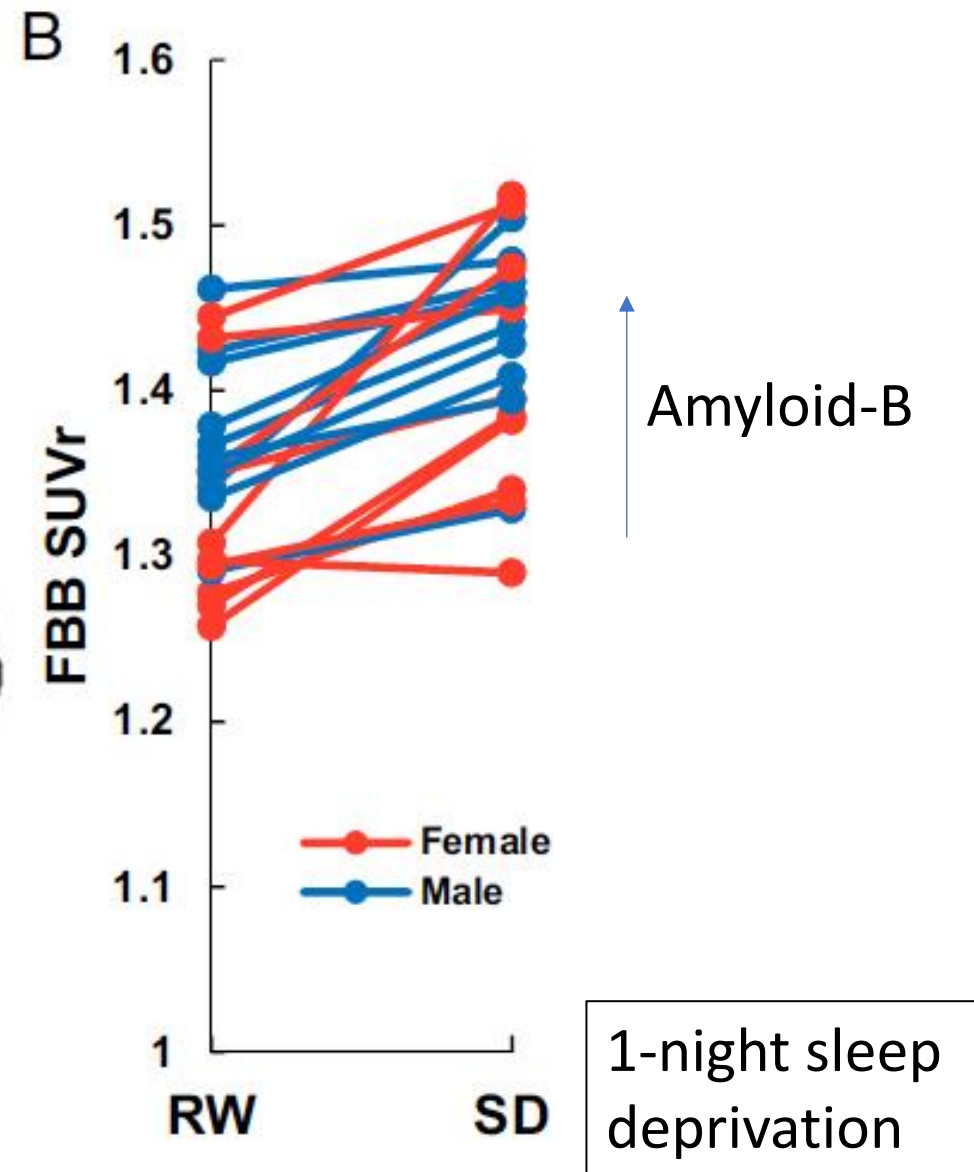
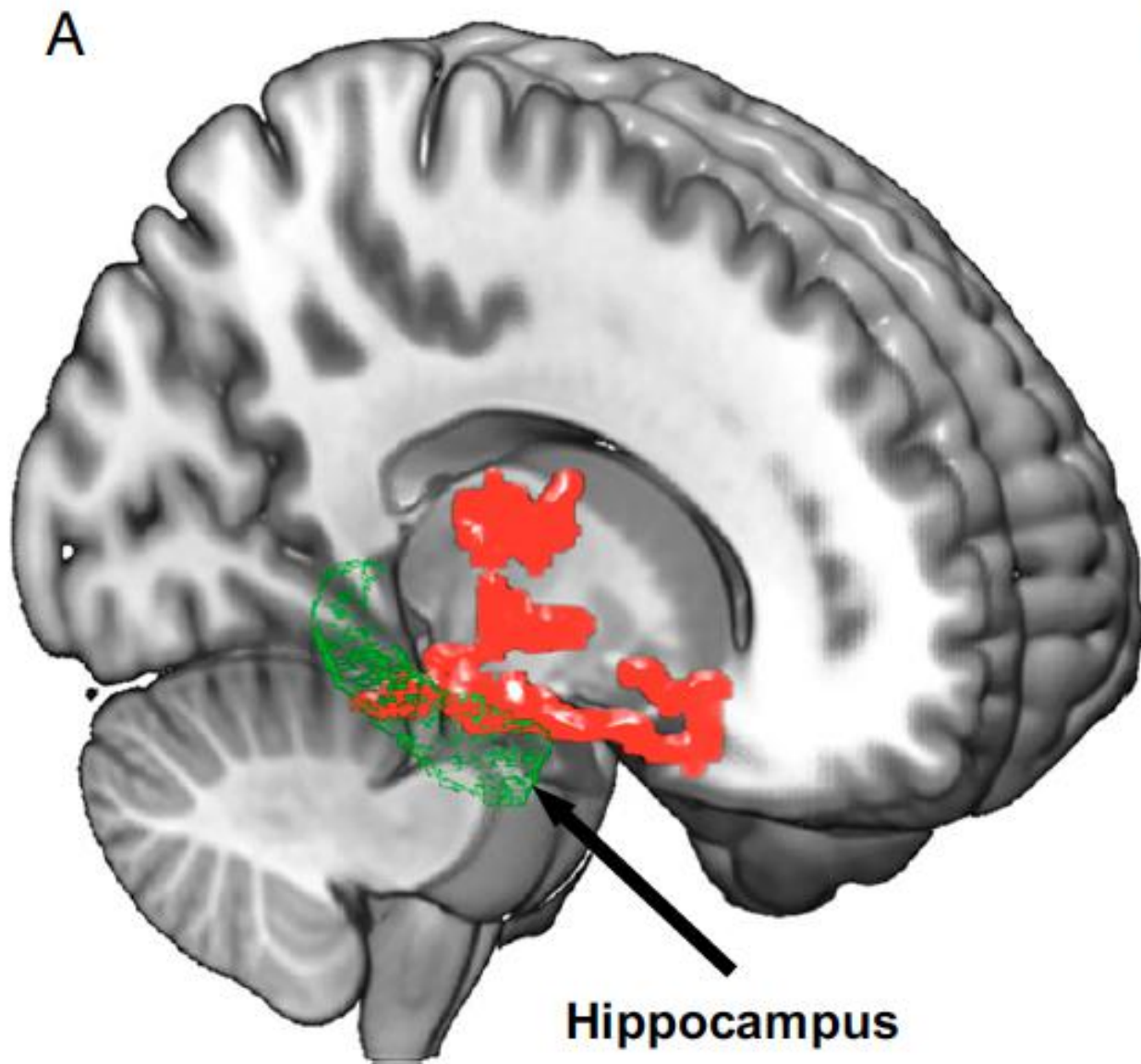


Wake suppresses influx

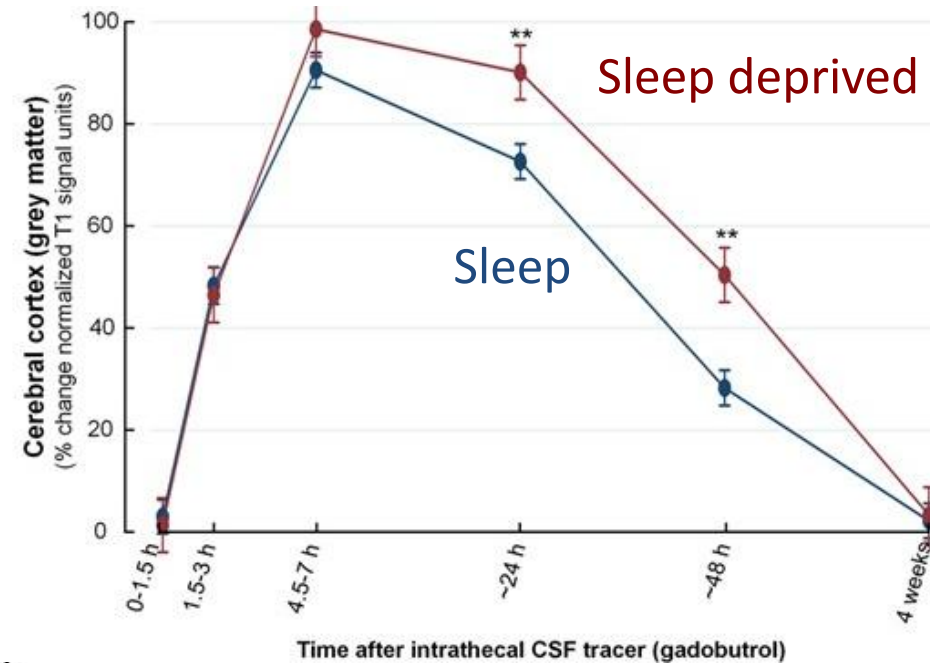
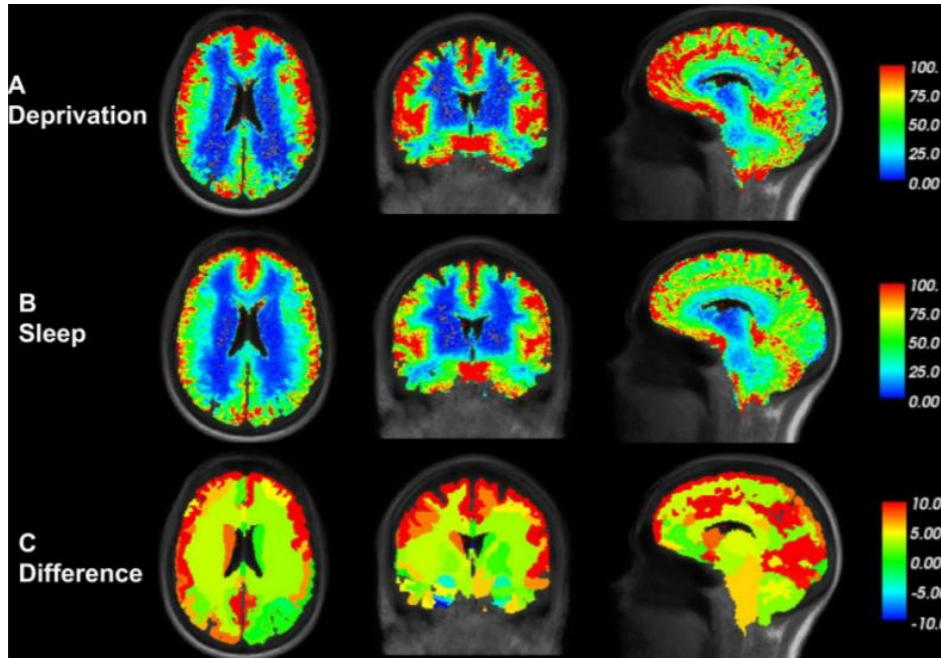


Sleep improves clearance



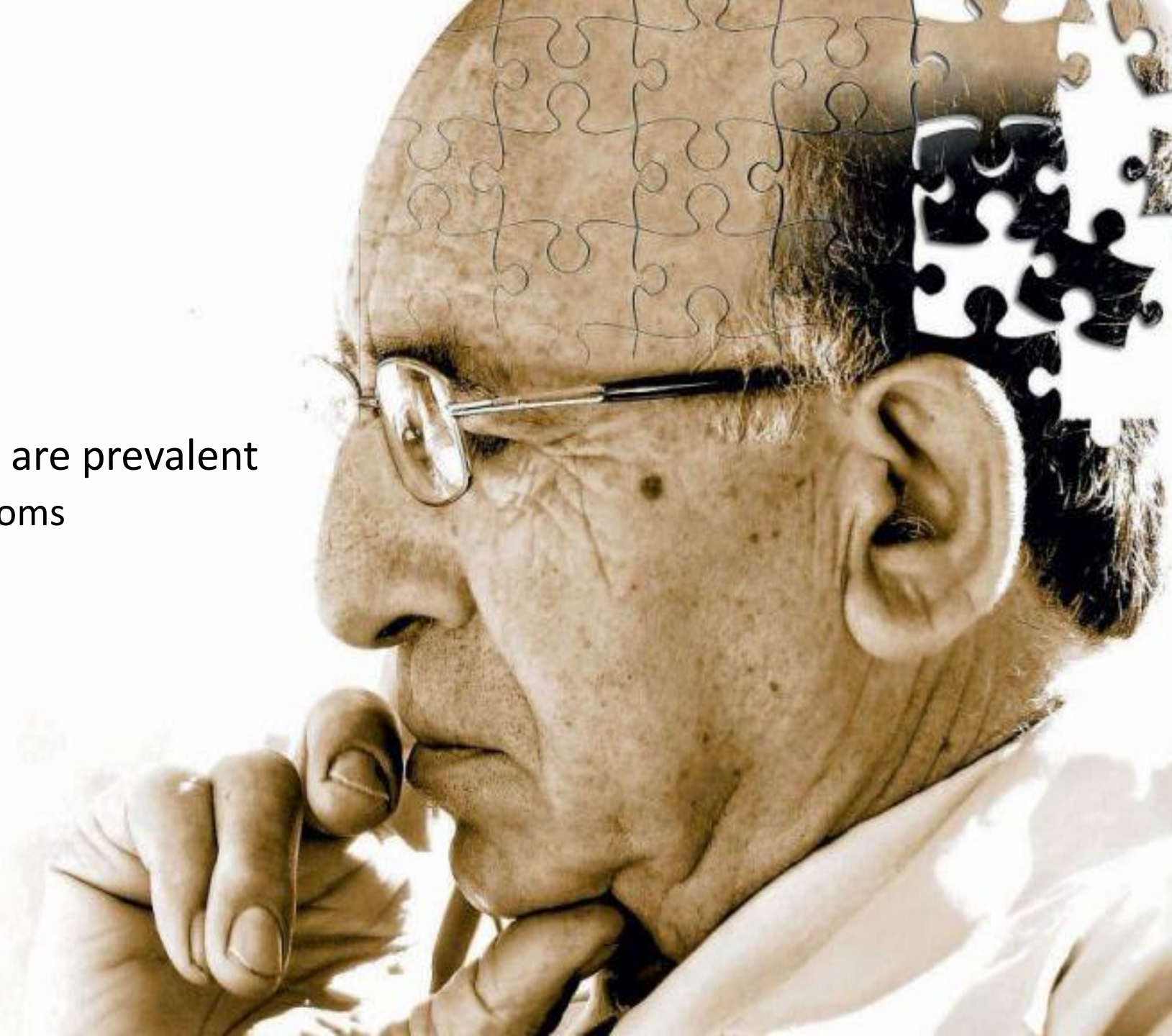


Intrathecal tracer injections

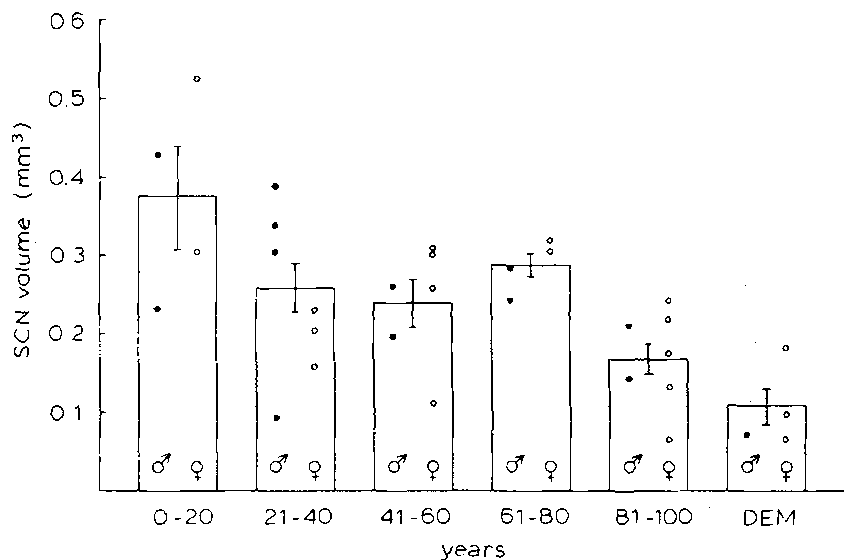


M. Alzheimer

- Sleep-wake rhythm problems are prevalent
 - Often one of the first symptoms
 - Often the prime reason for institutionalization



M. Alzheimer



suprachiasmatic nucleus

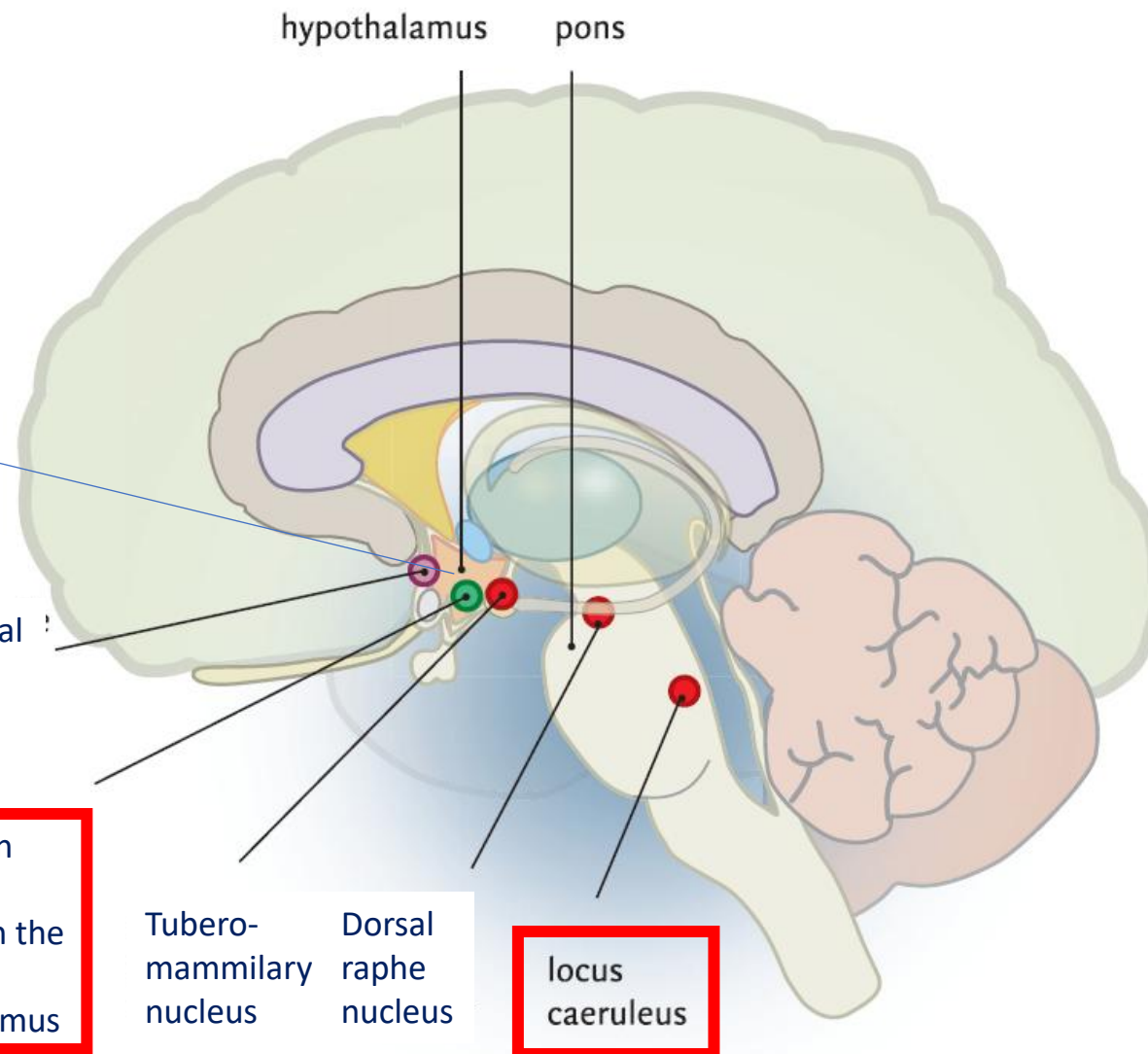
Ventrolateral pre-optic nucleus

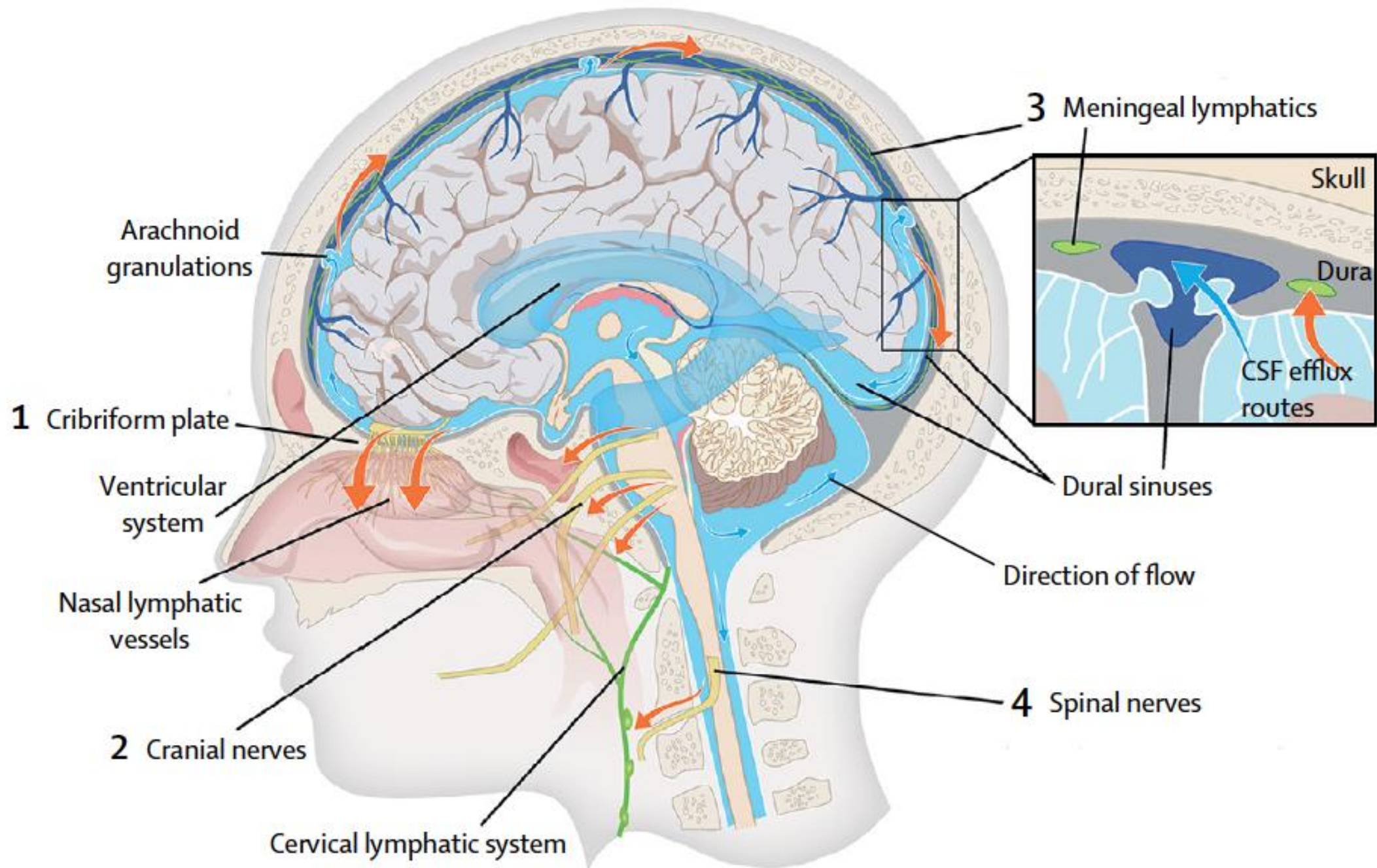
Hypocretin producing neurons in the lateral hypothalamus

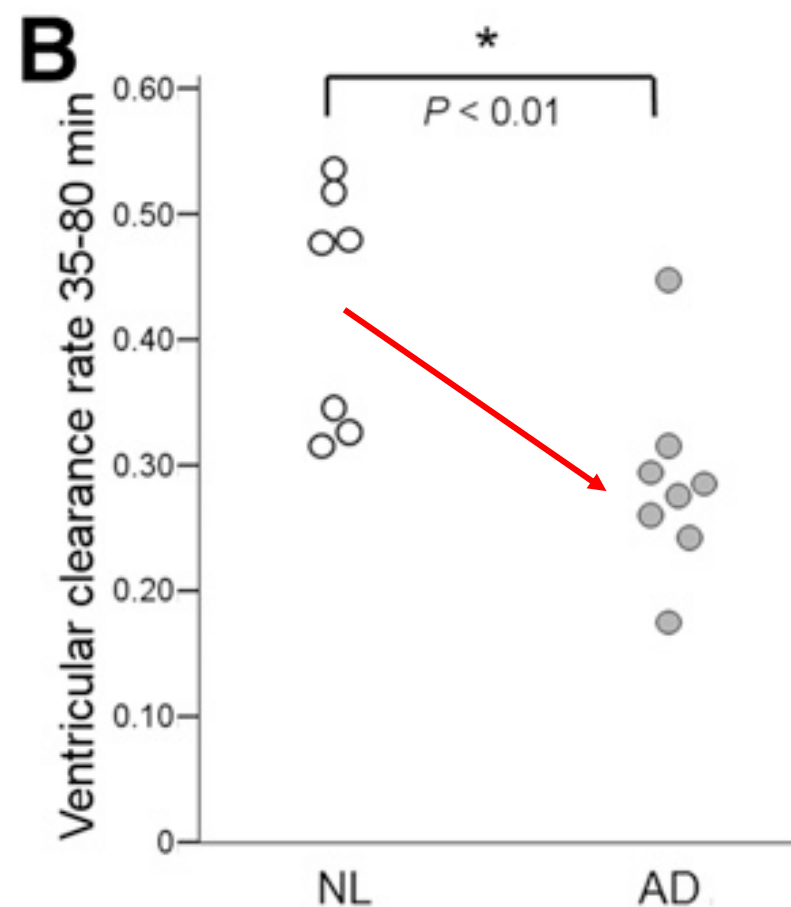
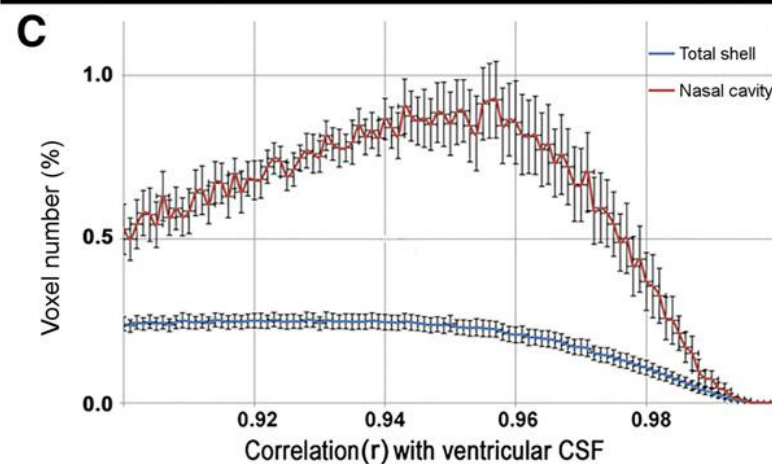
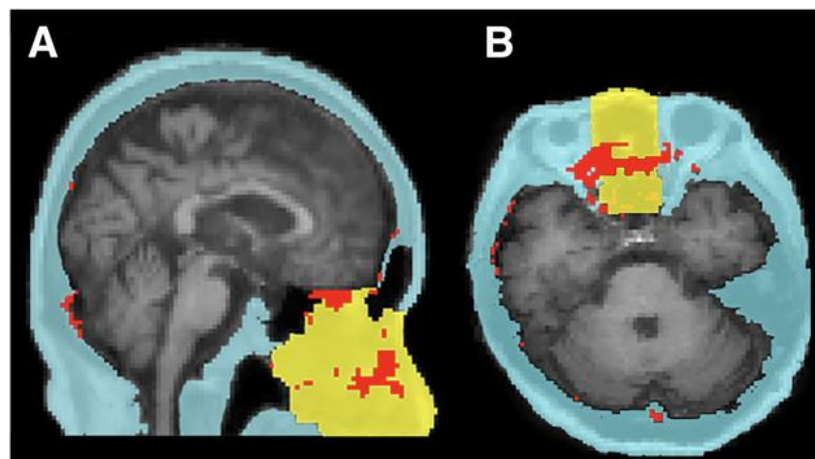
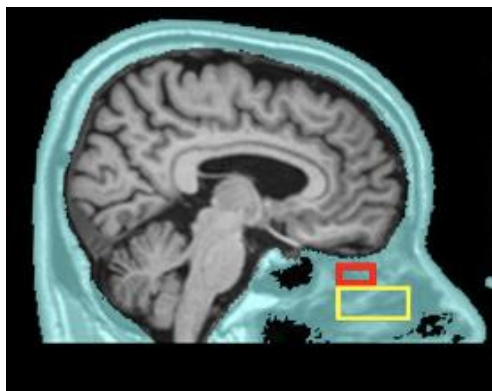
Tubero-mammillary nucleus

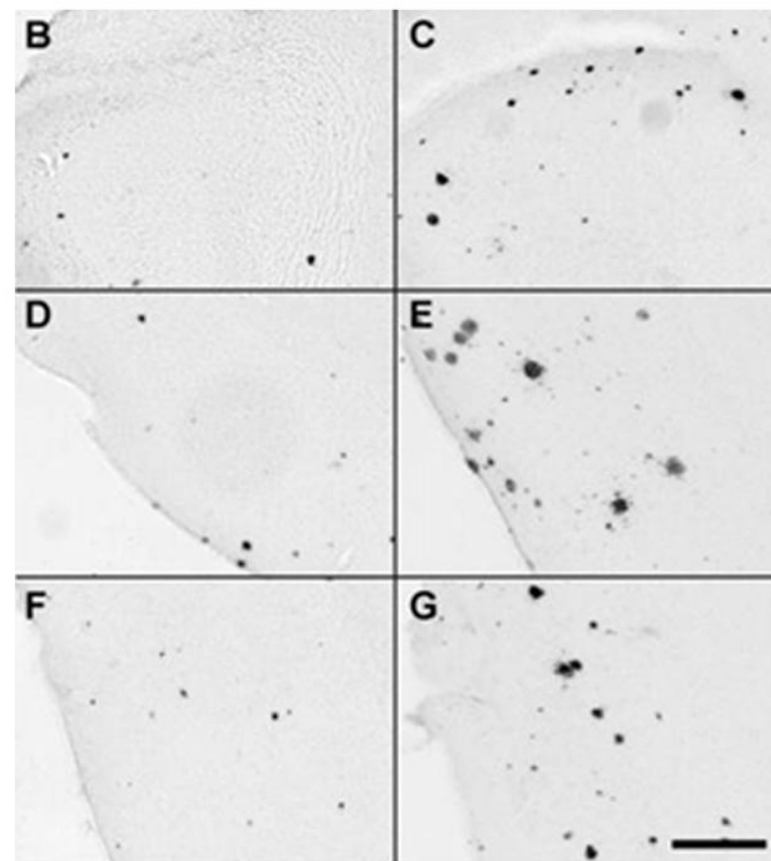
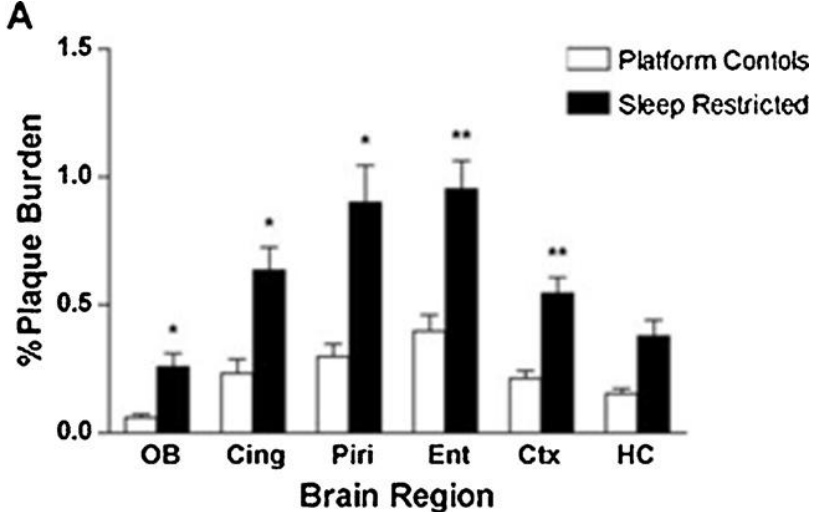
Dorsal raphe nucleus

locus caeruleus









Sleep deprivation

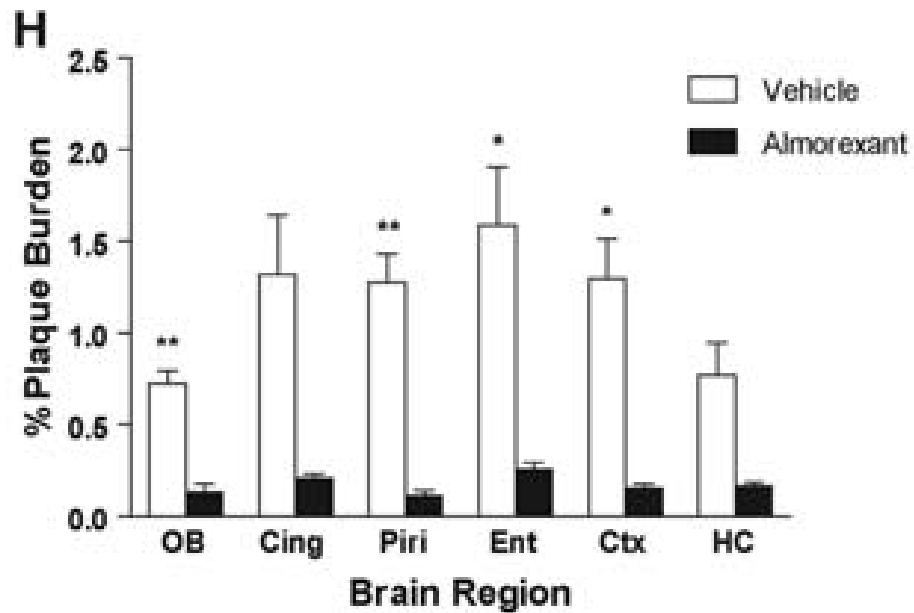


Amyloid-beta depositions

APP-mice



Kang et al, Science 2009



Sleep improvement (?)



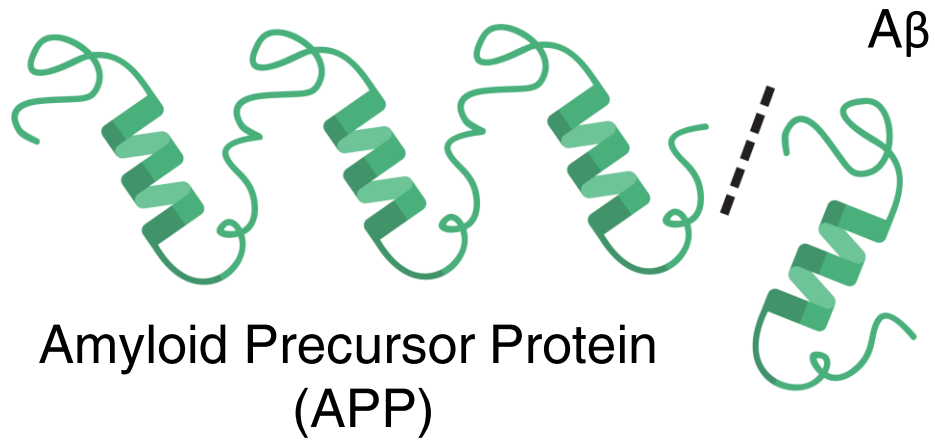
Amyloid- β depositions



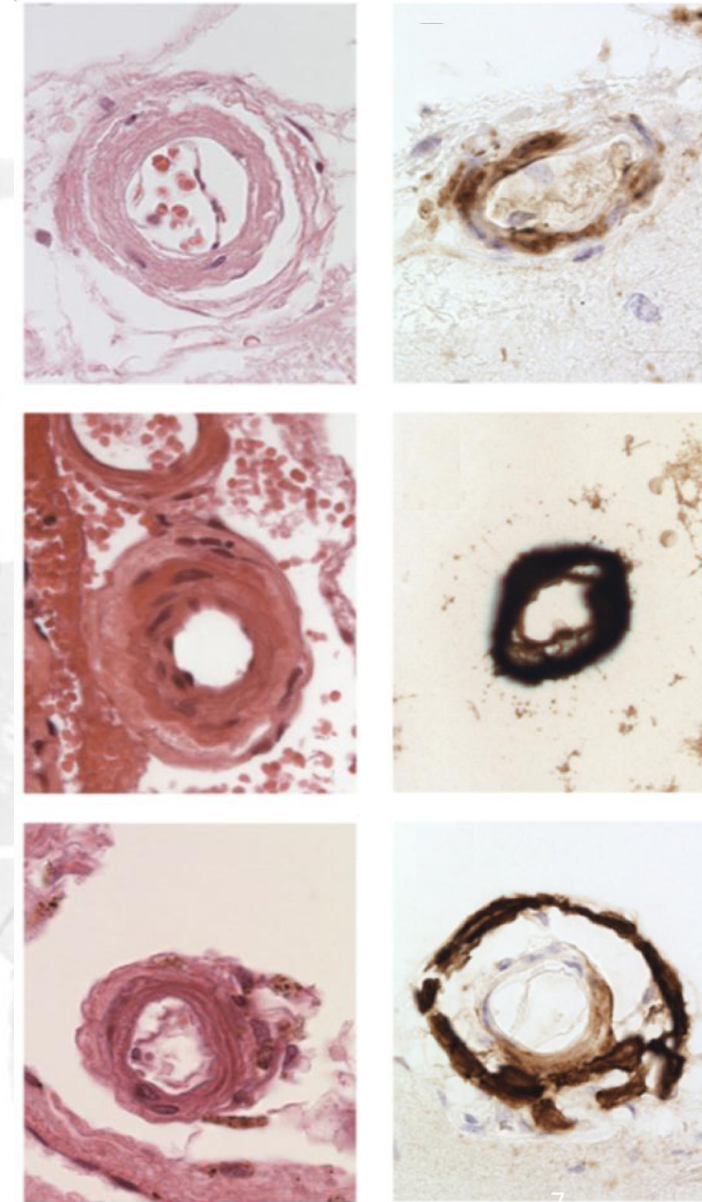
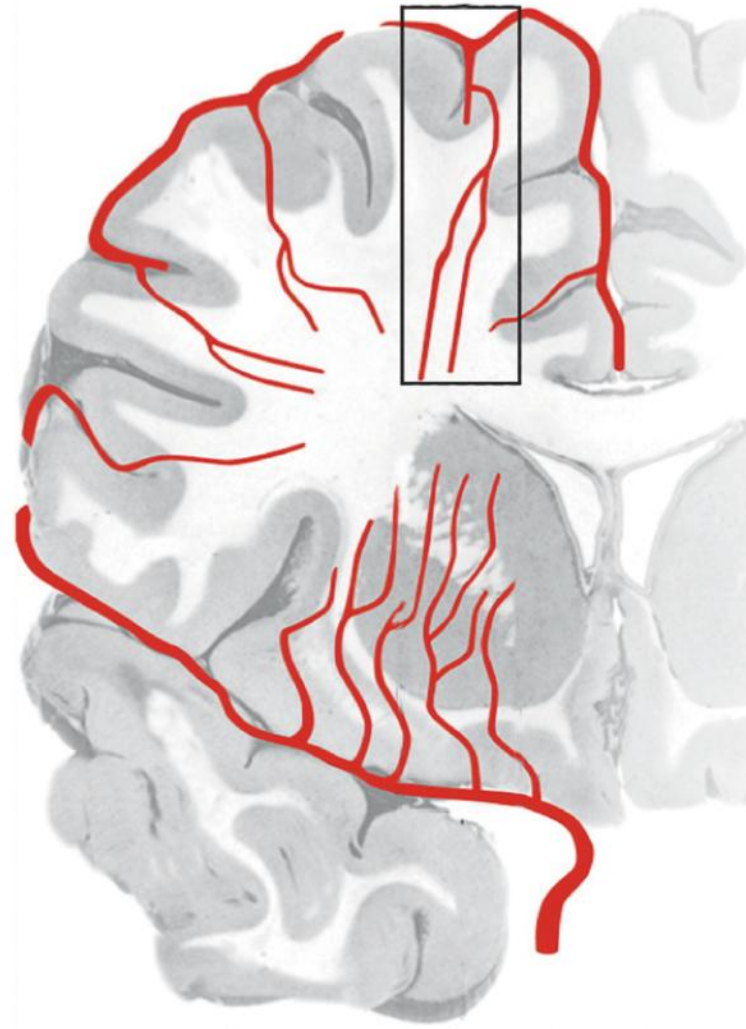
APP-mice

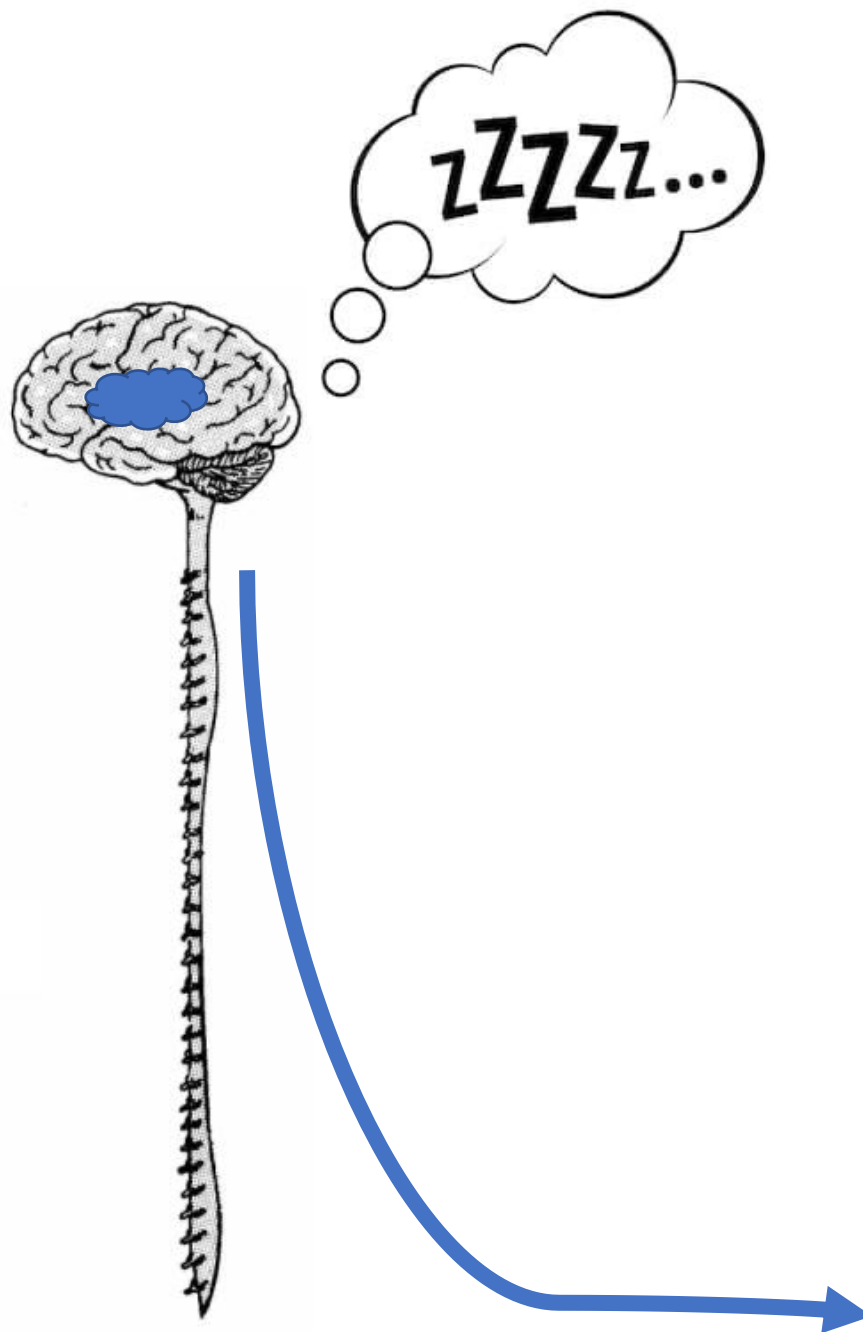
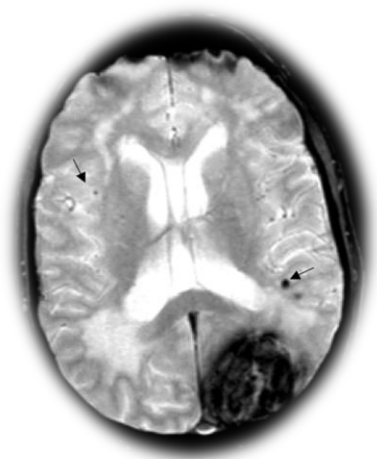


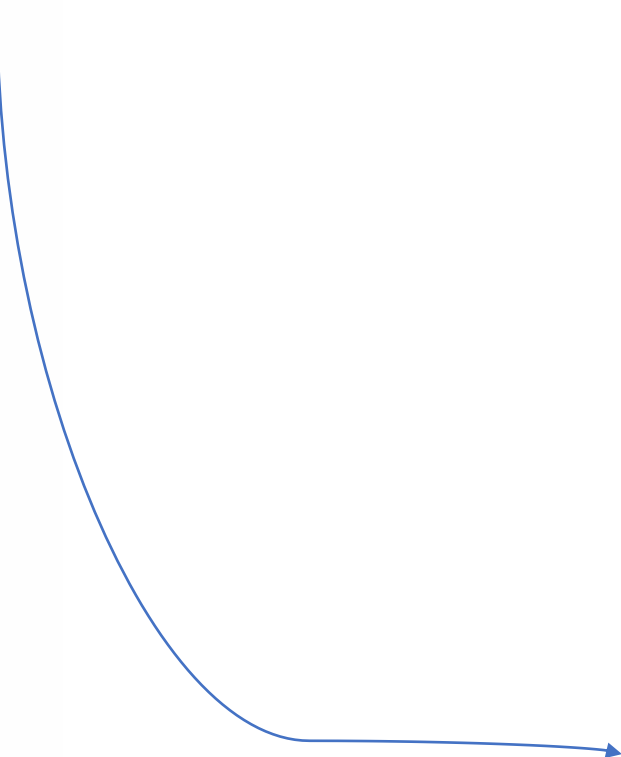
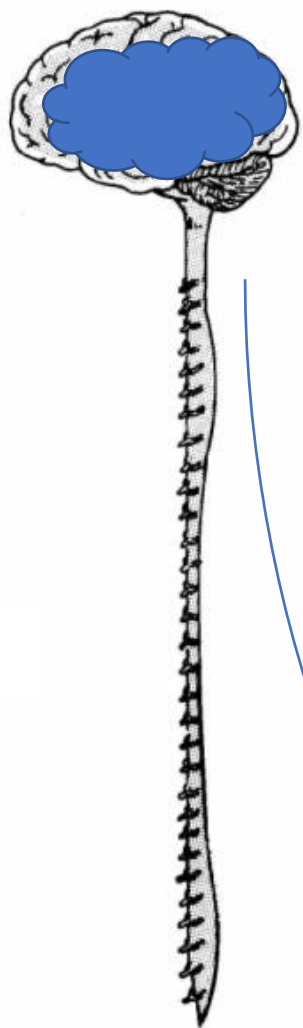
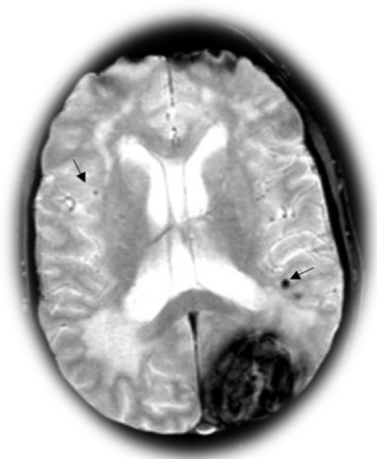
Cerebral Amyloid Angiopathy

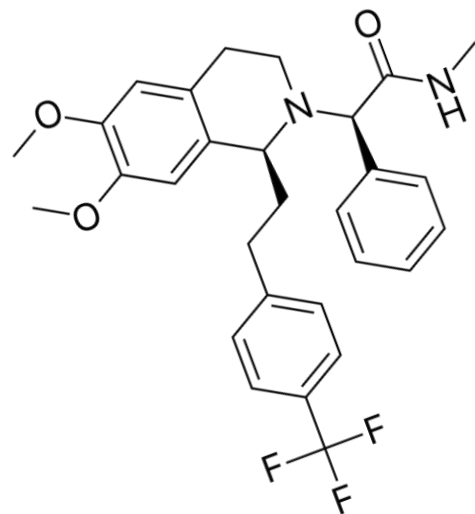
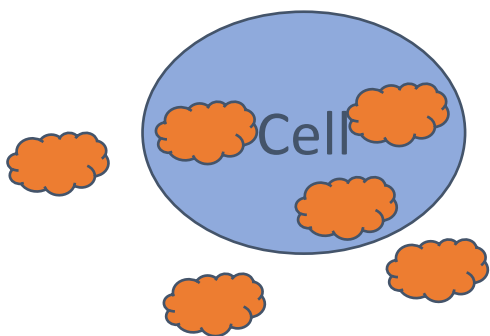
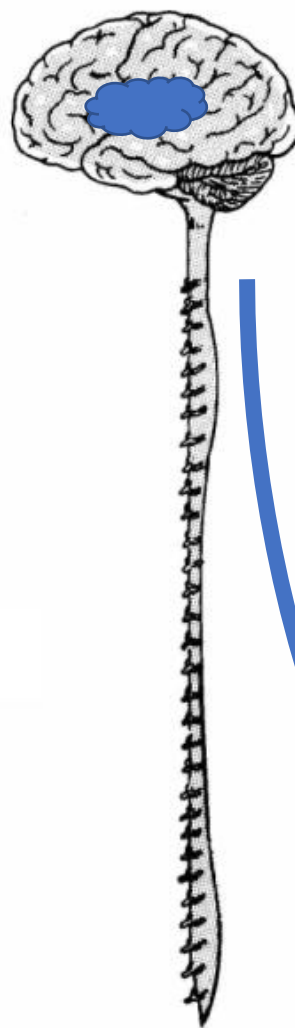
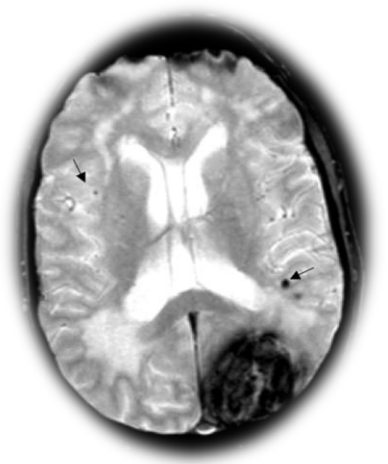


Prevalence >60 years: ±35-55%

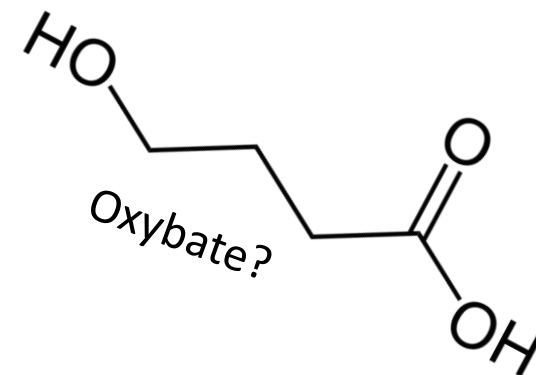








Orexin antagonists?



Sleep and headache: Differential diagnosis



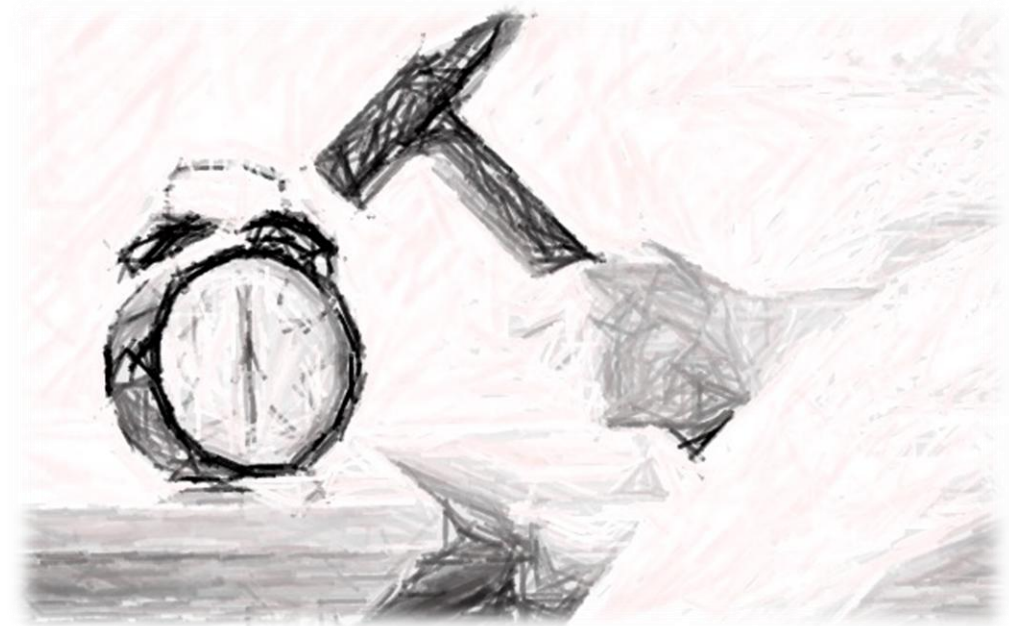
- Cluster headache¹⁻³
- Paroxysmal hemicrania¹⁻³
- SUNCT/SUNA^{1,2}
- Migraine with/without aura^{2,3}

- Hypnic headache¹⁻³
- Exploding head syndrome^{3,4}

- Secondary / Overuse / Apnoea / Hypertension / ...¹⁻³

Hypnic Headache

- 'Alarm Clock Headache'
- >50 year old
- Bilateral (66%)
- 15 minutes - 4 hours
- Mild nausea
- No
 - autonomic features
 - restlessness



Hypnic Headache: Differential Diagnosis

Sleep Apnea

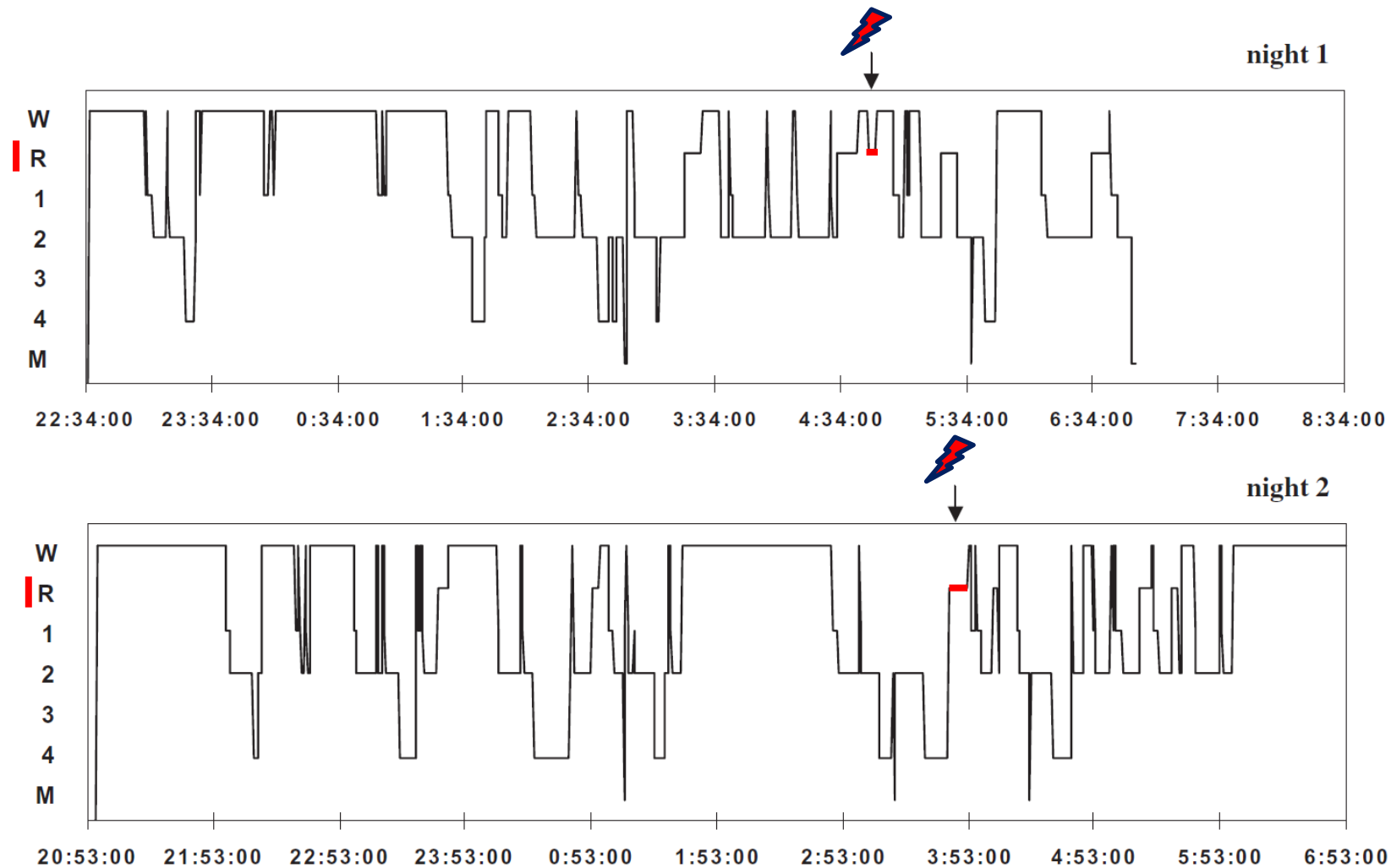
Hypertension

Hypoglycaemia

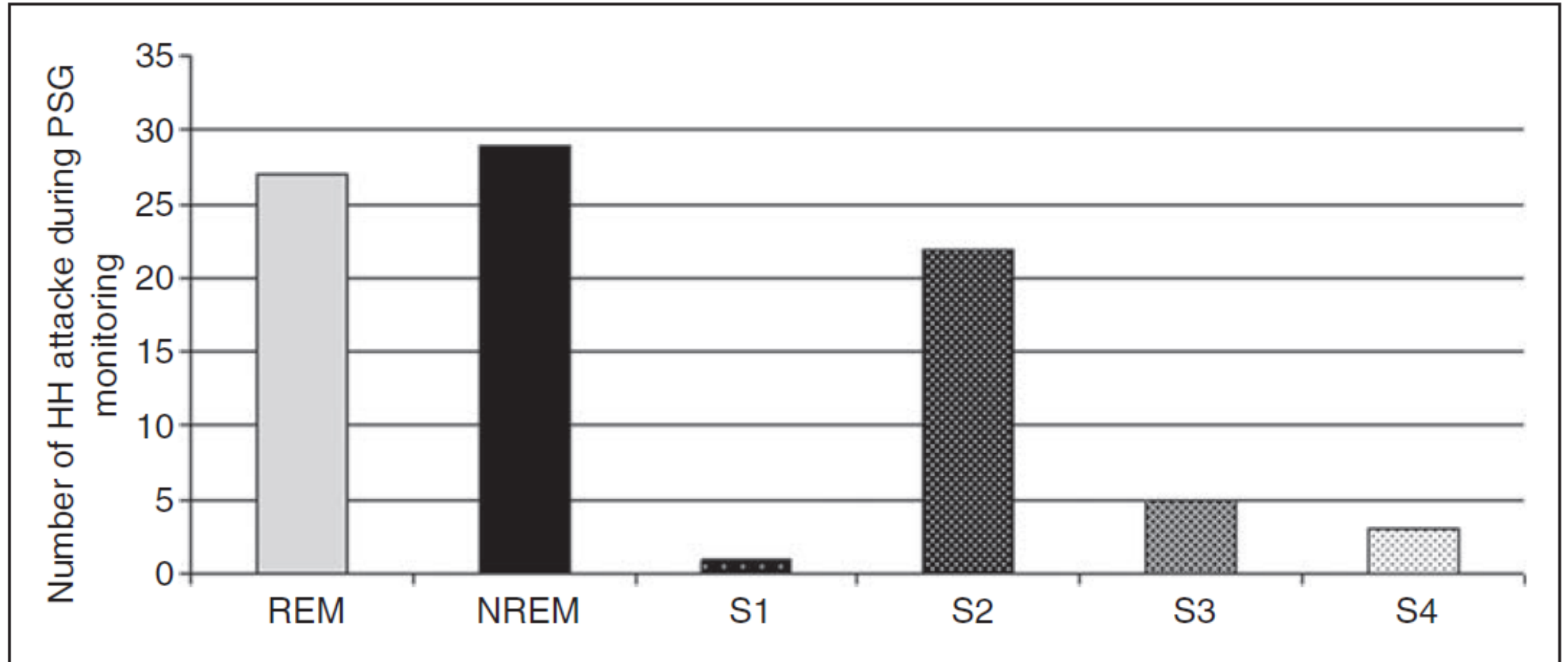
Analgetics Overuse

Secondary Headache

Hypnic Headache & REM-Sleep?

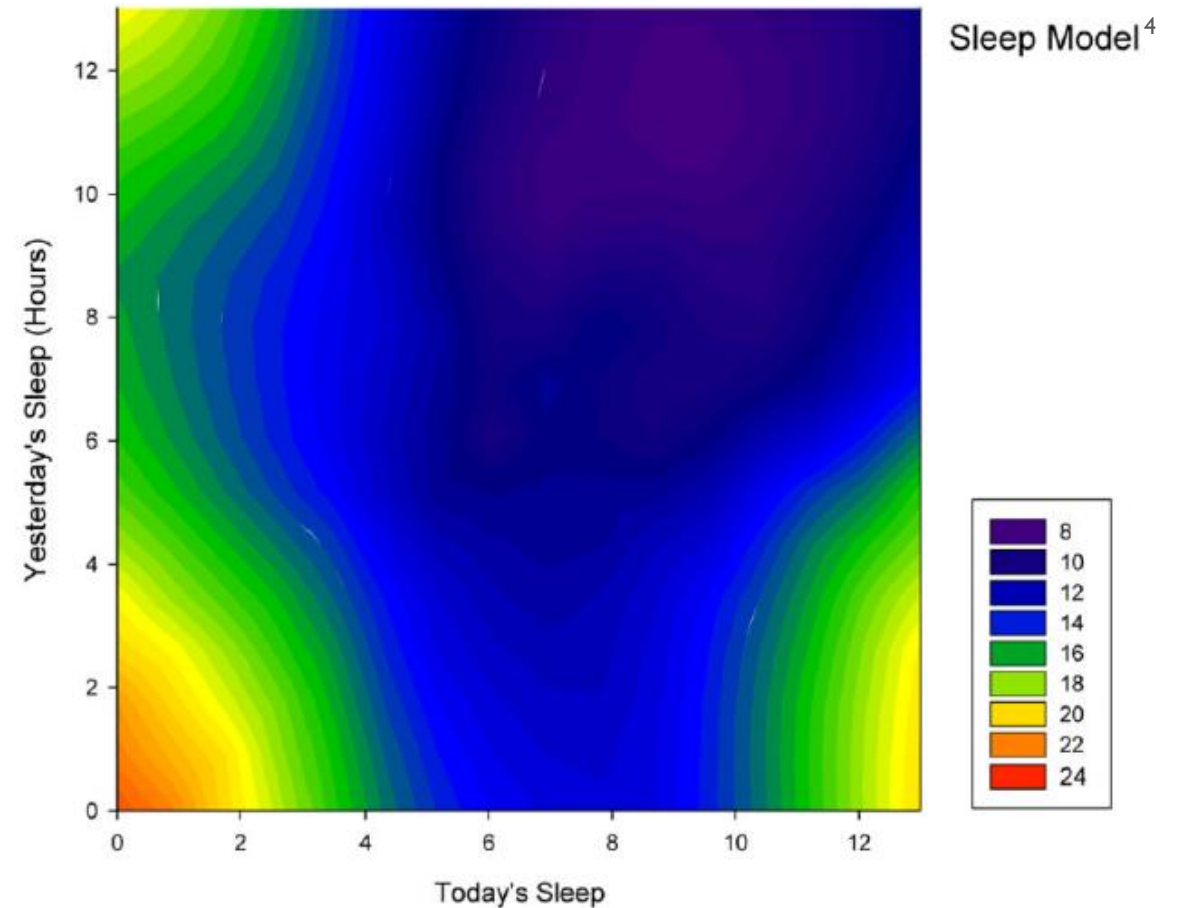
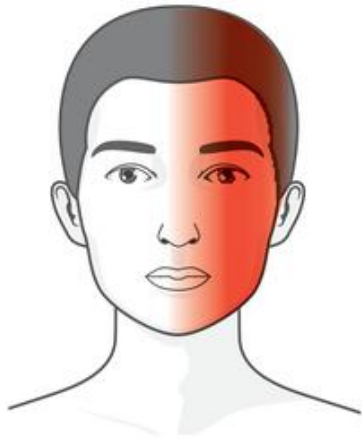


Sleep stage?



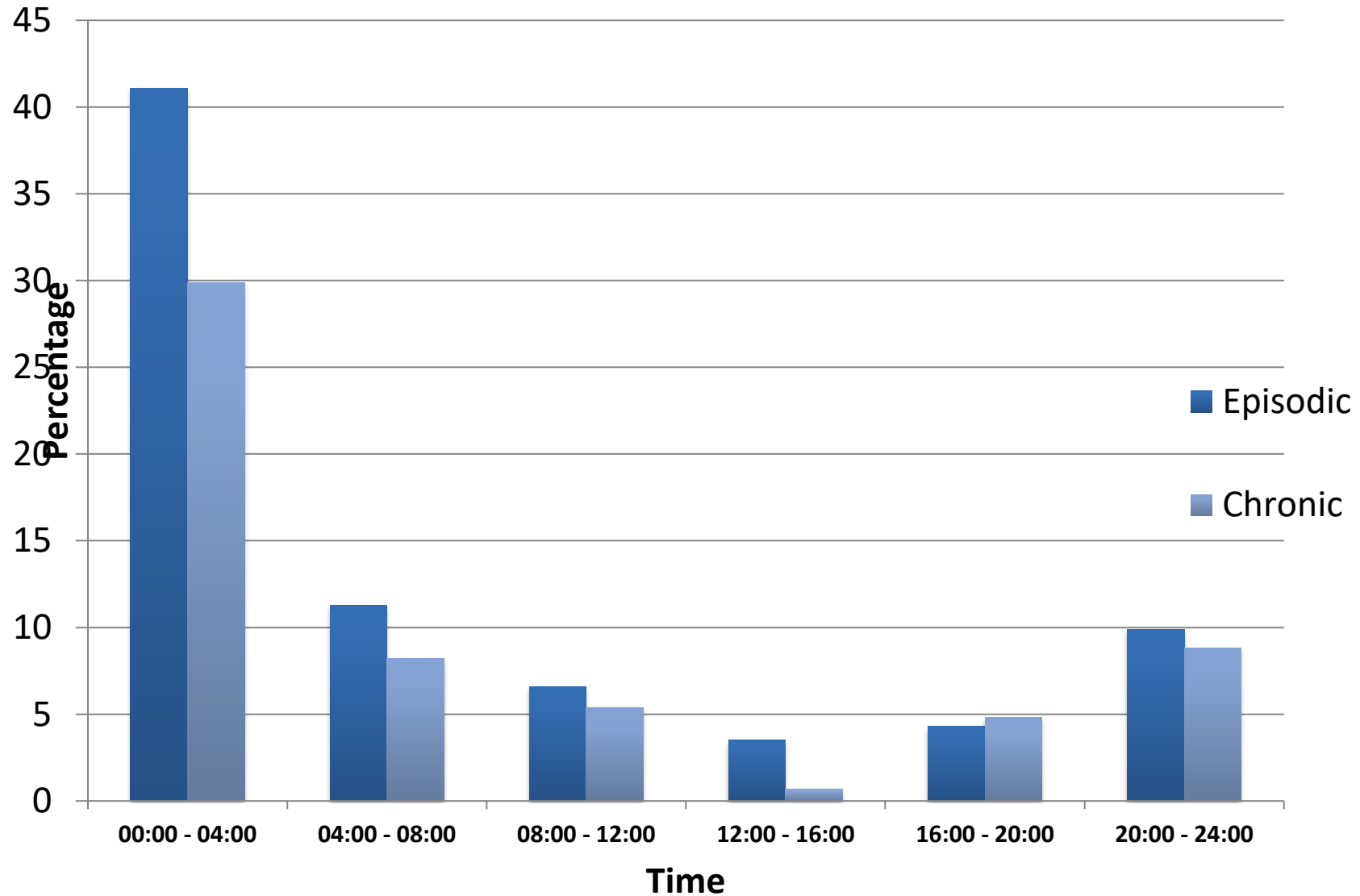
Migraine and sleep

- Patients often report
 - Sleep deprivation = trigger^{1,2}
 - Sleeping too long = trigger^{1,2}
 - Sleep can abort an attack¹
 - Sleep enhances effects of triptans³



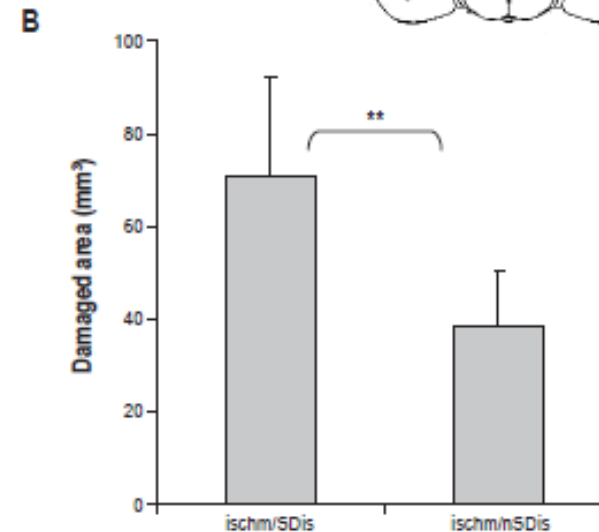
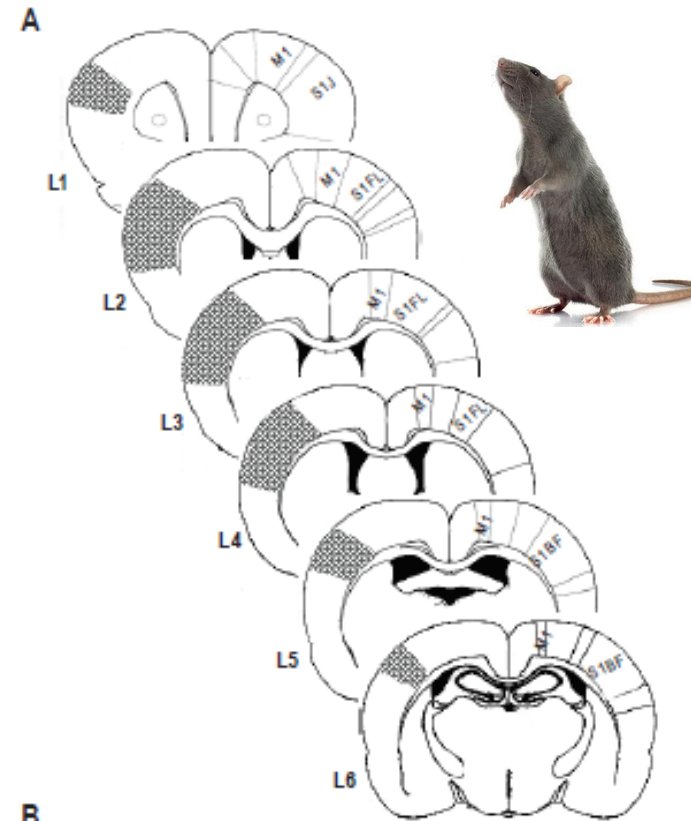


Cluster Headache: Timing of Attacks



Sleep & Stroke

- Sleep deprivation impairs recovery after stroke
- Sleep apnea is a cardiovascular risk factor
- Increased odds of sleep apnea after stroke
 - *Screening/PAP-treatment?*



Sleep & Stroke

Figure 2 Prevalence of AHI >5/h, >20/h, and >30/h for the acute, subacute, and chronic phase after stroke or TIA

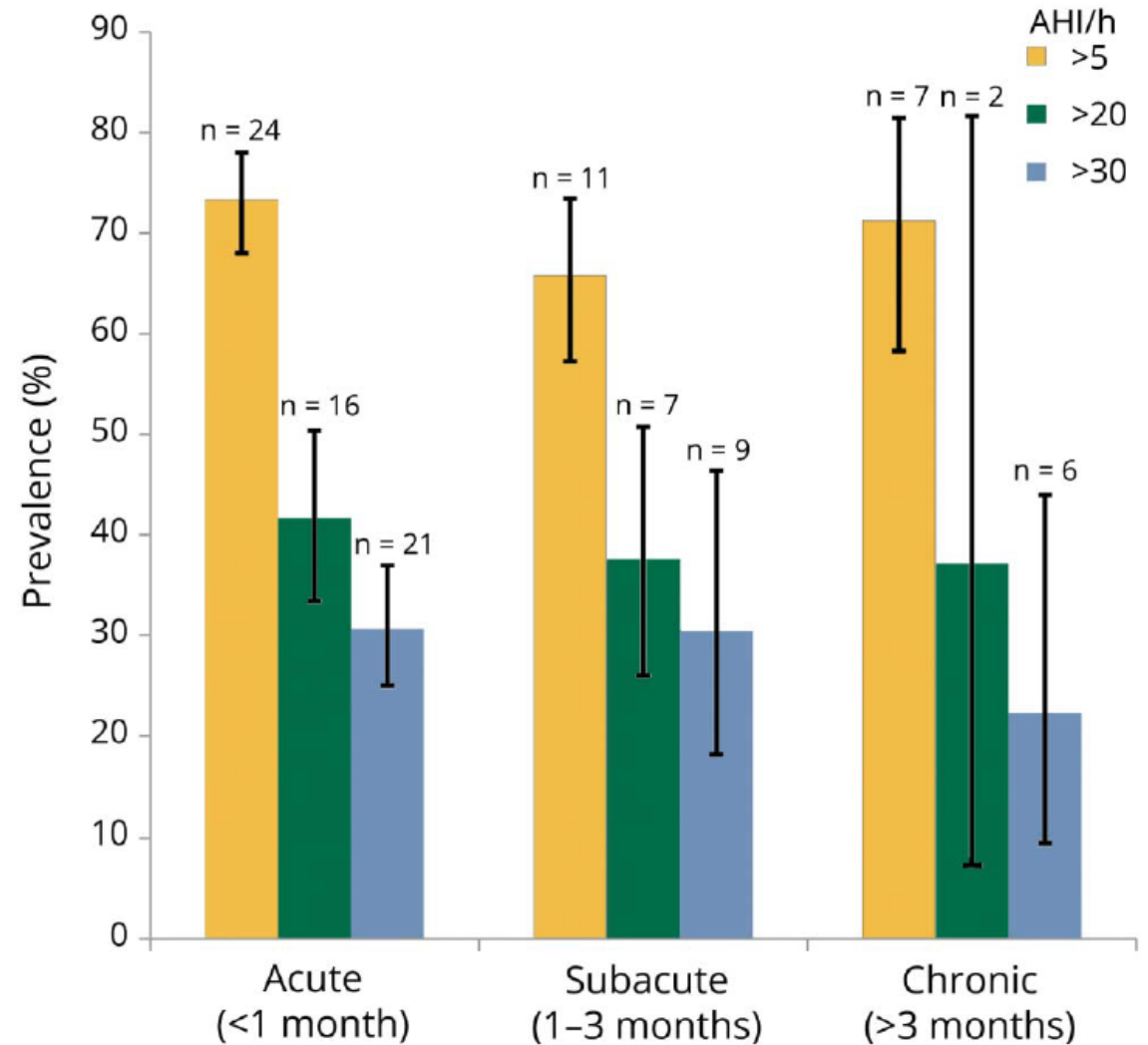


FIGURE 1 Effect of CPAP Therapy on BP in Patients With Resistant Hypertension

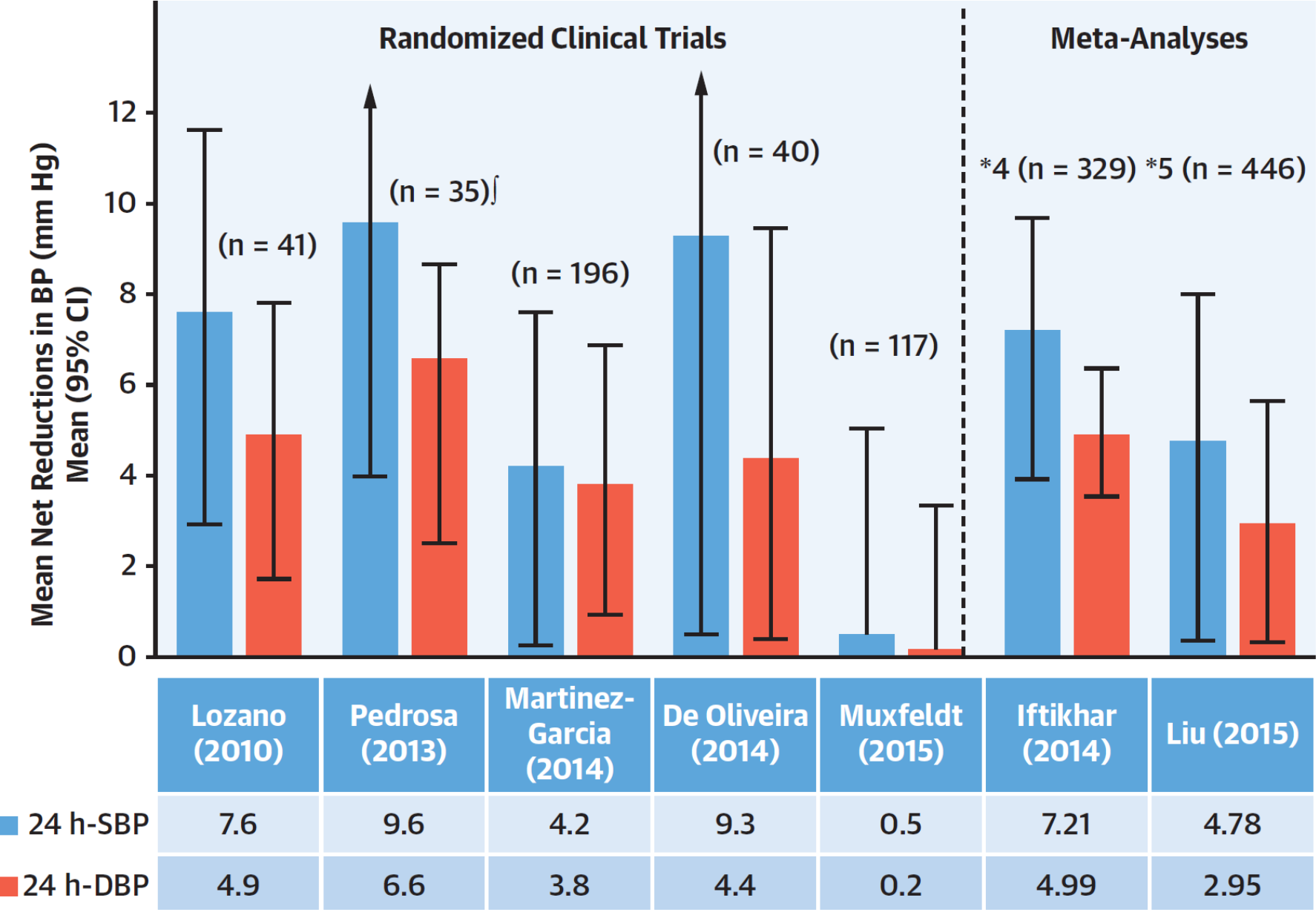
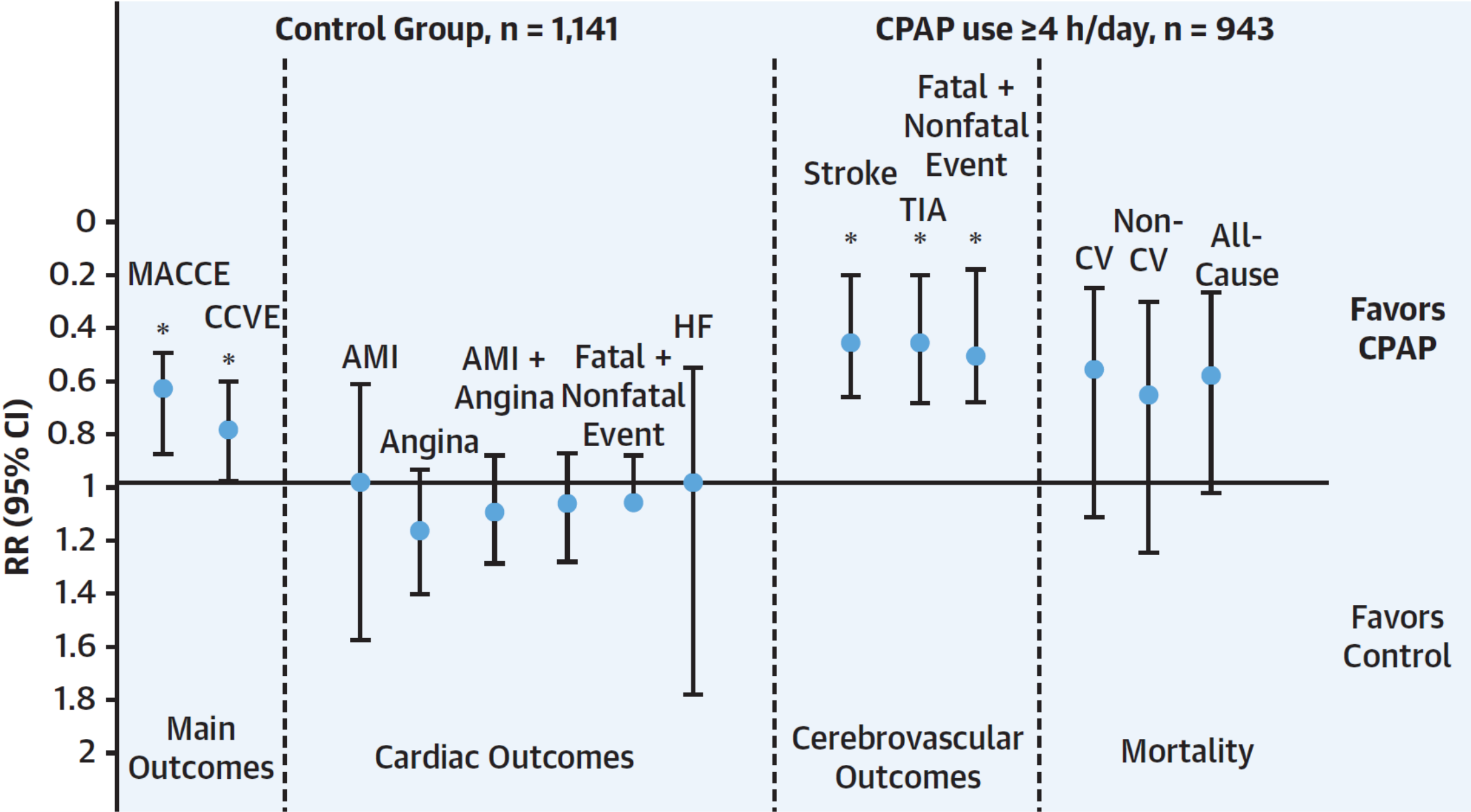


FIGURE 4 Effective Use of CPAP Improves Cerebrocardiovascular Outcomes and All-Cause Mortality



Conclusions

- **Neurodegeneration**

- Sleep deprivation might impair **glymphatic clearance** → raises amyloid- β burden,
- **Disturbed sleep-wake rhythm** early symptom of Alzheimer's disease

- Primary **Headache** Disorders

- Tied to the **sleep-wake** cycle
- Cluster headache, hypnic headache, migraine and exploding head syndrome
- **Sleep history essential** to the differential diagnosis

- Sleep and **Stroke**

- interact bidirectionally
- sleep deprivation impairs post-stroke recovery
- sleep apnoea is both a risk factor for stroke and more prevalent after it



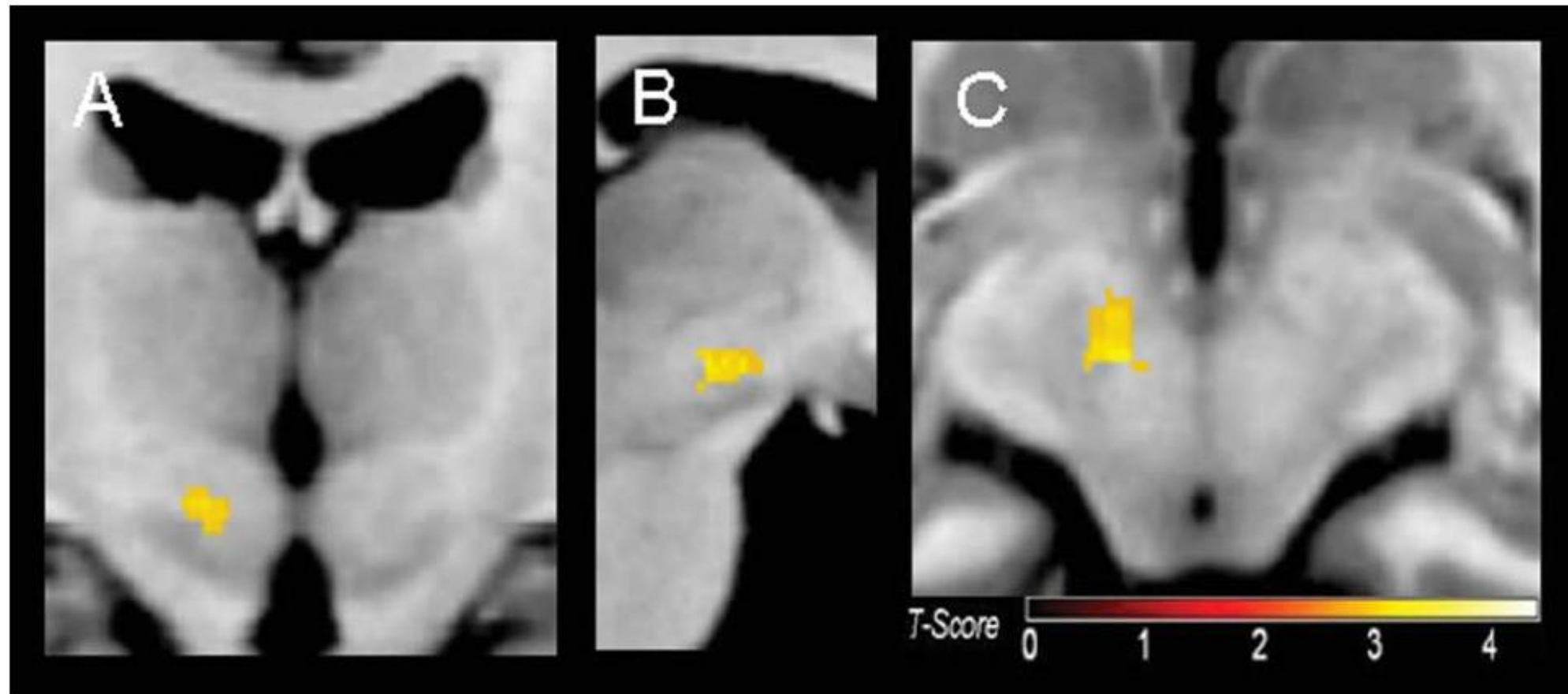
*Sleep is a **modifiable factor** across these conditions, opening potential avenues for screening and treatment in neurological practice*

Exploding Head Syndrome

Clomipramine / Flunarizine / Nifedipine /
Topiramate / Carbamazepine / Methylphenidate /
But most of all: don't worry...!

- Feeling/hearing a bang
- Waking up / falling asleep
 - Light flashes (10%)
 - Fear/sweating
 - Tachycardia
 - Infrequent
 - Irregular





Gray matter volume decrease of the posterior hypothalamus in hypnic headache.

Hypnic Headache: Treatment

Lithium

Indometacin

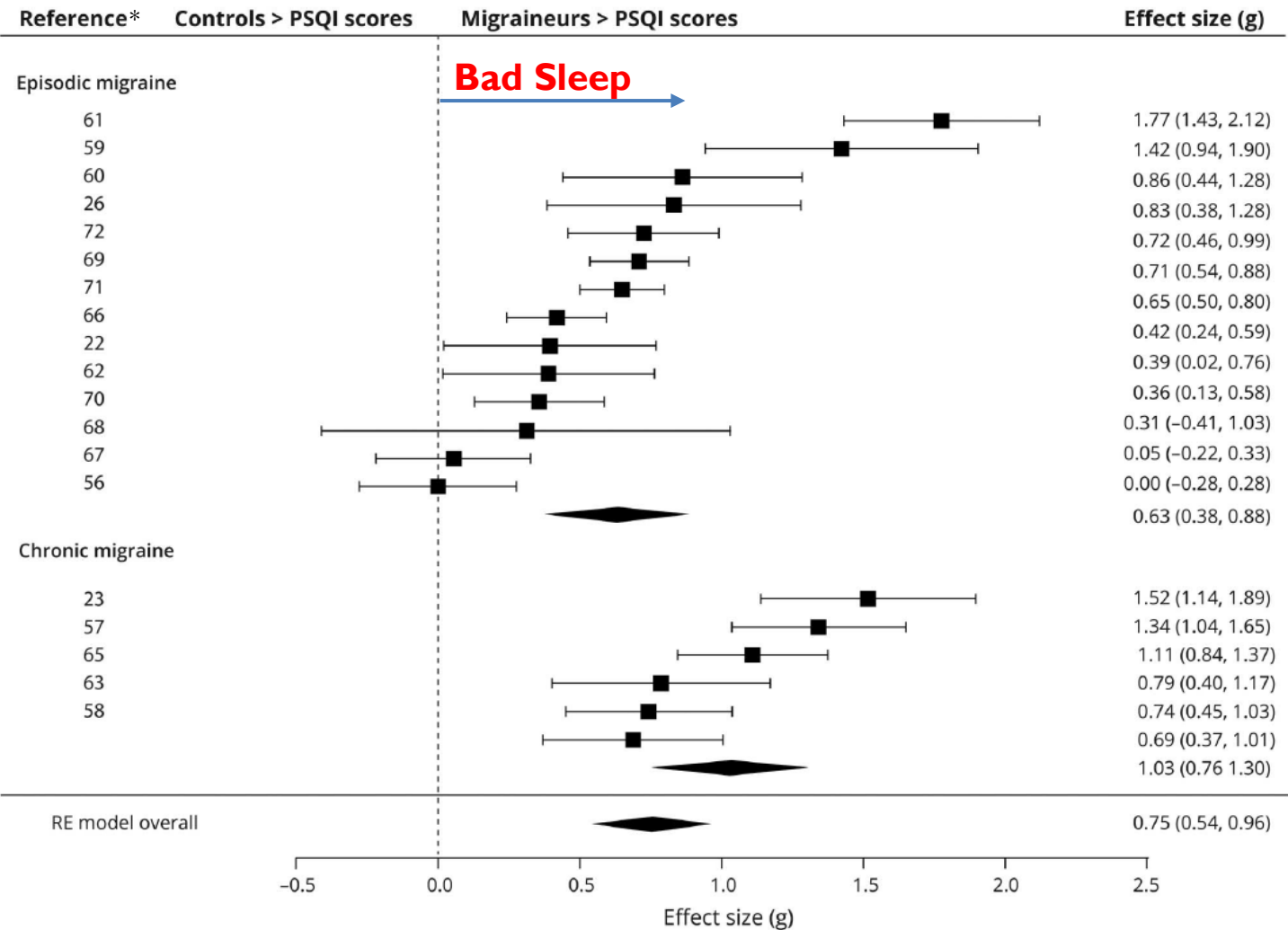
Caffein

Melatonin

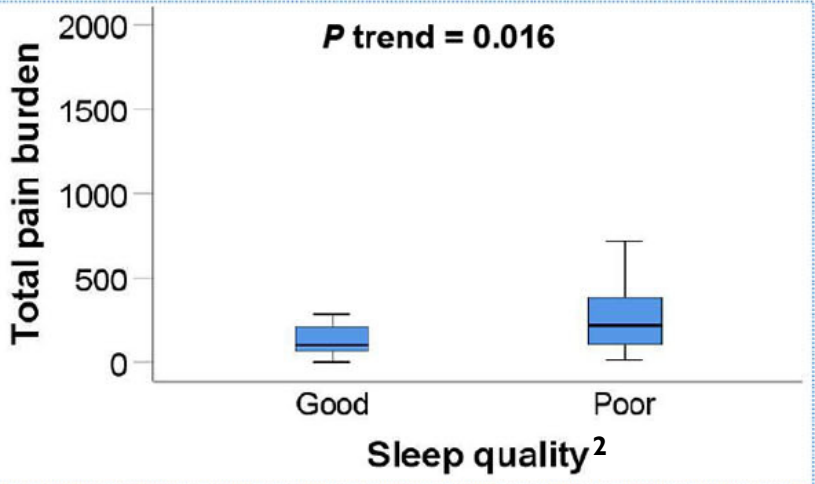


... (*topiramate, flunarizine, gabapentin, verapamil, pizotifen, lamotrigine, valproate*)

Forest Plot of the Meta-analysis of Pittsburgh Sleep Quality Index (PSQI) Scores in Patients With Migraine and Controls¹



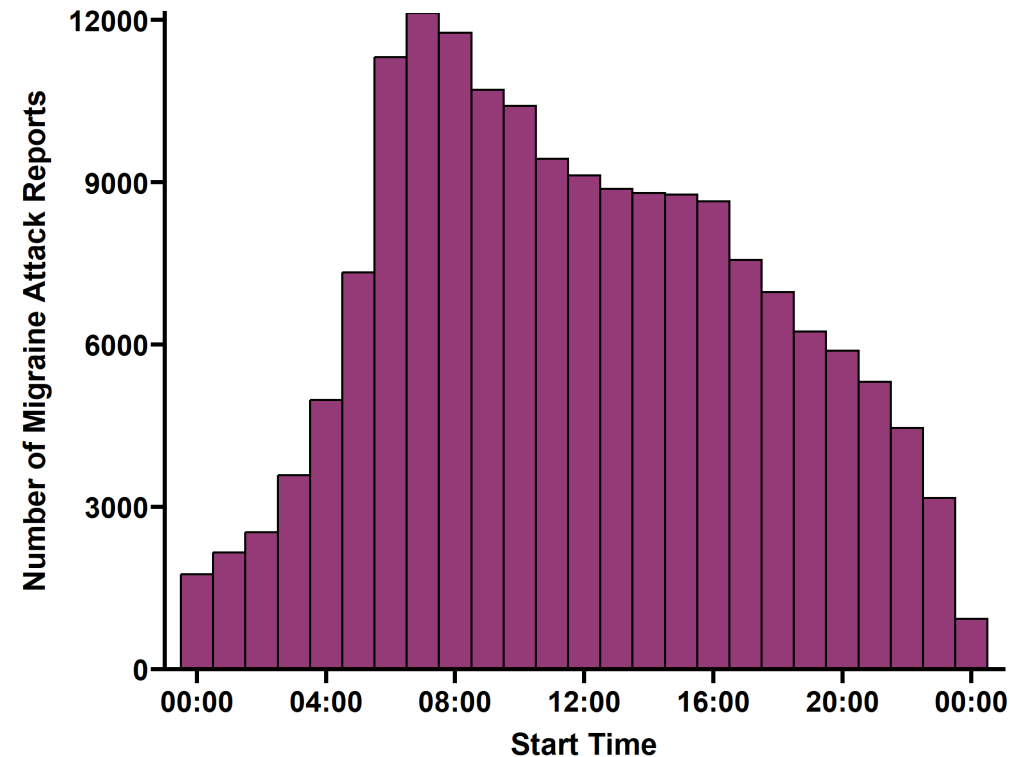
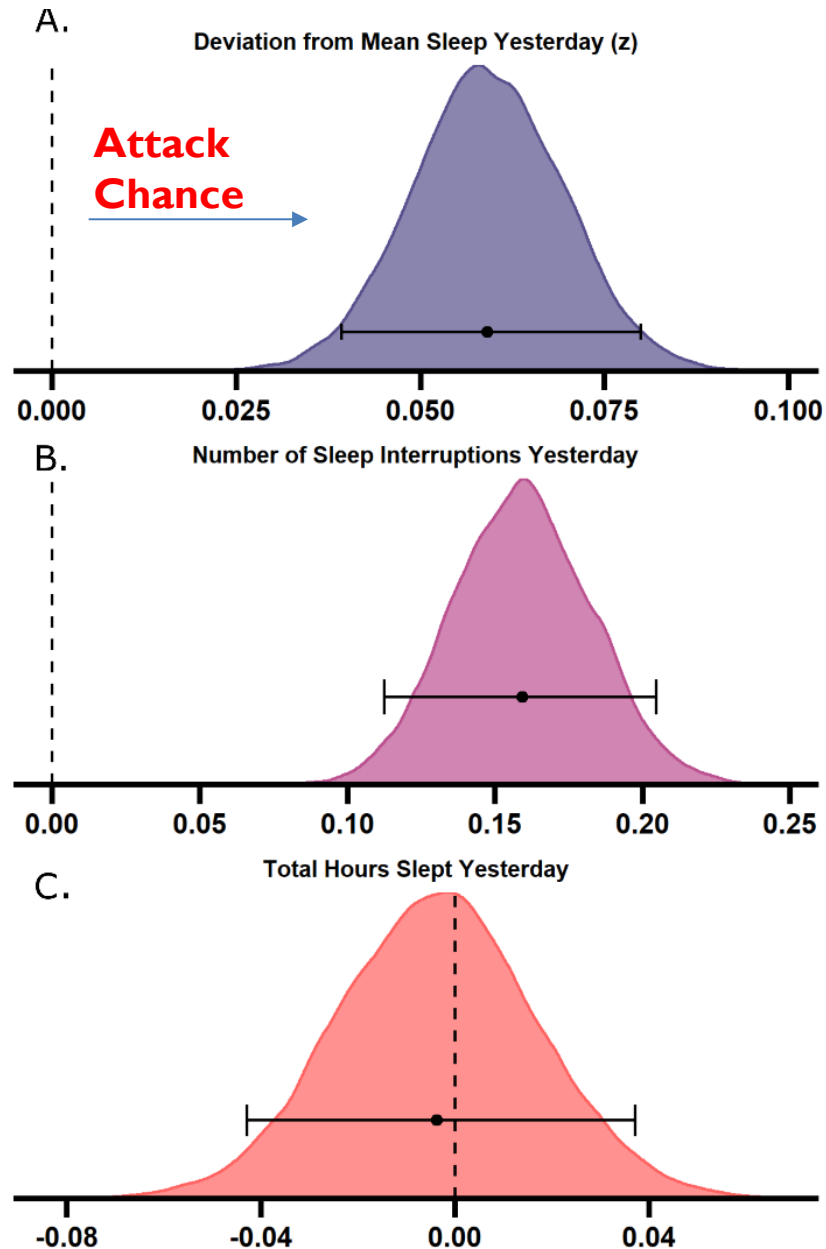
Pittsburgh Sleep Quality Index (PSQI)



*Numbers refer to the sources cited in the Stanyer et al. 2021 meta-analysis.¹

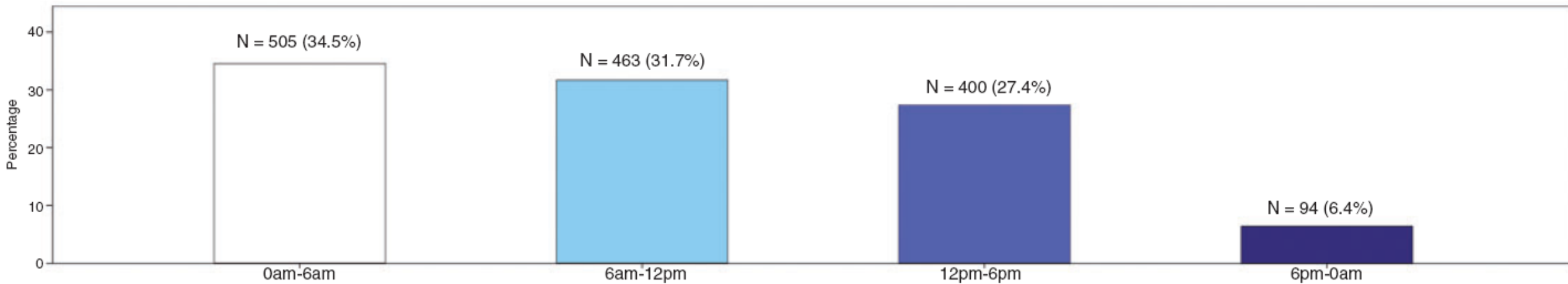
1. Adapted from: Stanyer EC, et al. 2021;97:e1620–e1631; 2. Duan S, et al. 2022;13:955298.

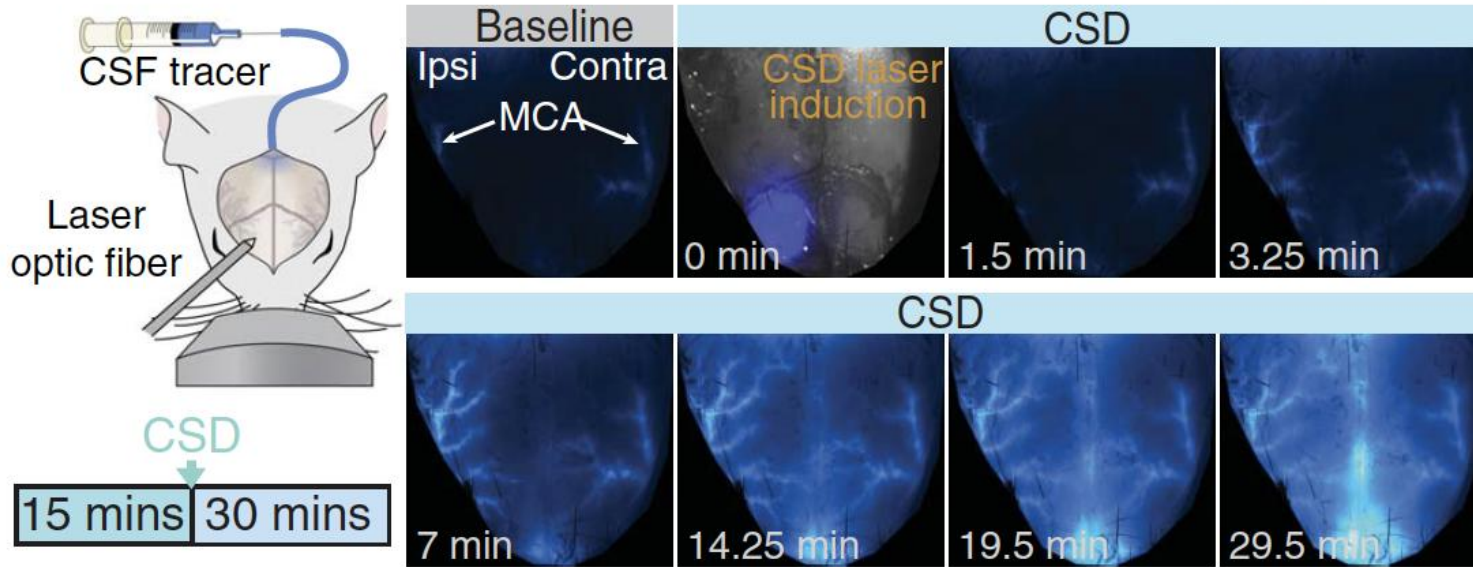
Migraine Buddy: Big data on sleep



Migraine and chronotype

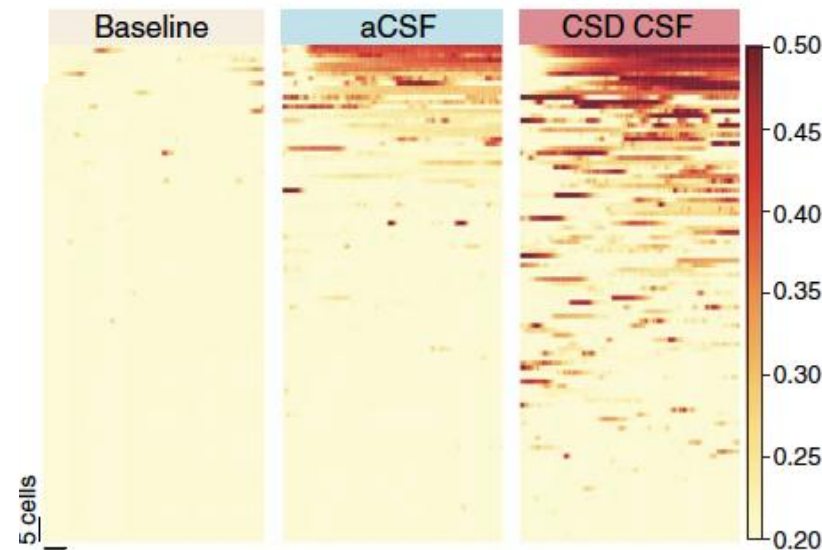
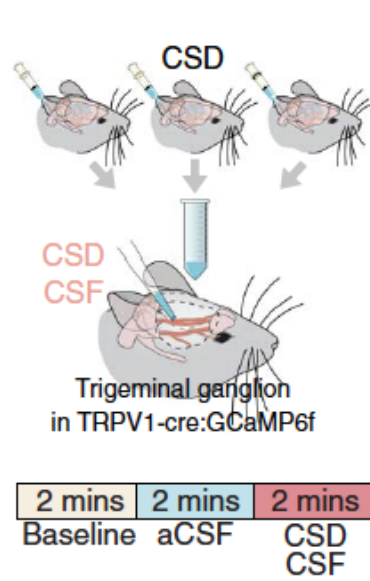
- Migraine patients often have an 'early chronotype'
- Circadian distribution of attack onset





Cortical Spreading Depression (CSD, *aura*) is elicited in a migraine model

CSF is collected and exposed to trigeminal ganglion neurons in other mice



CSF after CSD  Trigeminal ganglion
vs
'normal CSF'

Clearance?

