

The background features a dark blue gradient with a starry pattern. On the left side, there are several circular elements: a large scale with numbers from 140 to 250, and several smaller circles with arrows indicating clockwise or counter-clockwise rotation. The scale has major tick marks every 10 units and minor tick marks every 1 unit. The numbers are 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, and 250. The circular patterns are composed of solid and dashed lines, with some containing arrows.

THE SLEEP-WAKE CYCLE

MEGAN WONG

Wakefulness



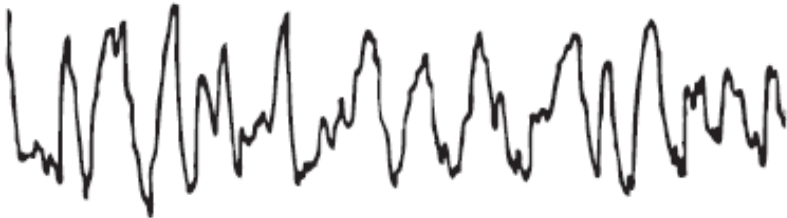
NREM (stage 1)



NREM (stages 2/3)



NREM (stage 4)



REM



PHYSIOLOGIC PATTERNS OF SLEEP

Basic physiologic rhythm divided into 3 states¹:

- Wakefulness
- NREM sleep
- REM sleep

Figure 1. EEG recordings of human vigilance states³

/AKEFULNESS



Figure 2. EEG recordings of wakefulness³

Electrographic Signals of Wakefulness

Activating Systems

- ARAS (Ascending Reticular Activating System)

Essential neurotransmitters

- Acetylcholine, serotonin, orexins/hypocretins, etc.

NREM SLEEP

Electrographic Signals of NREM sleep

Maintenance and Homeostasis

Functionality in Metabolism and Homeostasis

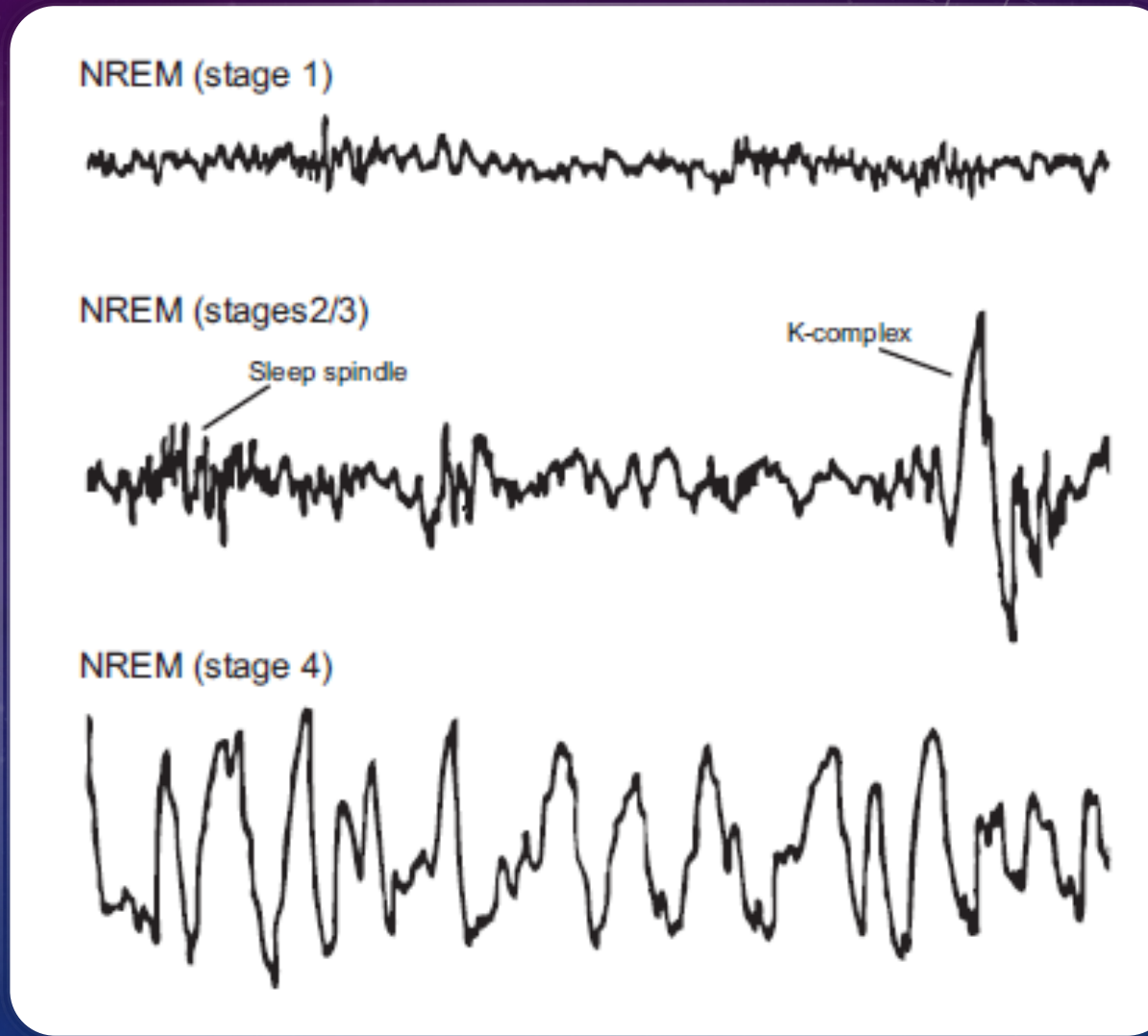


Figure 3. EEG recordings of NREM stages 1-4³

REM SLEEP



Figure 4. EEG recordings of REM sleep³

Electrographic Signals of REM sleep

Control mechanisms within stage and between

Dreaming

CONSEQUENCES OF SLEEP LOSS ON COGNITION

- Attention and Executive Function
- Emotion
- Learning and Memory

REFERENCES

- 1.) Harris, C. D. (2005 January). Neurophysiology of sleep and wakefulness. *Elsevier Inc.* (567-586).
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- 3.) Brown, R. E. et al. (2012). Control of sleep and wakefulness. *Physiol Rev*, 92 (1087-1187).