



Circadian and ultradian rhythmicity in patients with disorders of consciousness

Camargo, Aldo, Blandiaux, Séverine,
Piarulli Andrea, Wolff, Audrey, Gosseries Olivia,
Thibaut Aurore & Laureys Steven

Coma Science Group
GIGA Consciousness
Université & CHU de Liège



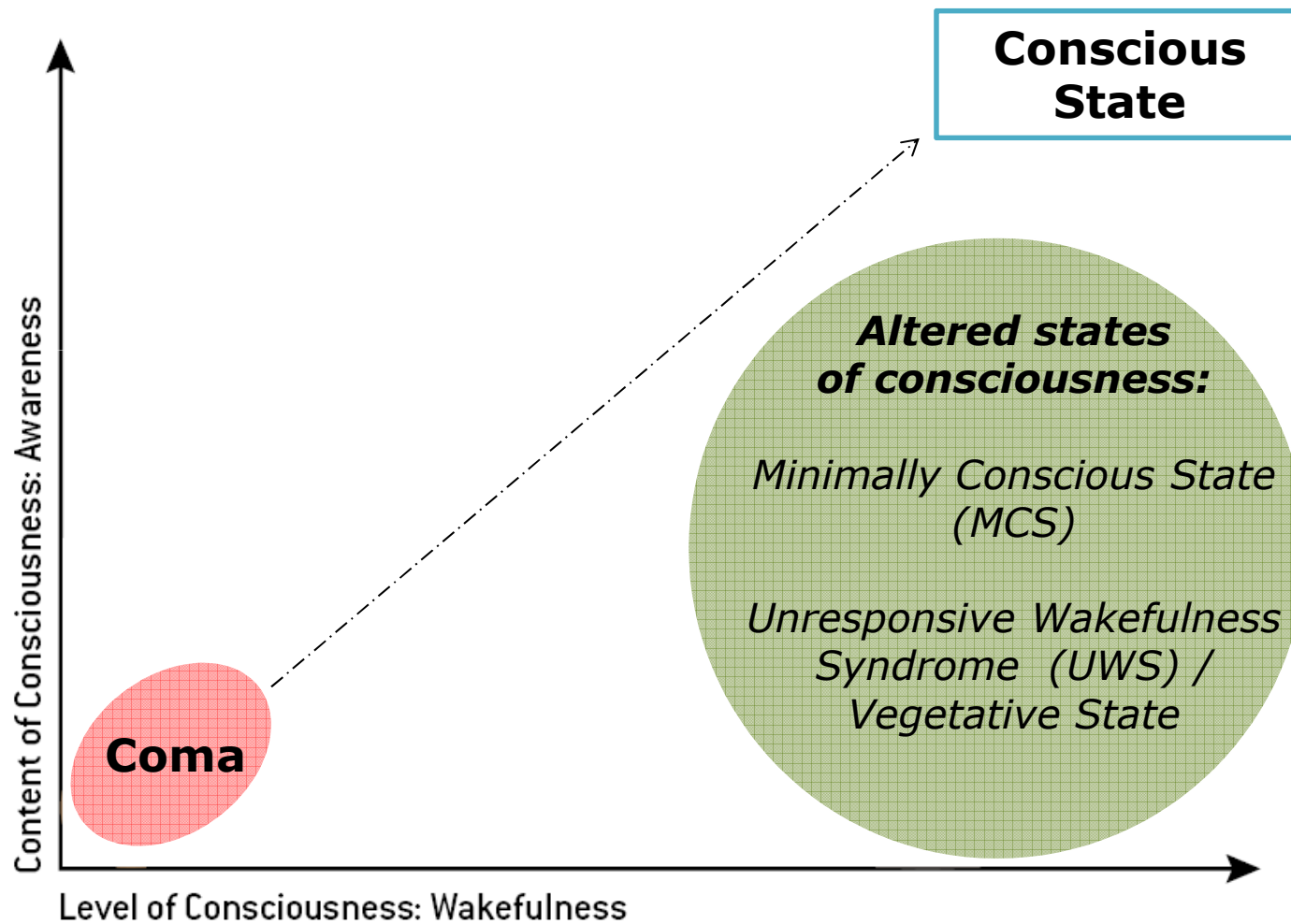
4rd Congress of the European Academy of Neurology, 2018, Lisbon



1. Introduction



Disorders Of Consciousness (DOC)





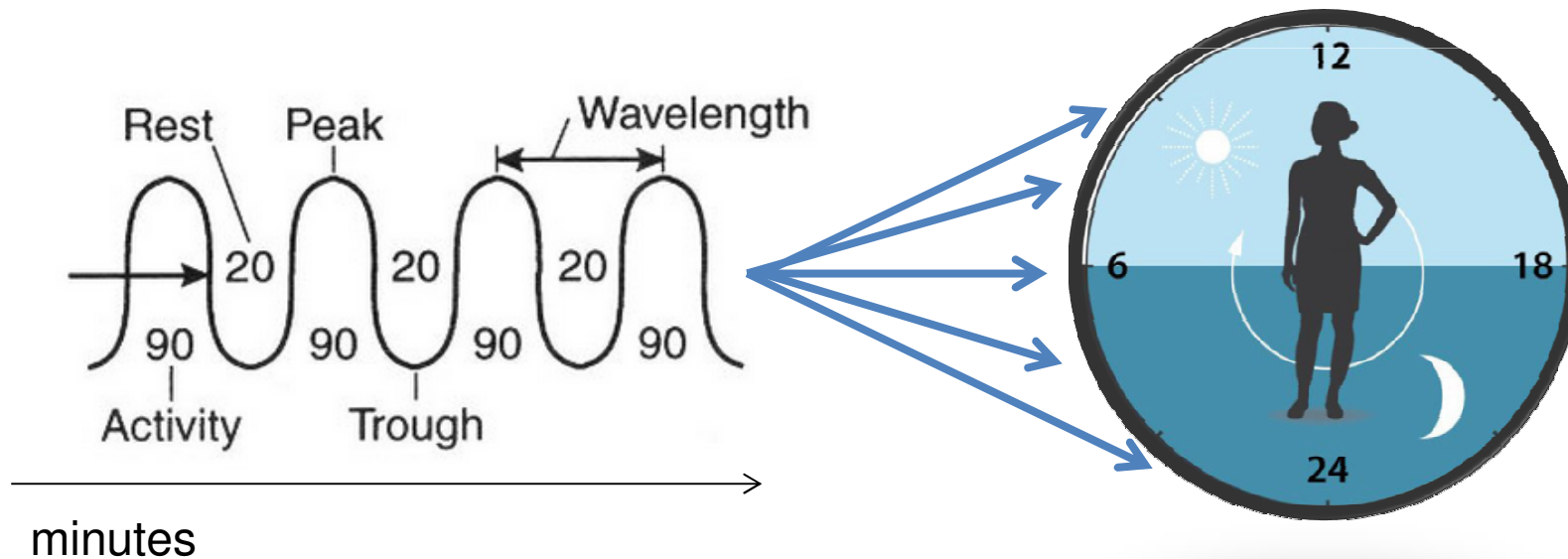
Circadian & Ultradian rhythmicity

Ultradian rhythms

= cycles of >1h and < 24h
= repeated throughout a 24-hour day

Circadian rhythms

= cycles > over 24h period
= sleep / wake cycle





Background

DOC patients

- changes in the oscillatory brain dynamics
- which affects the circadian and ultradian rhythmicity [5]

Previous results showed :

- no circadian rhythmicity in UWS and MCS
- spectral entropy =



Hypothesis

Based on previous results :

Hypothesis 1: MCS and UWS patients have no circadian and ultradian rhythmicity.

Hypothesis 2: spectral entropy can be used to differentiate patients in MCS from UWS.

2. Methods



Study design

- **N = 99** ; 18 UWS & 81 MCS ; 47 females

- **Etiology** : Traumatic brain injury = 46 ; Not traumatic brain injury = 55

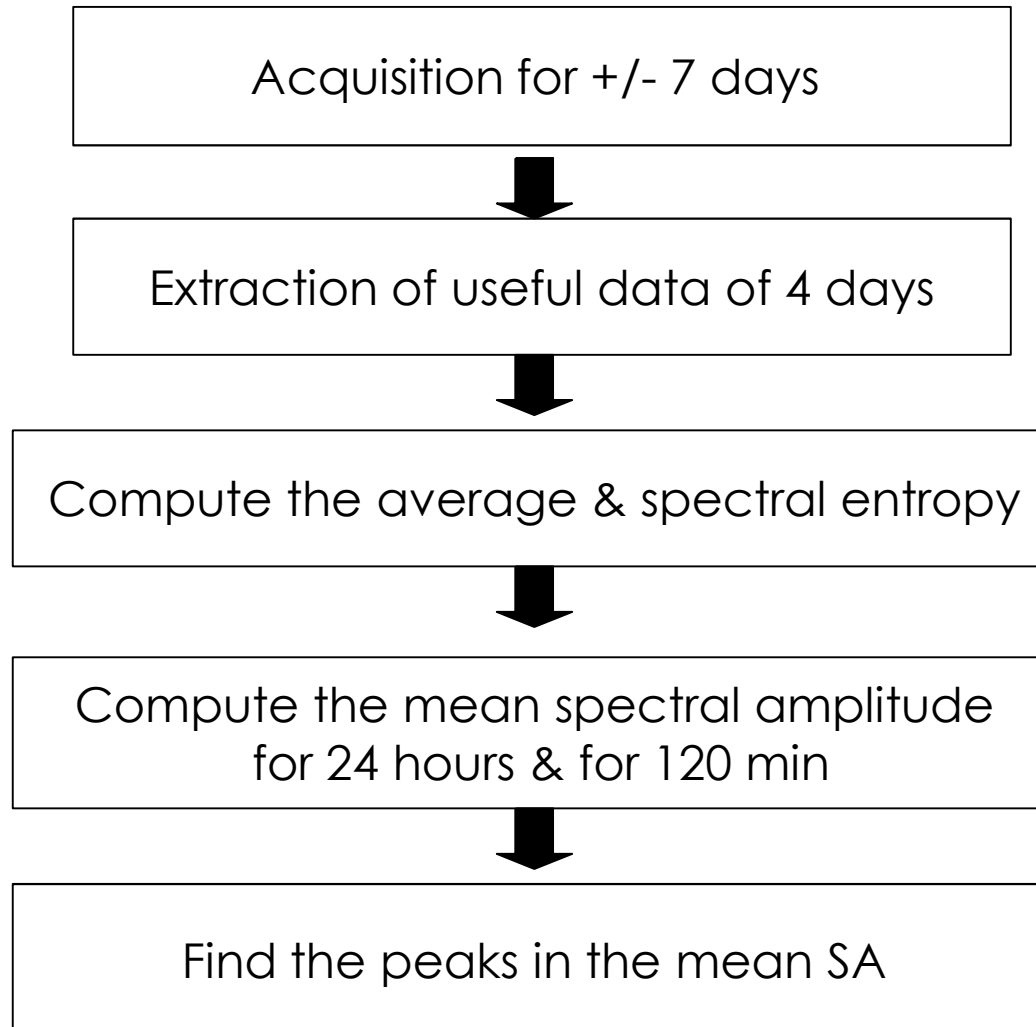
- **Actigraphy** = cost-effective method assessing movements
 - ❖ Camntech MotionWatch : n = 42

 - ❖ Phillips Activewatch : n = 57





Study design



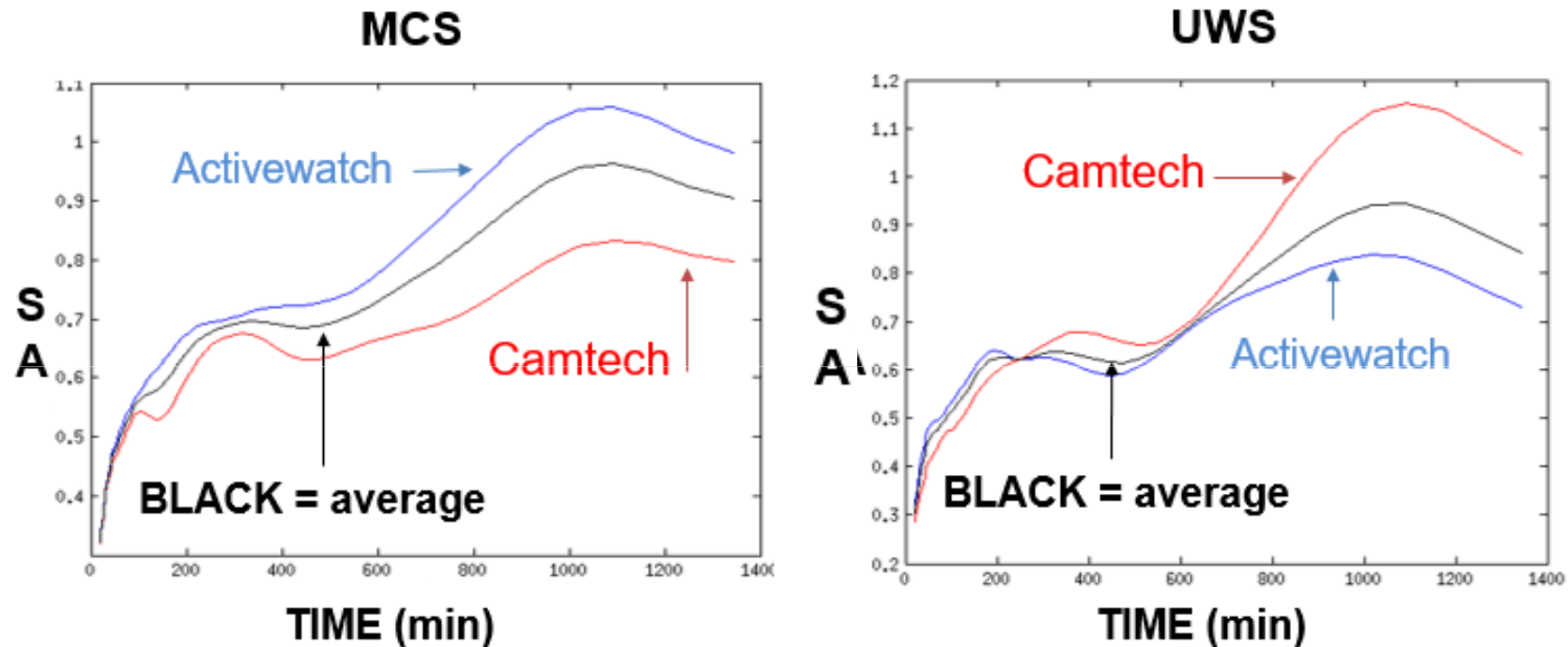


3. Results



Results : hypothesis 1

24h spectral amplitude (SA) plot



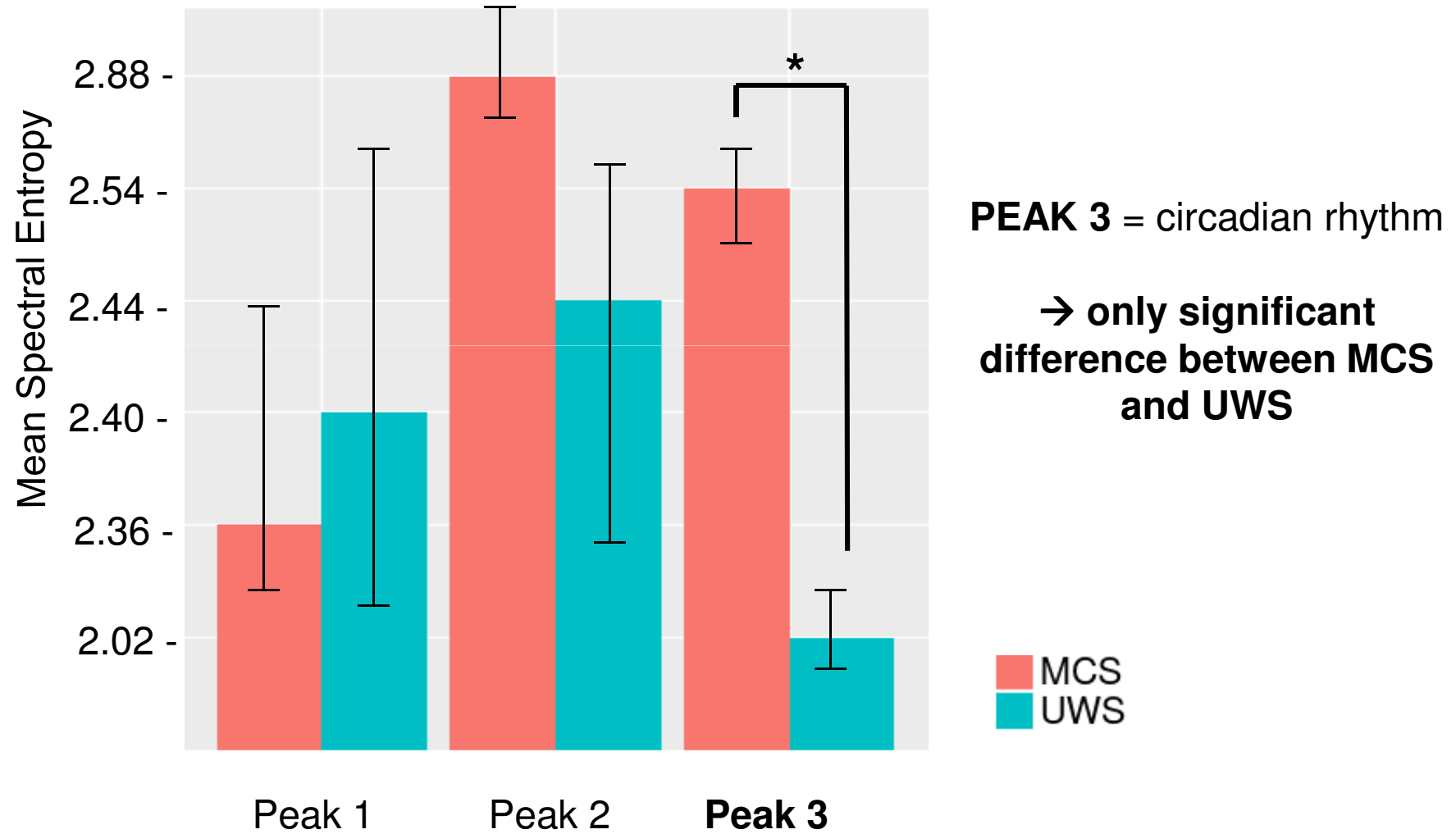
3 main peaks for 90% of MCS and 89% of UWS:

1. Ultradian rhythm (min) = [20, 240[& [240, 720[
2. Circadian rhythm (min) : [720, 1400[



Results : hypothesis 2

Spectral entropy differences between MCS and UWS for the 3 peaks



* $p = 0.004$



4. Conclusion



Take home message

- 89% UWS & 90% MCS show circadian and ultradian rhythms

- Actigraphy = promising non-invasive diagnostic tool
 - Differentiate MCS from UWS patients
 - Different circadian rhythmicity



Thank you



Studying Consciousness
in the electrical brain

LUMINOUS

