

# Le sommeil et le syndrome de Dravet

## Sleep and Dravet syndrome

Steve Gibbs, neurologue

Centre d'études avancées en médecine du sommeil

Hôpital du Sacré-Cœur de Montréal

Université de Montréal

Samedi le 14 avril 2018



- English
- Français

# Sleeping ..... Dormir



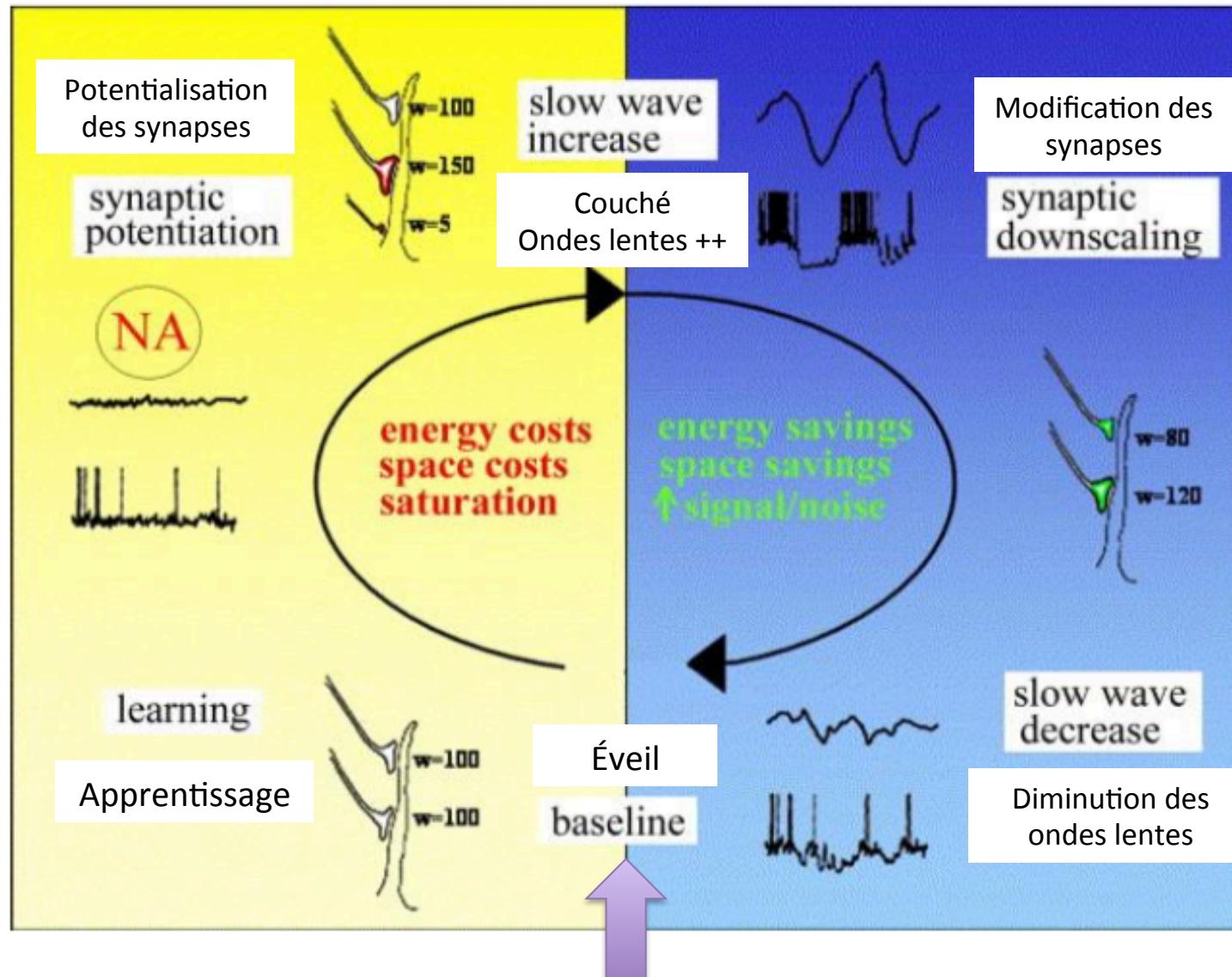
## Why do we sleep?

- Many theories...
  - Growth (bone, brain, muscle)
  - Synaptic plasticity and memory consolidation
  - Emotional regulation
  - Restore energy levels
  - Synthesizing neurotransmitters
  - Nettoyer les substances toxiques (daily cleanup)

## Pourquoi dort-on?

- Plusieurs théories...
  - Croissance (os, cerveau, muscle)
  - Plasticité synaptique et consolidation de la mémoire
  - Régulation des émotions
  - Refaire le plein d'énergie
  - Fabrication de molécule/neurotransmetteurs
  - Nettoyer les substances toxiques (faire le ménage)

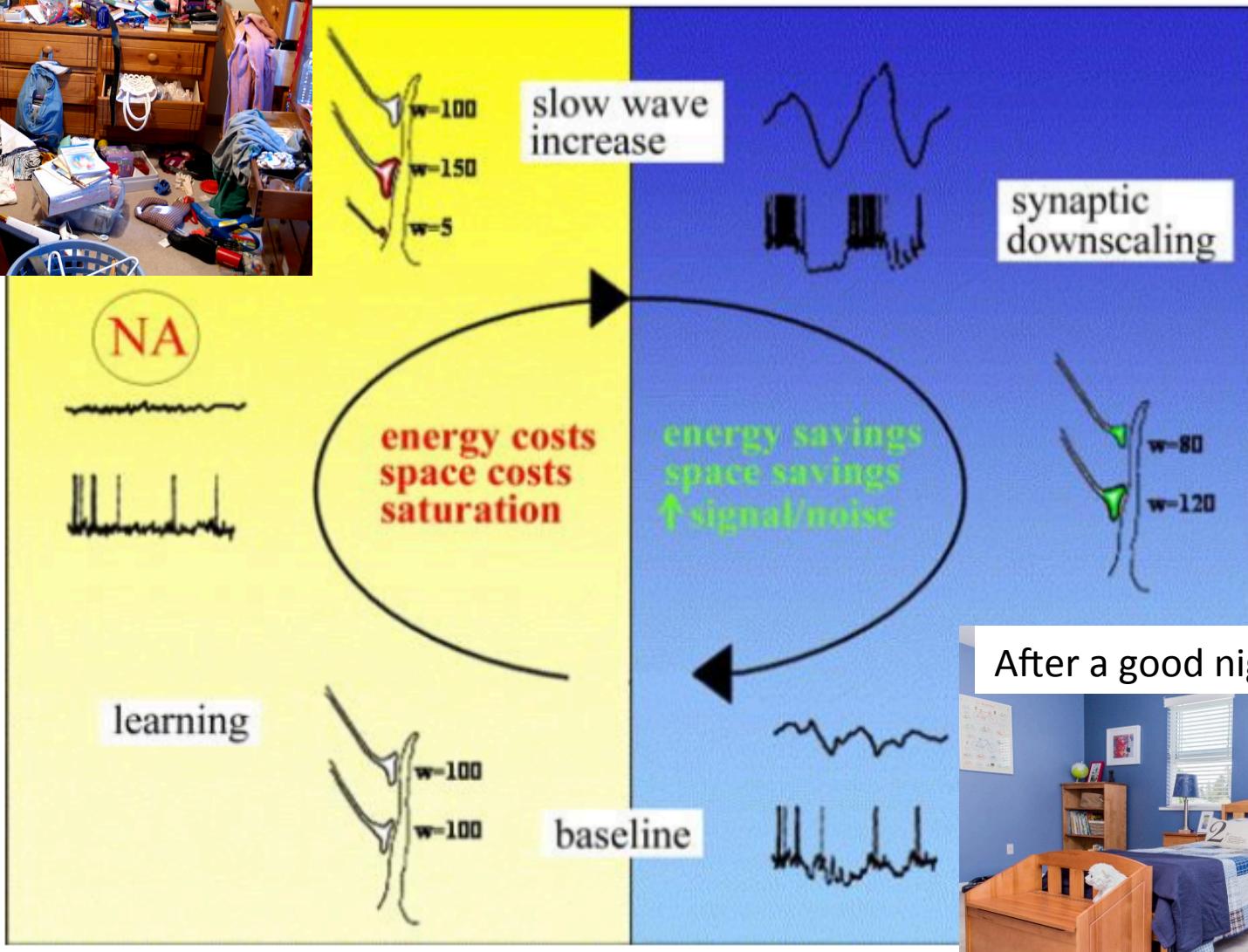
# Why sleep ? Pourquoi dormir ?



# Why sleep ?

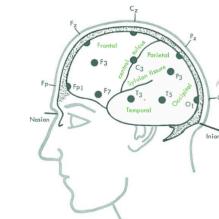
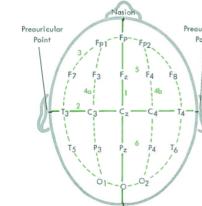
## Pourquoi dormir ?

End of the day

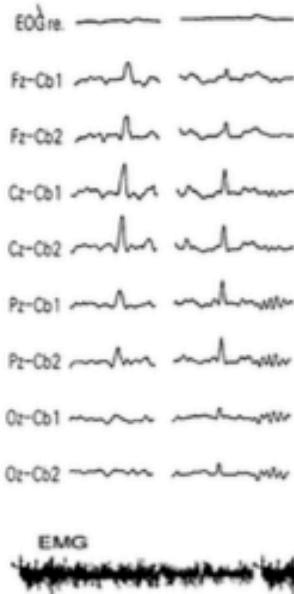


# How do we measure sleep ?

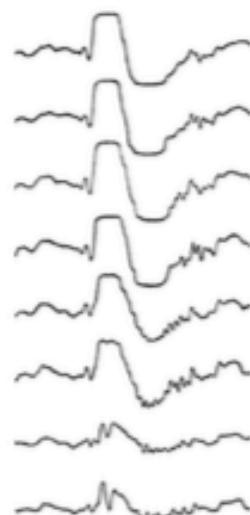
## Comment on mesure le sommeil ?



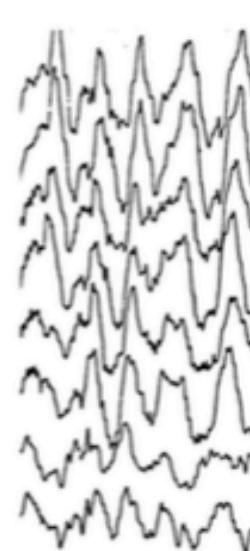
NREM 1  
Vertex-waves



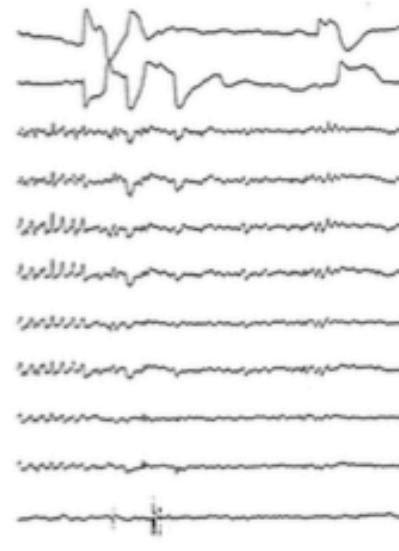
NREM 2  
K-Komplexes  
Sleep spindles



NREM 3/4  
Slow wave  
sleep

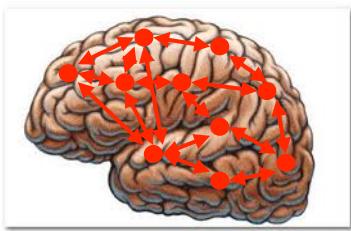


REM-sleep



# « Falling » asleep « Tomber » endormi

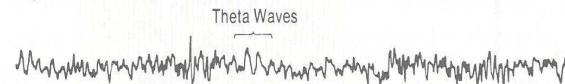
Wake/  
Éveil



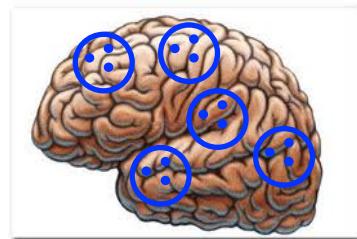
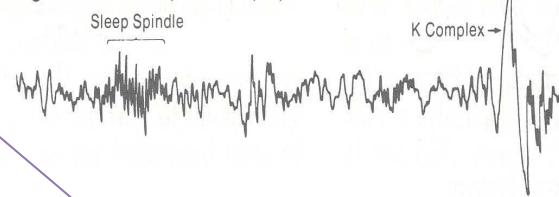
Drowsy — 8 to 12 cps — Alpha Waves



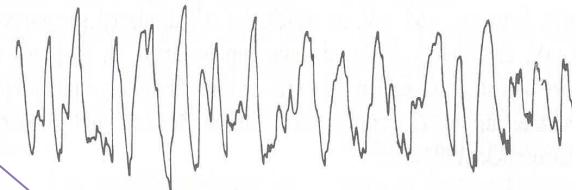
Stage 1 — 3 to 7 cps — Theta Waves



Stage 2 — 12 to 14 cps — Sleep Spindles and K Complexes



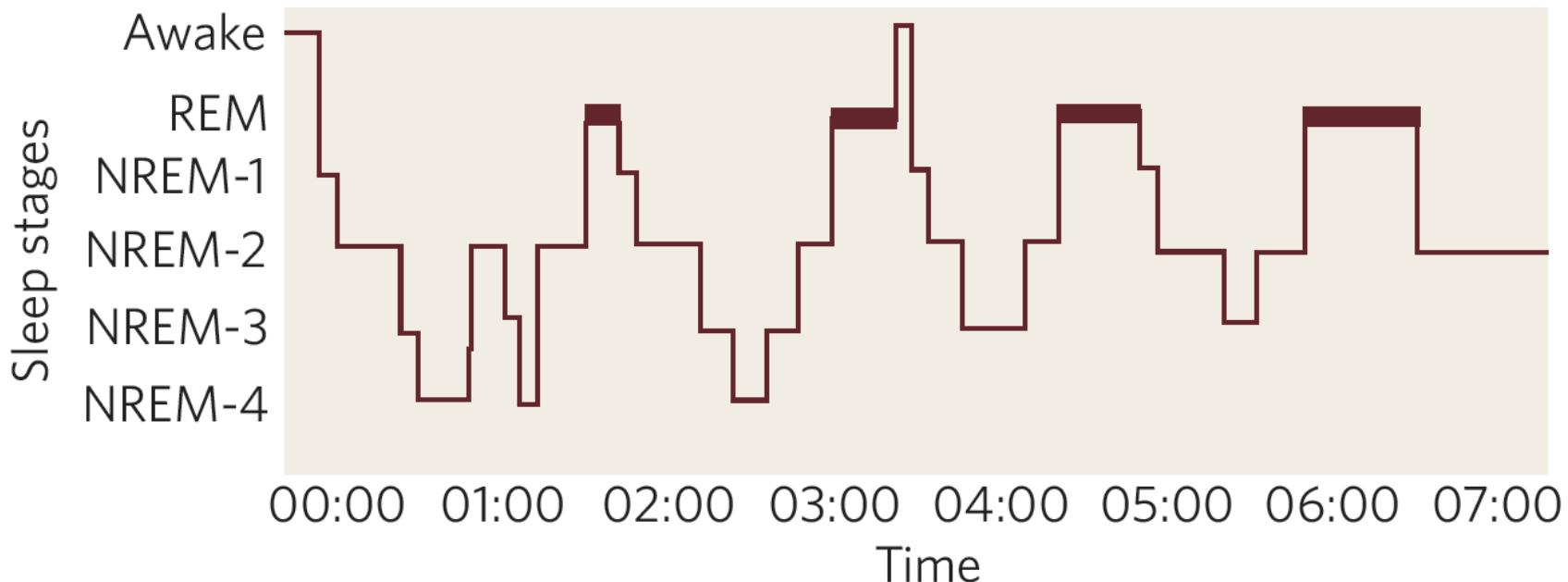
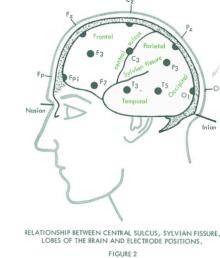
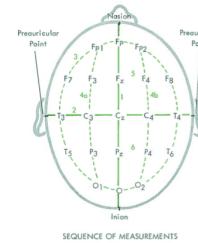
Delta Sleep (S Sleep) —  $\frac{1}{2}$  to 2 cps — Delta Waves



Sleep/  
Sommeil

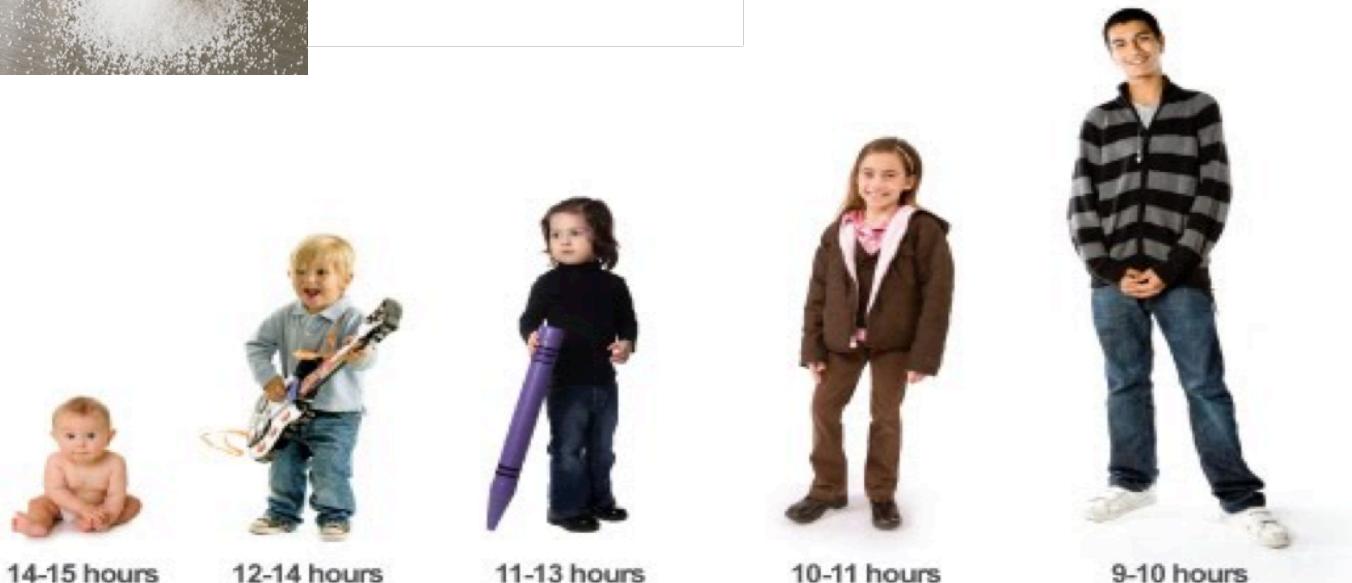
# How do we measure sleep ?

## Comment mesure-t'on le sommeil ?



# Le sommeil

## Age-related recommendations Durée recommandée

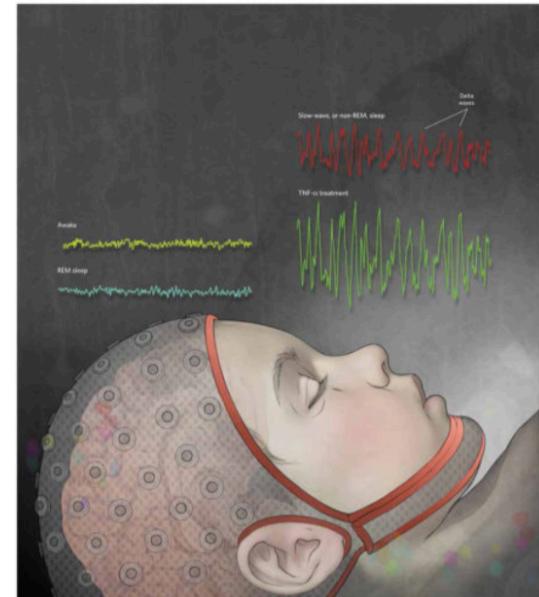
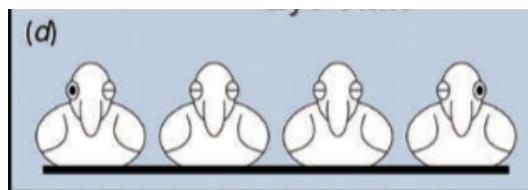
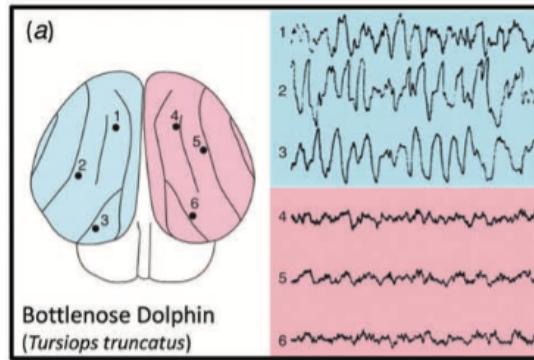
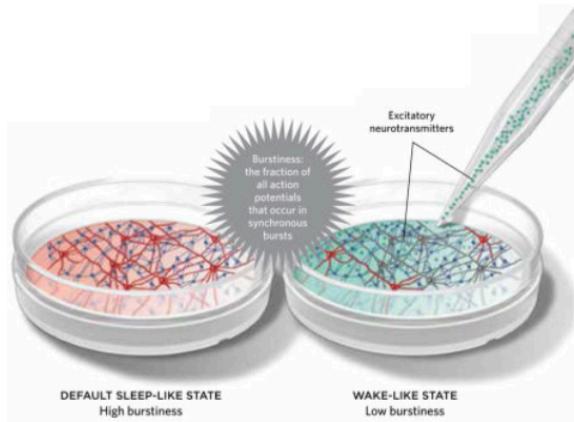


# We are programmed to sleep

## Nous sommes programmé pour dormir

What is the primary state?  
Wakefulness or sleep...

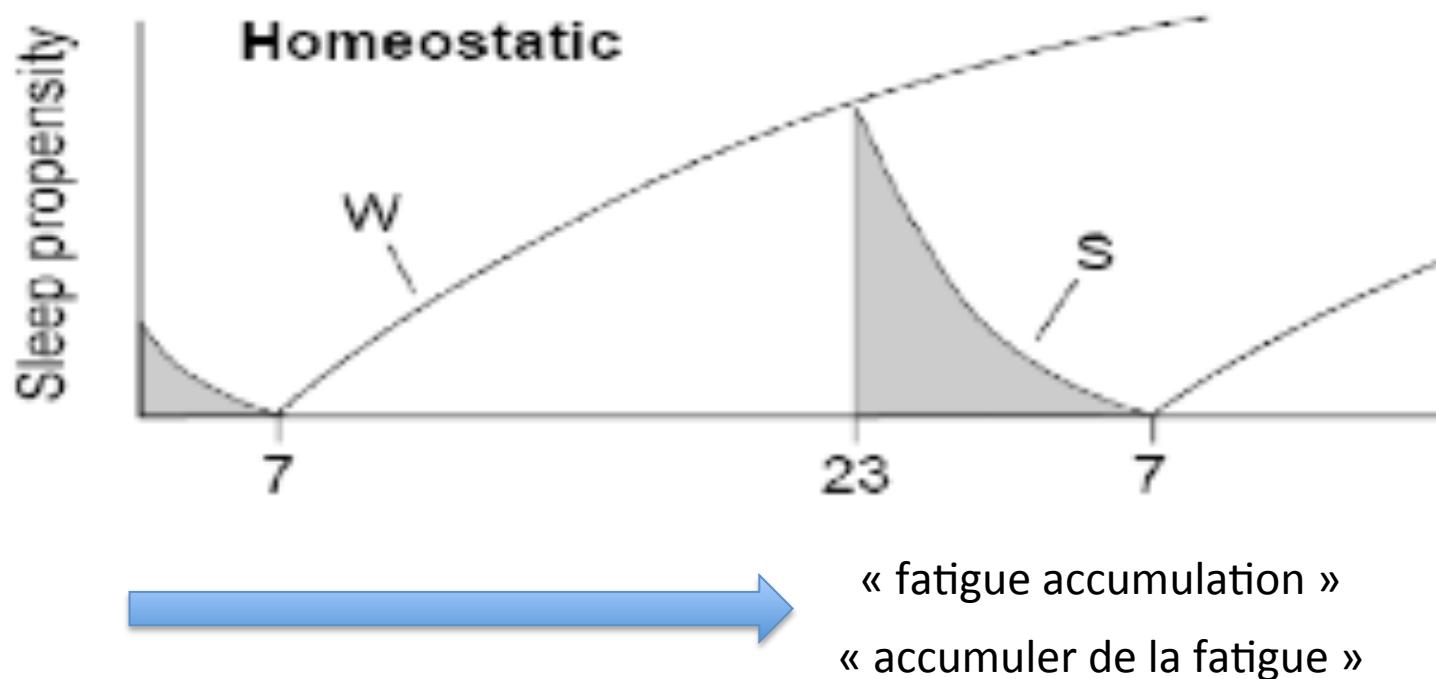
Quel est l'état de base?  
L'éveil ou le sommeil



# We are programmed to sleep

## Nous sommes programmé pour dormir

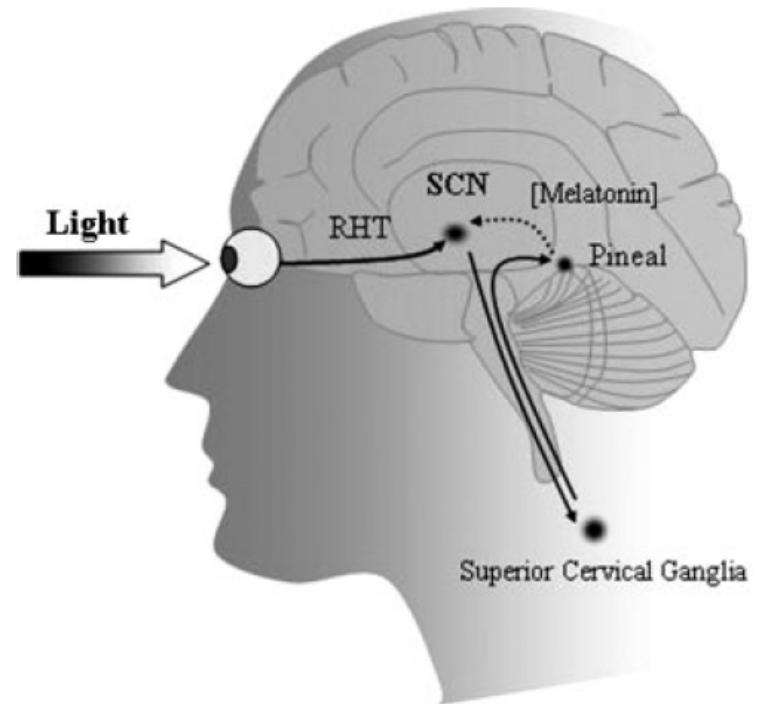
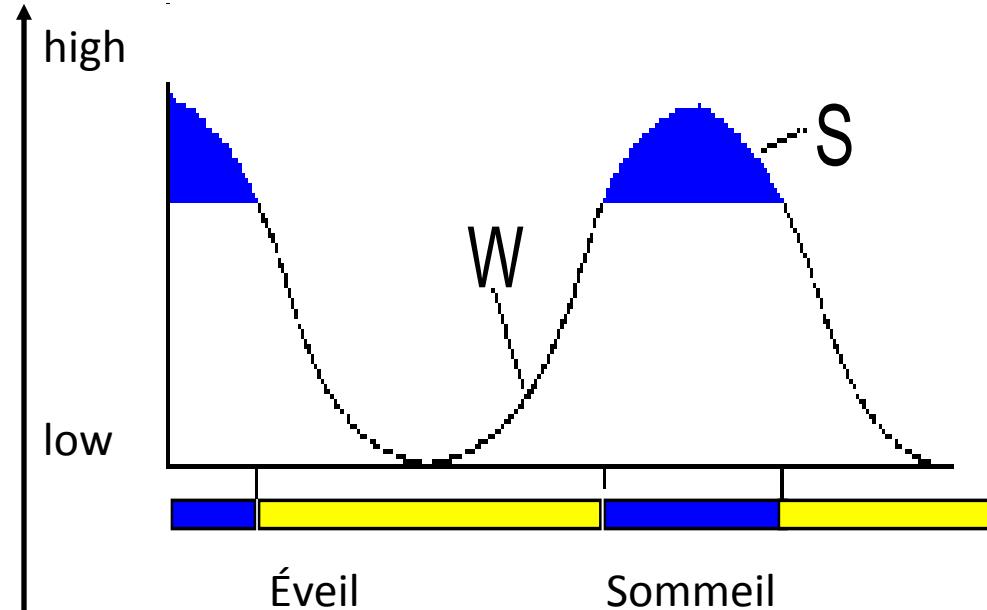
*Homeostatic process / processus homéostatique*



# We are programmed to sleep

## Nous sommes programmé pour dormir

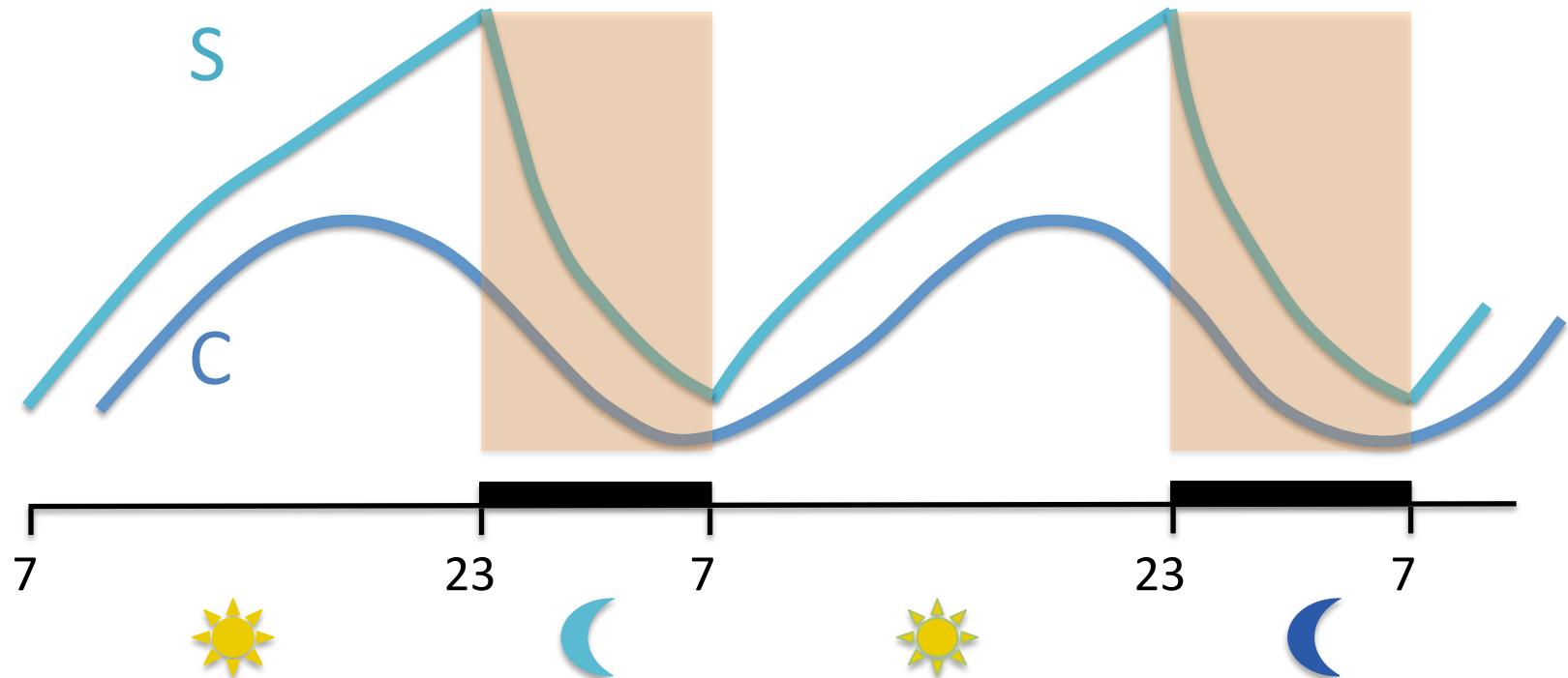
*Circadian process / Processus circadien*



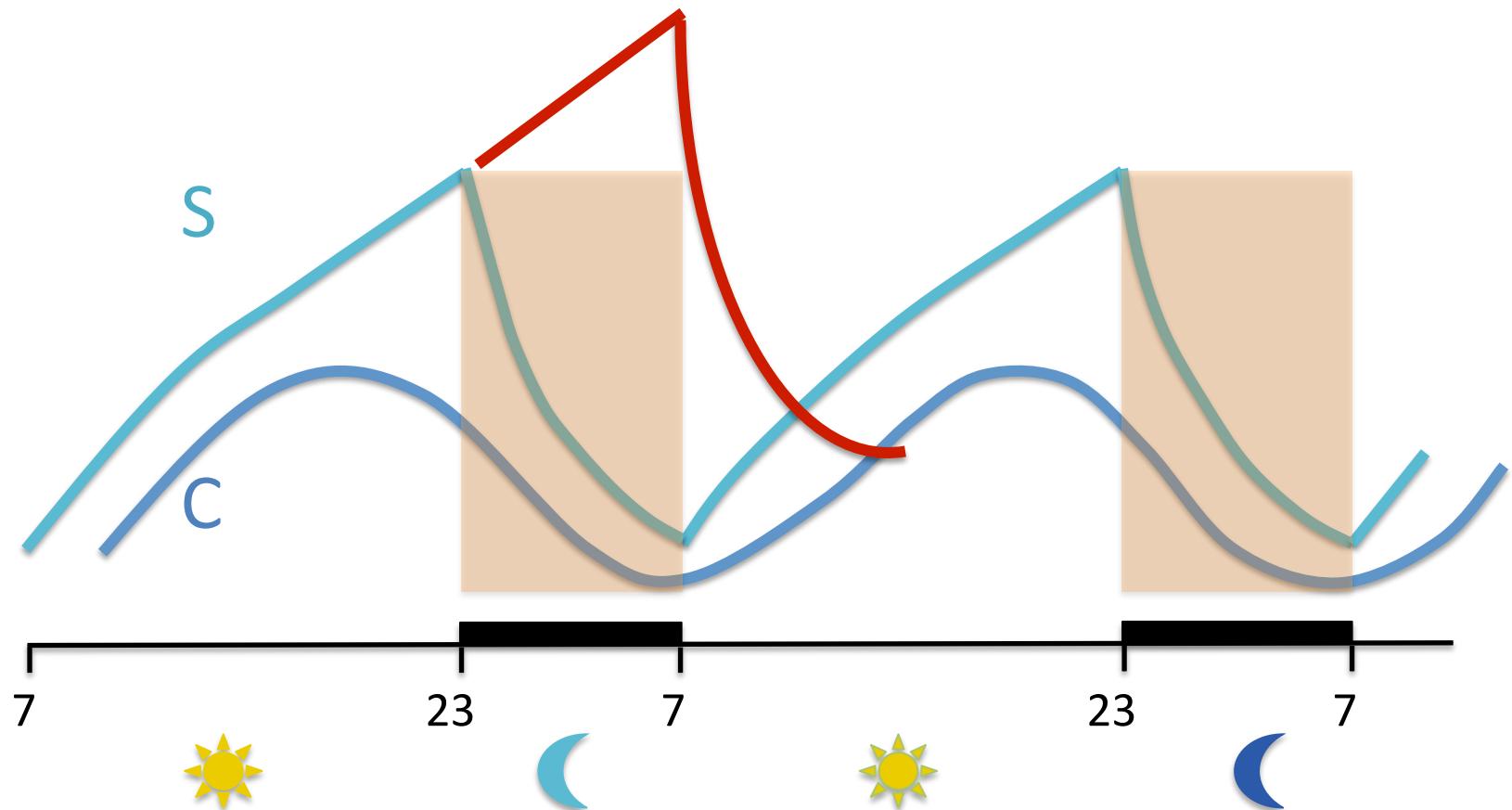
Our brain is programmed to rest when it is dark (nocturnal sleep)  
Notre cerveau est programmé pour se reposer à la noirceur (sommeil nocturne)

# Sleep wake regulation

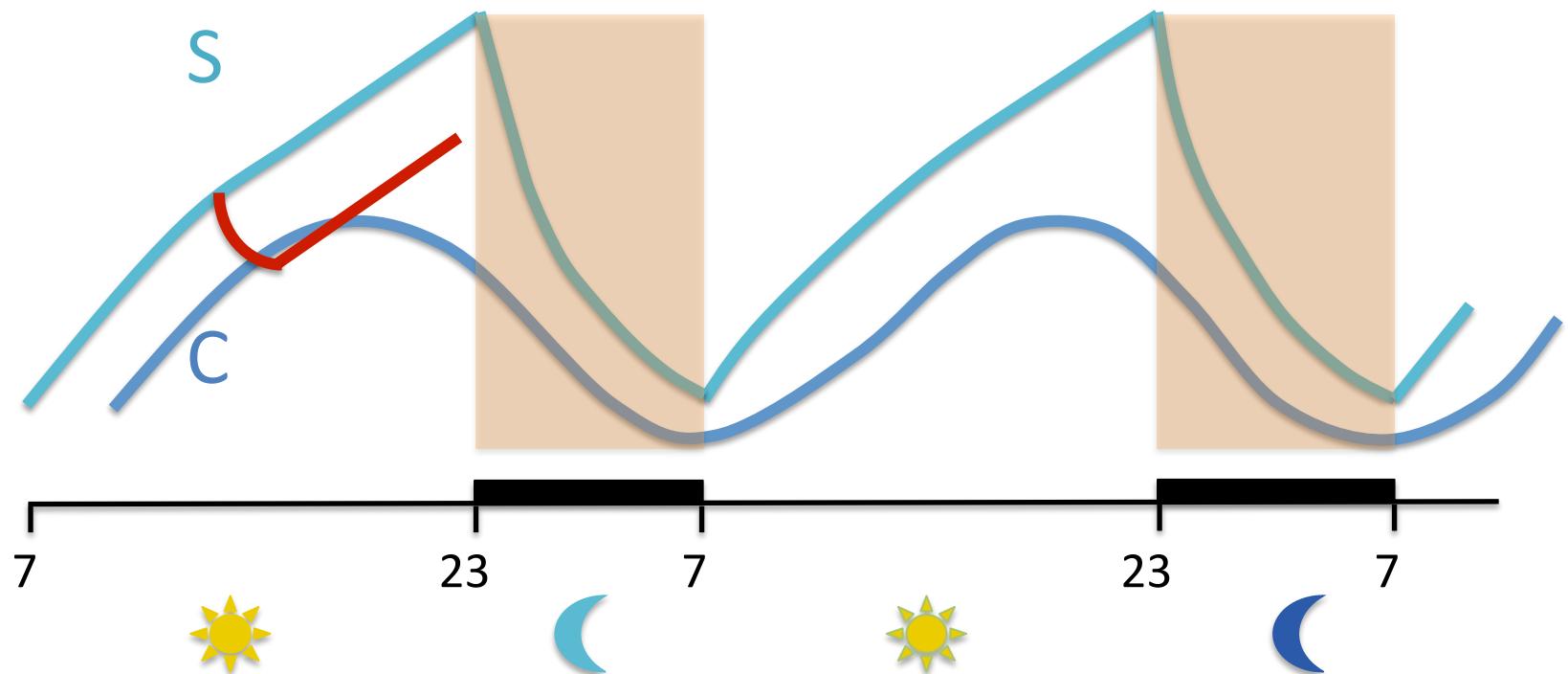
## Régulation veille-sommeil



# Stay up late... Veiller tard...



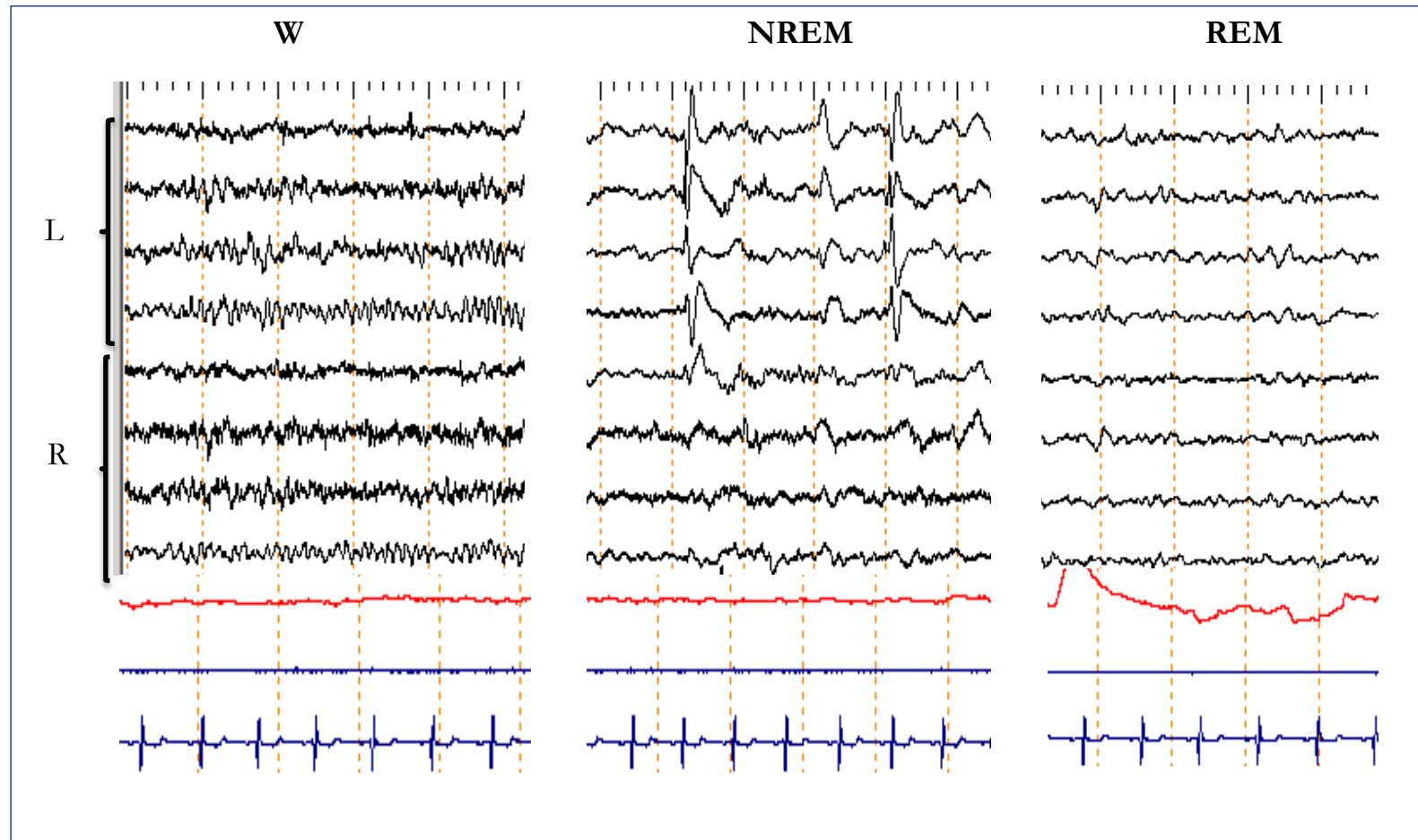
# Taking a nap... Faire une sieste...



# Sleep and Epilepsy

## L'épilepsie et le sommeil

## Non-REM sleep facilitates epileptic activity and seizures while REM sleep has an inhibitory effects



Le sommeil NREM facilite l'activité épileptique et les crises tandis que le sommeil REM exerce un effet inhibiteur sur les crises

# Sleep deprivation and disrupted sleep

## Le manque de sommeil et le sommeil « perturbé »

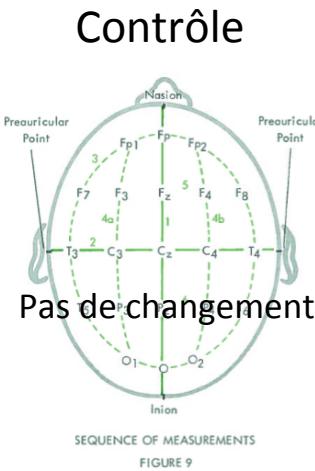
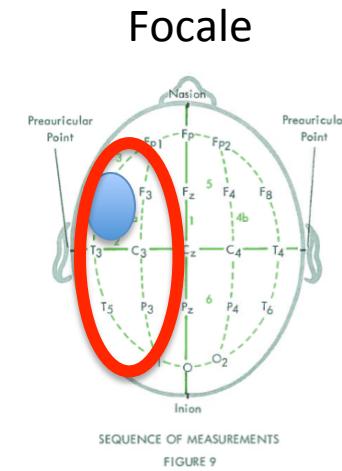
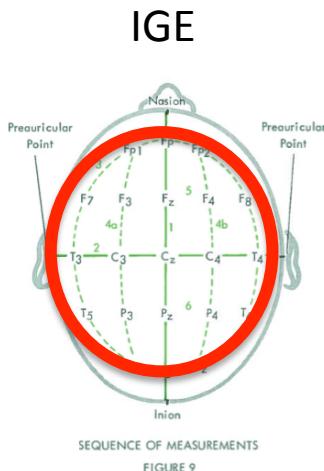
### Articles

#### **Sleep deprivation increases cortical excitability in epilepsy**

Badawy et al. 2006

### Syndrome-specific effects

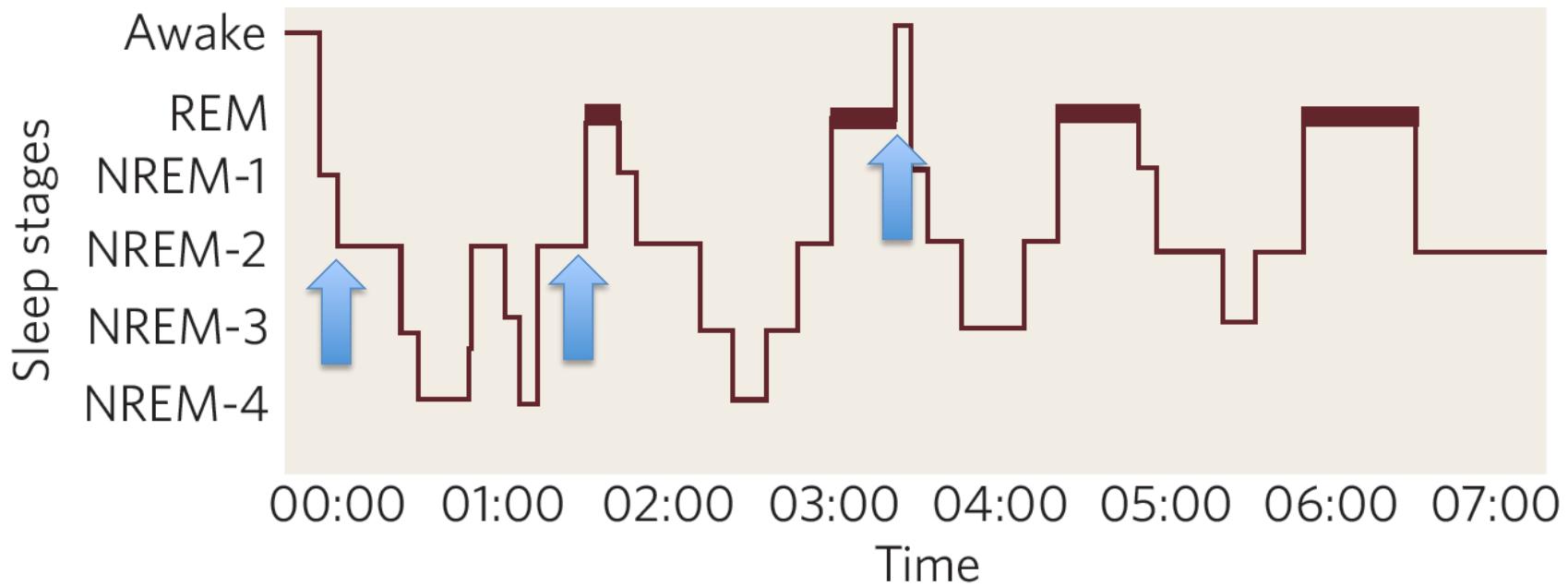
- Increase in cortical excitability
- Augmentation de l'excitabilité corticale:



# Sleep deprivation and disrupted sleep

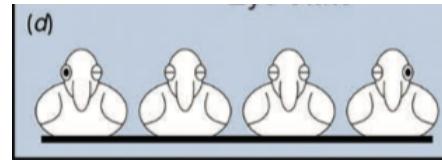
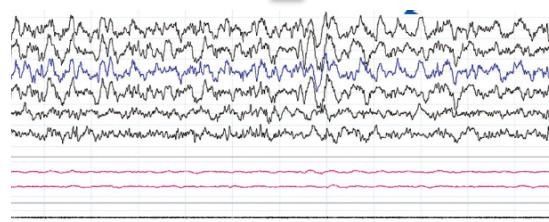
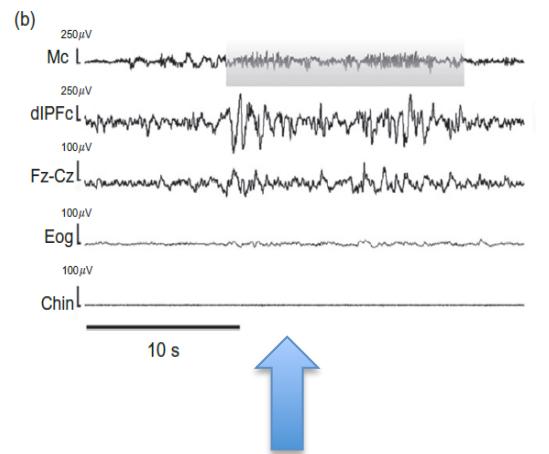
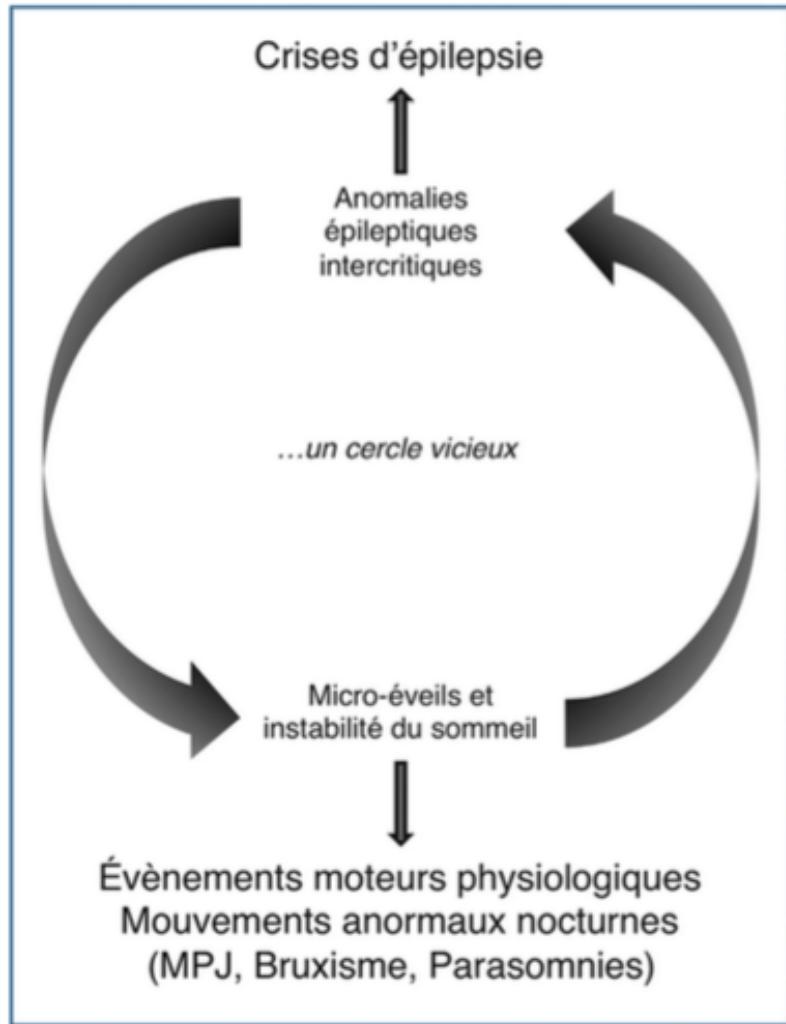
## Le manque de sommeil et le sommeil « perturbé »

Sleep-phase transitions increases seizure probabilities  
La transition entre les phases favorise les crises



# Sleep deprivation and disrupted sleep

## Le manque de sommeil et le sommeil « perturbé »



# Sleep-related epileptic syndromes

## Syndromes épileptiques liés au sommeil

### Childhood focal epilepsies

- Childhood epilepsy with centro-temporal spikes (Rolandic)
- Atypical CECTS
- Panayiotopoulos syndrome (Childhood epilepsy with occipital paroxysms)
- Childhood occipital epilepsy – Gastaut type
- Landau-Kleffner syndrome
- Epileptic encephalopathy with continuous spike-and-wave during sleep (ESES)

### Structural/Genetic focal epilepsies

- Frontal lobe epilepsy (FLE)
- Nocturnal FLE
- Temporal lobe epilepsy (Nocturnal TLE)

### Genetic generalized epilepsies

- Juvenile myoclonic epilepsy
- Epilepsy with generalized tonic-clonic seizures alone (grand mal seizures on awakening)

### Structural/Genetic syndromes

- Lennox-Gastaut syndrome (tonic seizures)
- West syndrome (infantile spasms)

What about Dravet syndrome?

Et le syndrome de Dravet ?



# Sleep in Dravet syndrome

## Le sommeil et le syndrome de Dravet

- Sleep quality is a major predictor of quality of life in patients with epilepsy
- La qualité du sommeil est un déterminant majeure de la qualité de vie
- In Dravet syndrome
  - Concerns about sleep issues were reported by 97% of caregivers
    - Sleep disturbances
    - Nocturnal seizures
    - Insomnia
    - Premature awakenings
    - SUDEP

# Sleep in Dravet syndrome

## Le sommeil et le syndrome de Dravet

- Survey / Sondage
  - Most family members/caregivers consider having extensive experience in sleep-related issues
  - La majorité des aidants naturels considèrent posséder une grande expérience en sommeil
  - Sleep problems have a profound effect on seizure control due to sleep deprivation, impact on the child's learning and on the coping mechanisms of the entire family

# Sleep in Dravet syndrome

## Le sommeil et le syndrome de Dravet

Original Article

### Sleep Abnormalities in Children With Dravet Syndrome

Radhika Dhamija MBBS<sup>a</sup>, Maia K. Erickson<sup>c</sup>, Erik K. St Louis MD<sup>b,c</sup>,  
Elaine Wirrell MD<sup>b</sup>, Suresh Kotagal MD<sup>b,c,\*</sup>

<sup>a</sup> Department of Medical Genetics, Mayo Clinic, Rochester, Minnesota

<sup>b</sup> Department of Neurology, Mayo Clinic, Rochester, Minnesota

<sup>c</sup> Center for Sleep Medicine, Mayo Clinic, Rochester, Minnesota

- Standard examination did not show abnormalities in the obstructive or central apnea index, arousal index, sleep efficiency, or sleep architecture
  - Macroscopically normal sleep
  - Sommeil « normal »
- Non-REM sleep microarchitecture was, however, abnormal reflecting poor NREM sleep quality

# Sleep problems in Dravet syndrome: a modifiable comorbidity

SHANE H LICHENI<sup>1</sup>  | JACINTA M MCMAHON<sup>1</sup> | AMY L SCHNEIDER<sup>1</sup> | MARGOT J DAVEY<sup>2</sup> |  
INGRID E SCHEFFER<sup>1,3,4</sup> 

- Common sleep complaints (75%):
  - Nighttime awakenings (éveils nocturnes) 46%
  - Sleep initiation difficulty (trouble de l'endormissement) 47%
  - Daytime sleepiness (somnolence diurne) 58%
  - Nocturnal jerks or hyperkinesia (hyperkinésie ou myoclonies nocturnes)
  - Sleep-related seizures (crises épileptiques liées au sommeil) 53%
- Use of sleep-related medication (39%)
  - Melatonin (rarely used/tried)
  - Clonidine, iron, risperidone, clobazam, fluoxetine, medical marijuana

## Sleep problems in Dravet syndrome: a modifiable comorbidity

SHANE H LICHENI<sup>1</sup>  | JACINTA M MCMAHON<sup>1</sup> | AMY L SCHNEIDER<sup>1</sup> | MARGOT J DAVEY<sup>2</sup> |  
INGRID E SCHEFFER<sup>1,3,4</sup> 

- Nav1.1 (SNN1A) not just about seizures
  - Impaired sleep homeostasis (implication du gène dans la stabilité du sommeil)
  - Altered sleep micro-architecture (altération micro-architecture)
- Similar sleep-related issues in other epileptic encephalopathies
  - Trouble envahissant du développement; retard développement
- Refractory nocturnal seizures (crises nocturnes Rx-résistantes)
- Polypharmacy can be an issue (polypharmacie)

# Sleep problems in Dravet syndrome: a modifiable comorbidity

SHANE H LICHENI<sup>1</sup>  | JACINTA M MCMAHON<sup>1</sup> | AMY L SCHNEIDER<sup>1</sup> | MARGOT J DAVEY<sup>2</sup> |  
INGRID E SCHEFFER<sup>1,3,4</sup> 

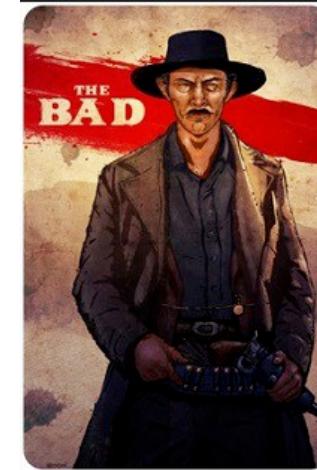
- Environmental factors !!

- Co-sleep with parents

- Sleep fragmentation, increased night awakenings, sleep initiation anxiety
    - Instabilité du sommeil, éveils nocturnes, anxiété de l'endormissement

- Behavioural insomnia (insomnie comportementale)

- Difficulty with regular bedtime routine
    - Difficulté à instaurer une routine « dodo » constante



# Sleep problems in Dravet syndrome: a modifiable comorbidity

SHANE H LICHENI<sup>1</sup>  | JACINTA M MCMAHON<sup>1</sup> | AMY L SCHNEIDER<sup>1</sup> | MARGOT J DAVEY<sup>2</sup> |  
INGRID E SCHEFFER<sup>1,3,4</sup> 

- Importance of excluding sleep co-morbidities
  - Obstructive sleep apnea (5%)
  - VNS-induced sleep apnea (33%)
  - Periodic limb movement disorders
  - NREM parasomnias (sleep walking; confusional arousals, etc.)
  - Nocturnal seizures !
- Discuss sleep issues with your treating physician
- Importance de discuter du sommeil avec le médecin traitant



## Sleep routine: Trucs et astuces

- Aller se coucher seulement quand on se sent fatigué
- Éviter les écrans au lit et 60 minutes avant le coucher
- Éviter le café et les boissons énergisantes après le souper ou en grande quantité
- Relaxation, yoga, méditation avec le coucher
  - Exercice physique/cardio favorise le sommeil mais pas juste avant
- Favoriser une routine du sommeil
- Si après 30 minutes on ne dort pas, on sort du lit...mais pas d'écran, téléphone, activité stimulante

# Regenerative nap: mind the duration

## Sieste régénérative: attention à la durée

### ORIGINAL ARTICLE

#### The Effects of an Afternoon Nap on Episodic Memory in Young and Older Adults

Michael K. Scullin, PhD<sup>1,2\*</sup>; Jacqueline Fairley, PhD<sup>2</sup>; Michael J. Decker, PhD<sup>3</sup>; Donald L. Bliwise, PhD<sup>2</sup>

- Too short / Trop court (5-10 min) = no effect / pas d'effet
- Too long / Trop long (plus de 30-45 min) = sleep inertia / inertie du sommeil post-sieste; will influence bedtime / effet hr couché

### CLINICAL REVIEW

Waking up is the hardest thing I do all day: Sleep inertia and sleep drunkenness

Lynn M. Trotti\*

Emory Sleep Center and Department of Neurology, Emory University School of Medicine, 12 Executive Park Dr NE, Atlanta, GA 30329, USA

Durée optimale: viser 20 minutes





Thank you for your attention  
Merci de votre attention

Questions?