

Understanding Sleep Loss in Alzheimer's Disease

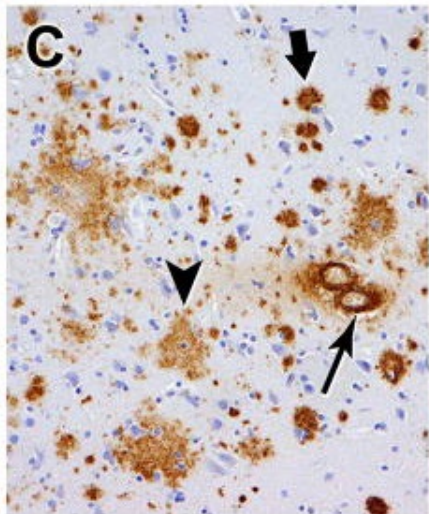
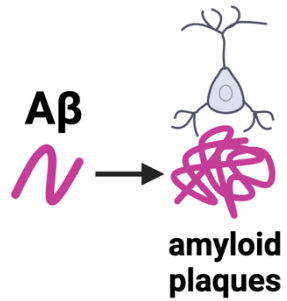
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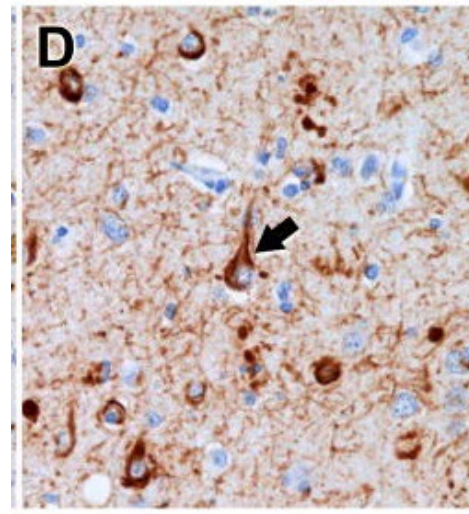
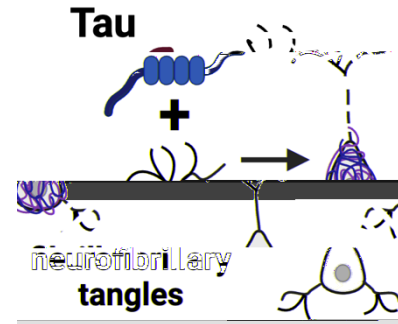
Alzheimer's Disease (AD)



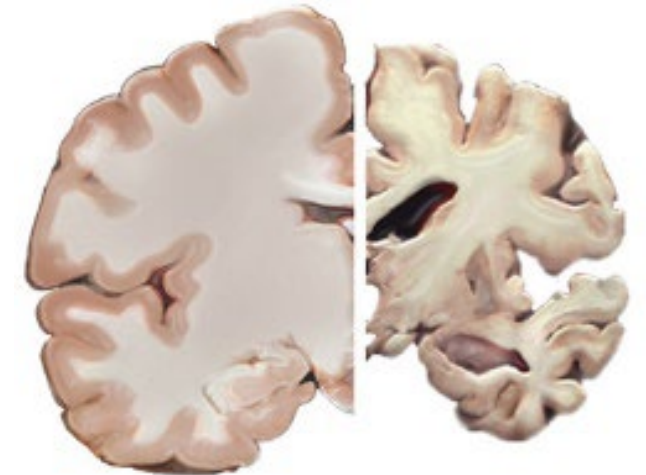
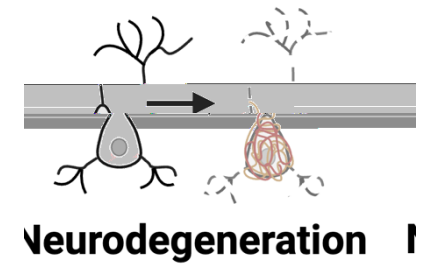
Amyloid plaques



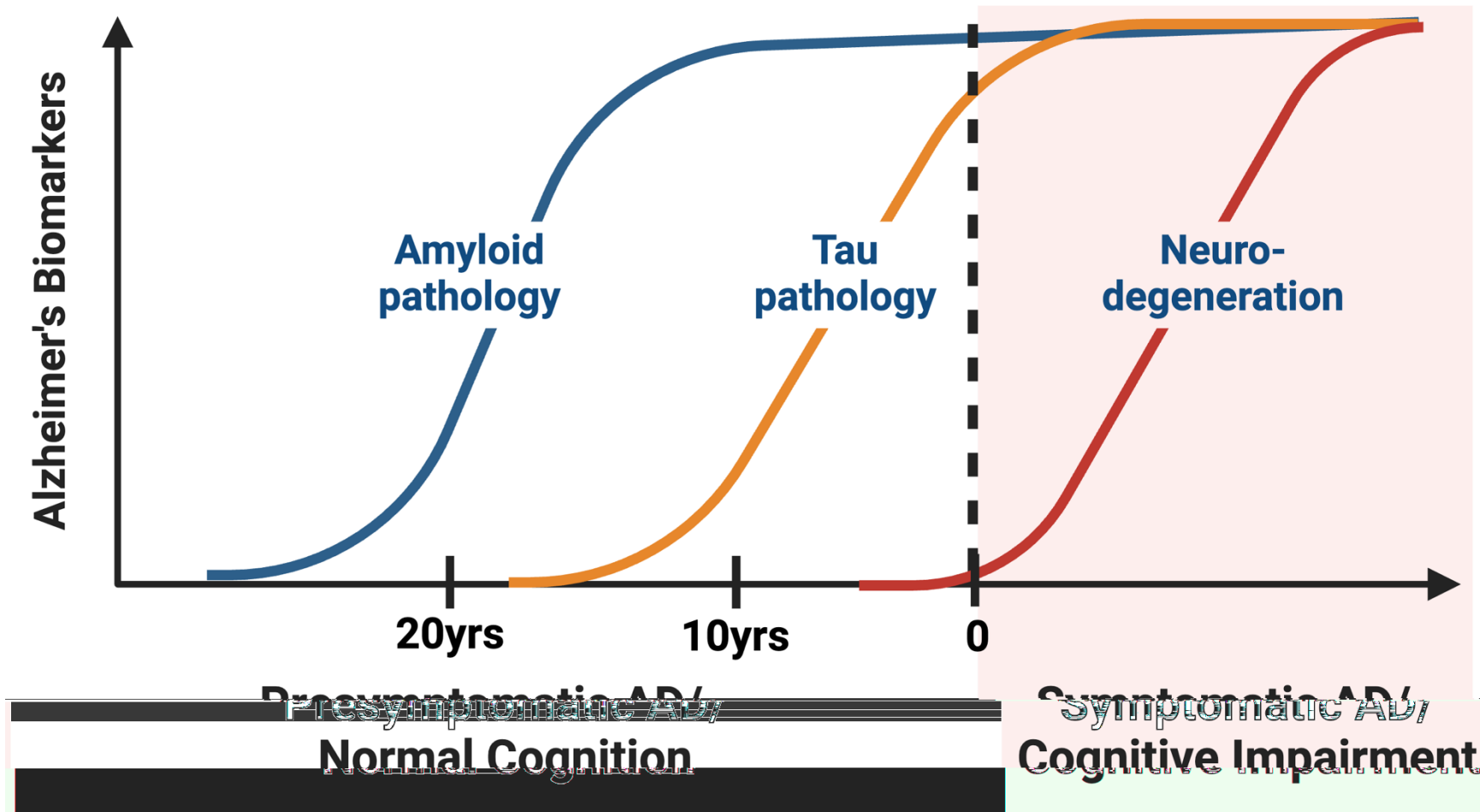
Neurofibrillary tangles



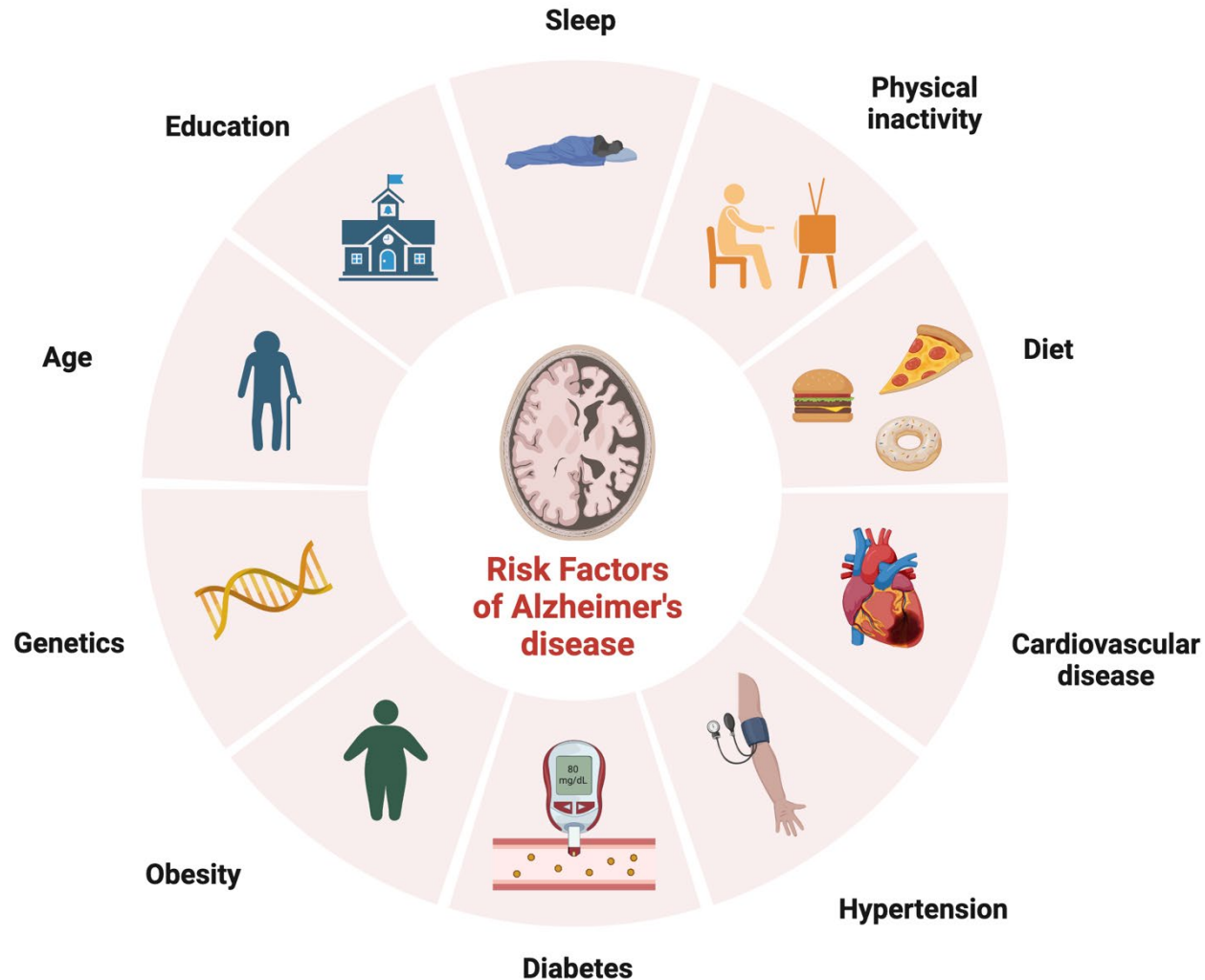
Neurodegeneration



The progression of Alzheimer's Disease (AD)

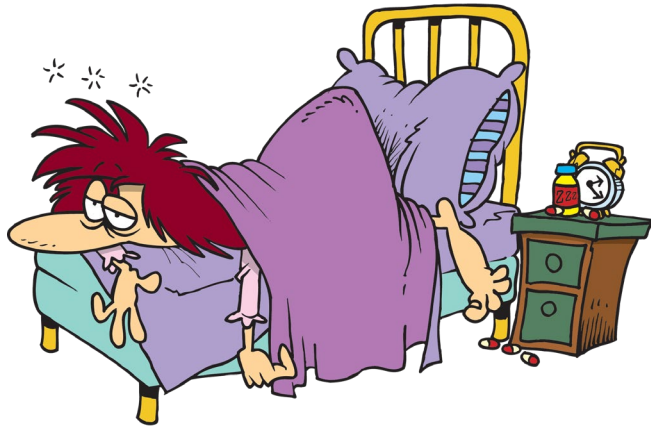


Modifiable risk factors affect Alzheimer's progression



~45% of dementia cases could be delayed or reduced if we targeted modifiable risk factors

Bidirectional relationship between sleep and AD



**Sleep
Impairment**

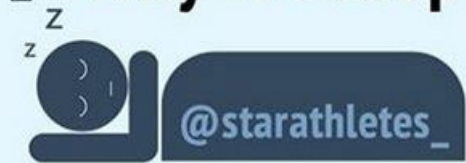


**Alzheimer's
Disease**

Why is sleep important?



Why Is Sleep Important?



Sleep
functions:



Cleaning the brain of toxins



Physical restoration



Information processing and
memorization



Mood regulation



Strengthening immune system

HOW SLEEP AFFECTS YOUR HEALTH SLEEP DEPRIVATION

IMPAIRED COGNITION

Lack of sleep impairs memory and your ability to process information.

INCREASES SYMPTOMS OF DEPRESSION

A lack of sleep disrupts neurotransmitters to the brain which regulates mood.

HIGHER LEVELS OF ANXIETY

Lack of sleep raises the brain's anticipatory reactions, increasing overall anxiety levels.

INCREASED RISK OF BREAST CANCER

Melatonin decreases when you are exposed to light late at night. A decrease in melatonin disrupts estrogen production which can lead to breast cancer.

STROKE RISK

When you sleep 6 hours or less a night, your chance of a stroke increases 4x.

INCREASED RISK FOR HEART DISEASE

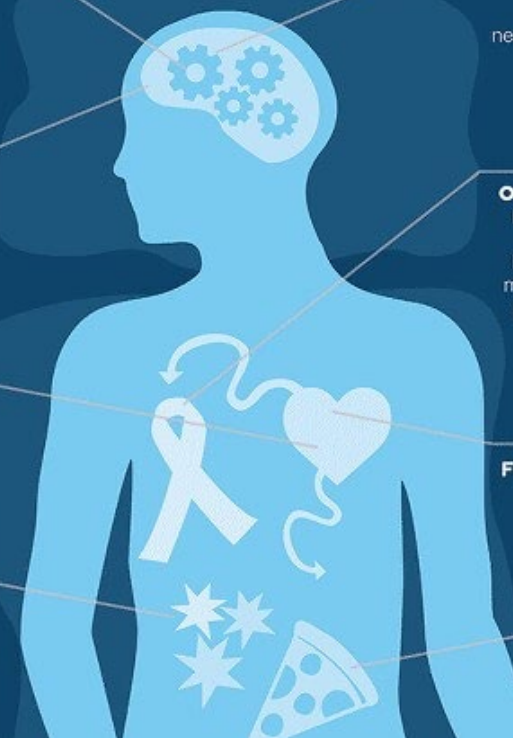
Blood pressure decreases when you sleep.

INCREASED RISK FOR DIABETES

Lack of sleep increases cortisol and norepinephrine, both are associated with insulin resistance.

WEIGHT GAIN

Sleep helps balance hormones that make you feel hungry and full.

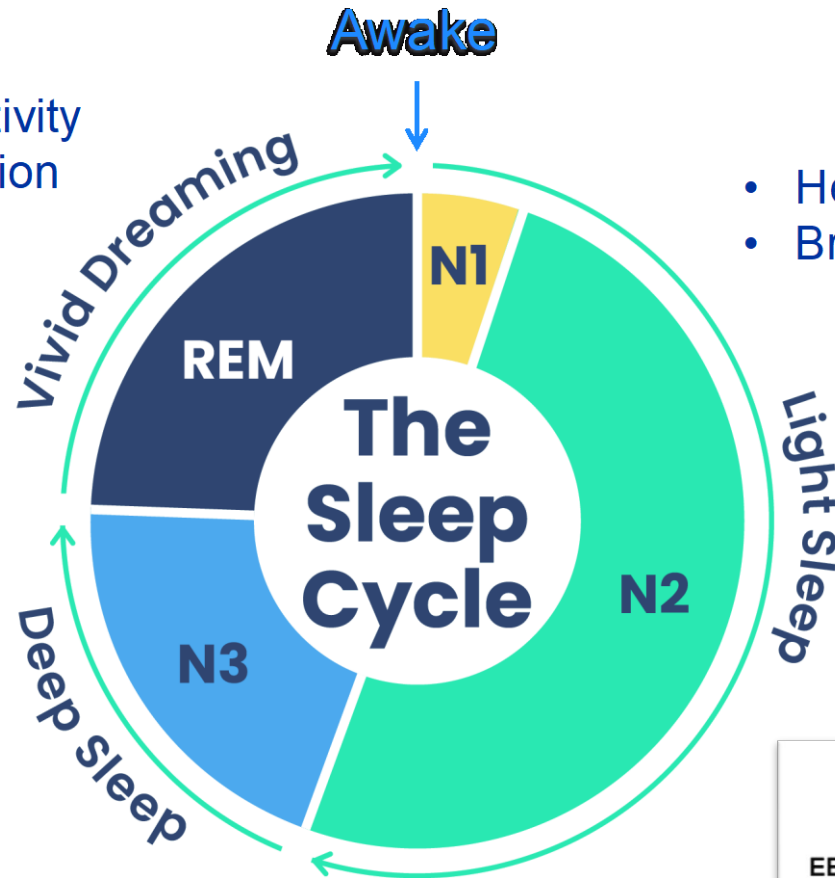


Sleep stages: sleep time versus sleep quality?



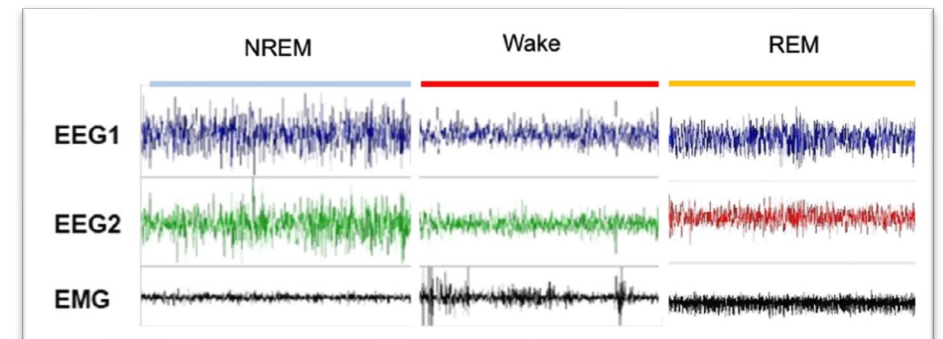
- Increased brain activity
- Memory consolidation
- Dreaming
- REM sleep

- NREM sleep
- Slow wave sleep
- Restorative sleep

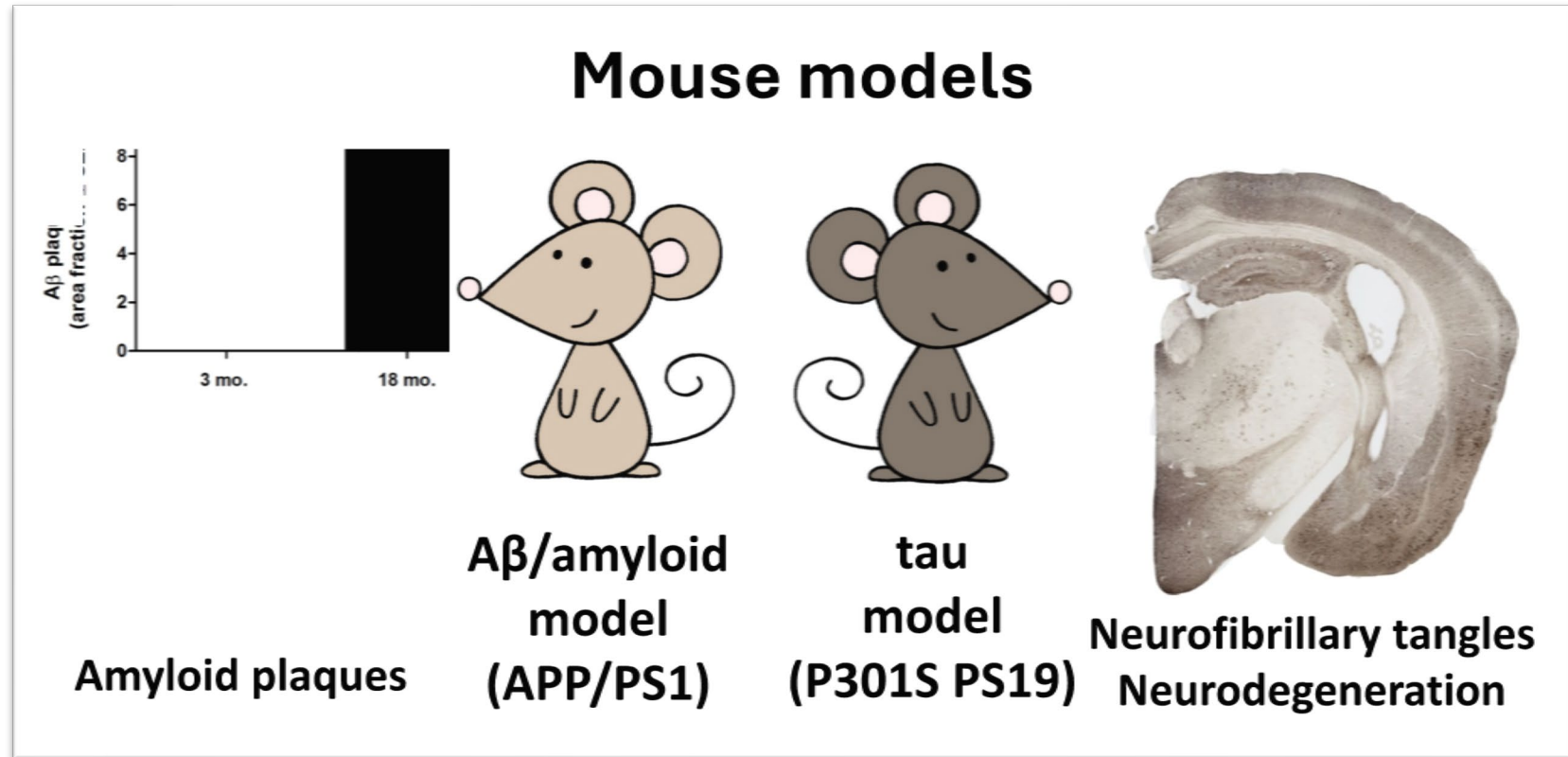


- Heart rate slows
- Breathing slows

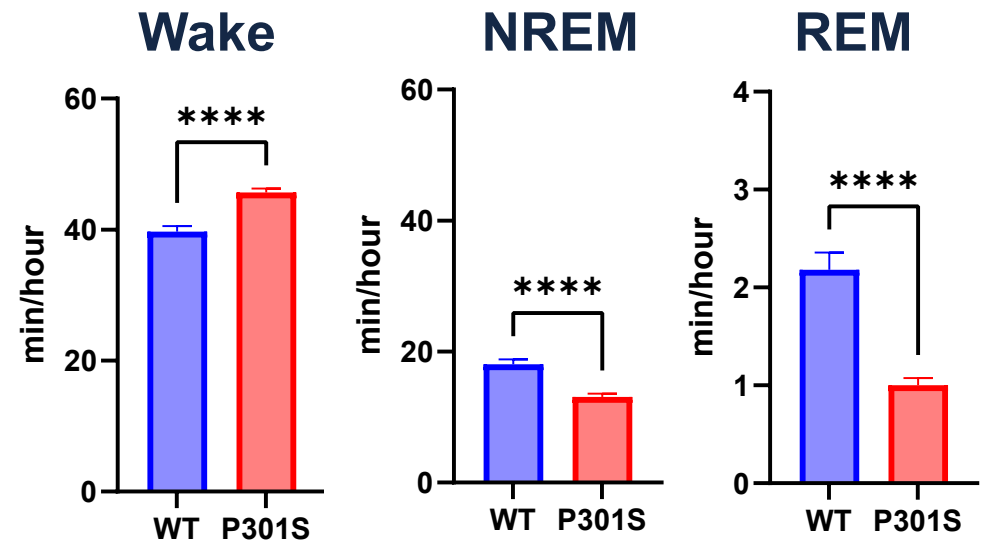
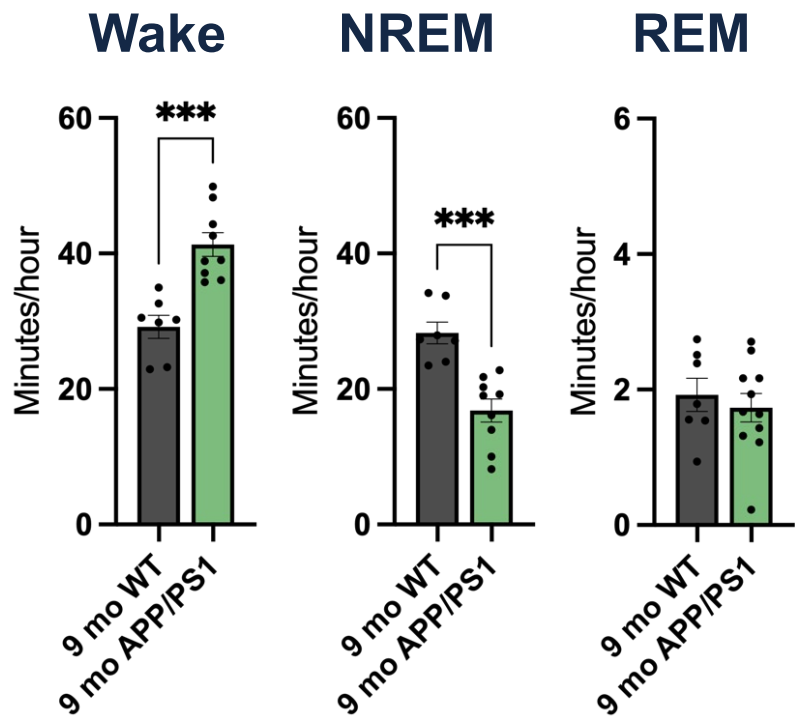
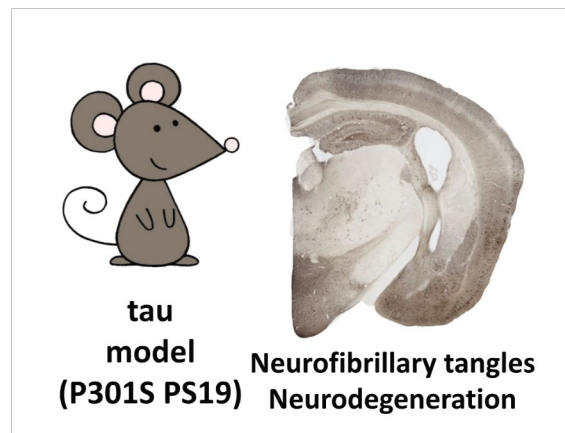
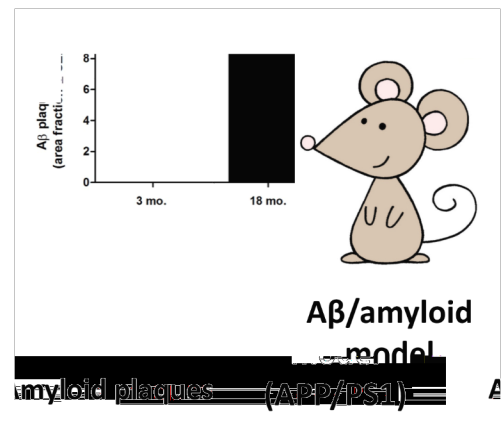
EEG/EMG recordings



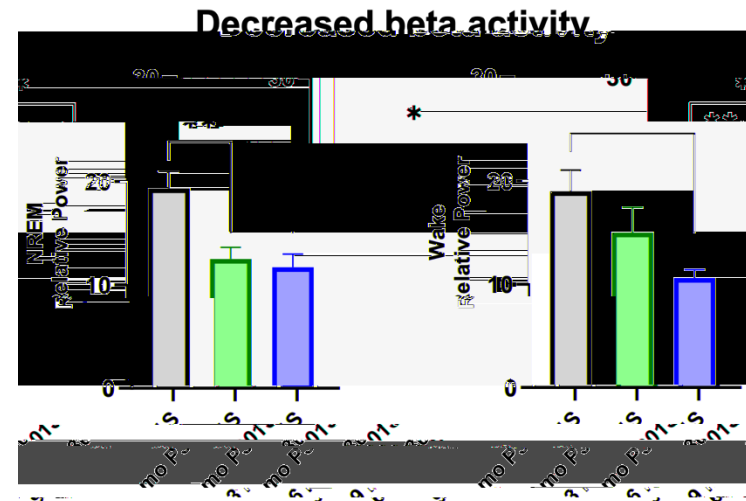
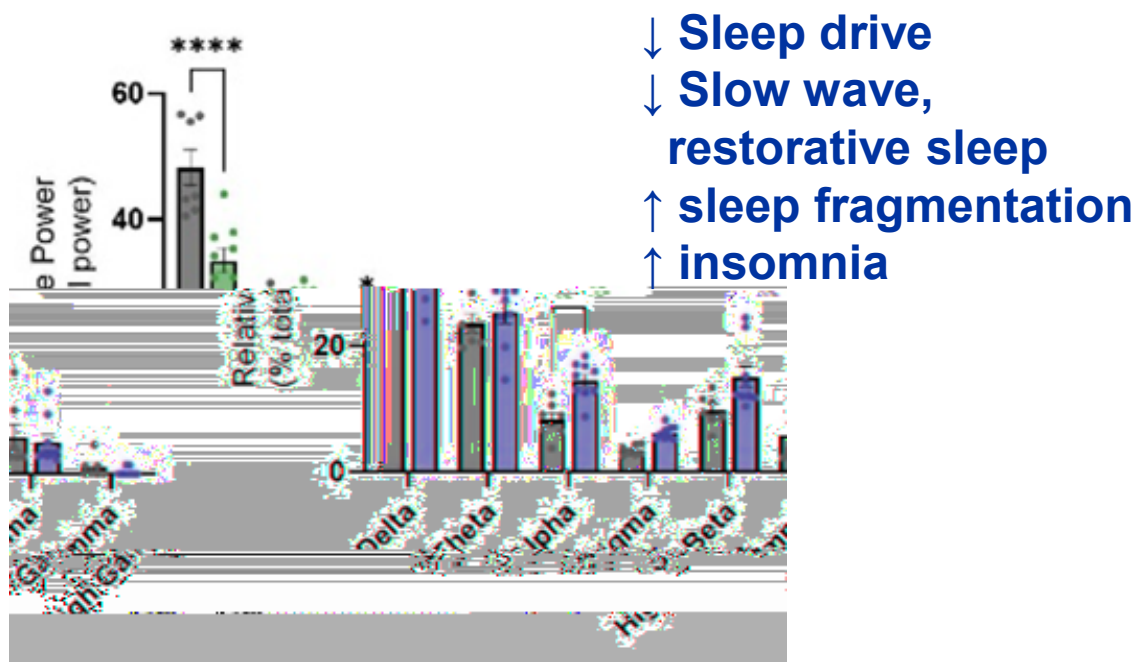
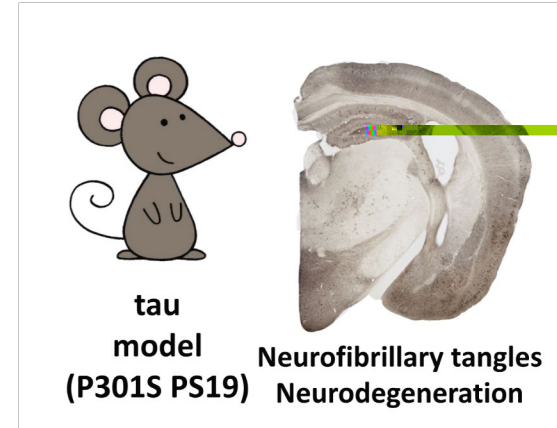
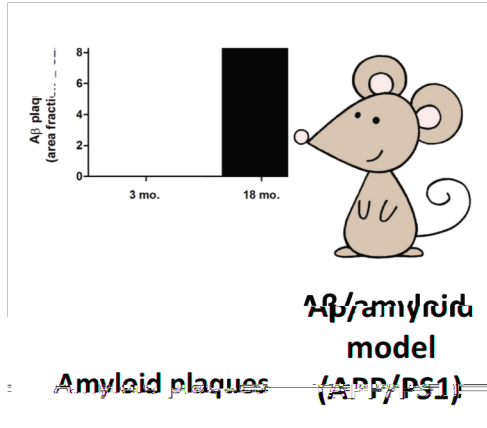
Alzheimer's mouse models to study sleep



How do plaques or tangles impact total sleep time?

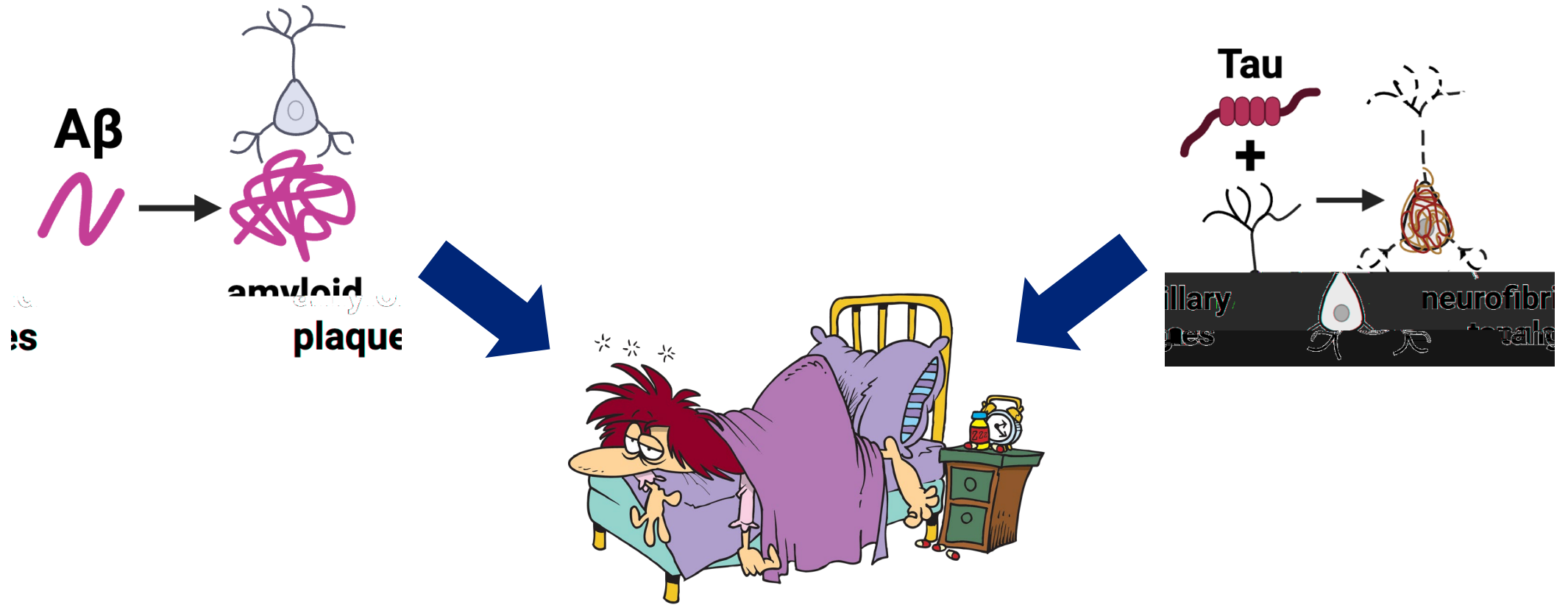


How do plaques or tangles affect sleep quality?



- ↓ Inhibition
- ↓ cognitive processing
- ↓ cortical synchrony

Plaques and tangles impact sleep differently



Acknowledgements



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