# Fundamentos fisiológicos del abordaje bio-psico-social de los trastornos de sueño

**Daniel E. Vigo**

**2013**


1. ***Introducción***
2. ***Fundamentos fisiológicos***
3. ***Impacto de factores b-p-s en la fisiología del sueño***
4. ***Ejemplos “de la casa”***
5. ***Conclusión***

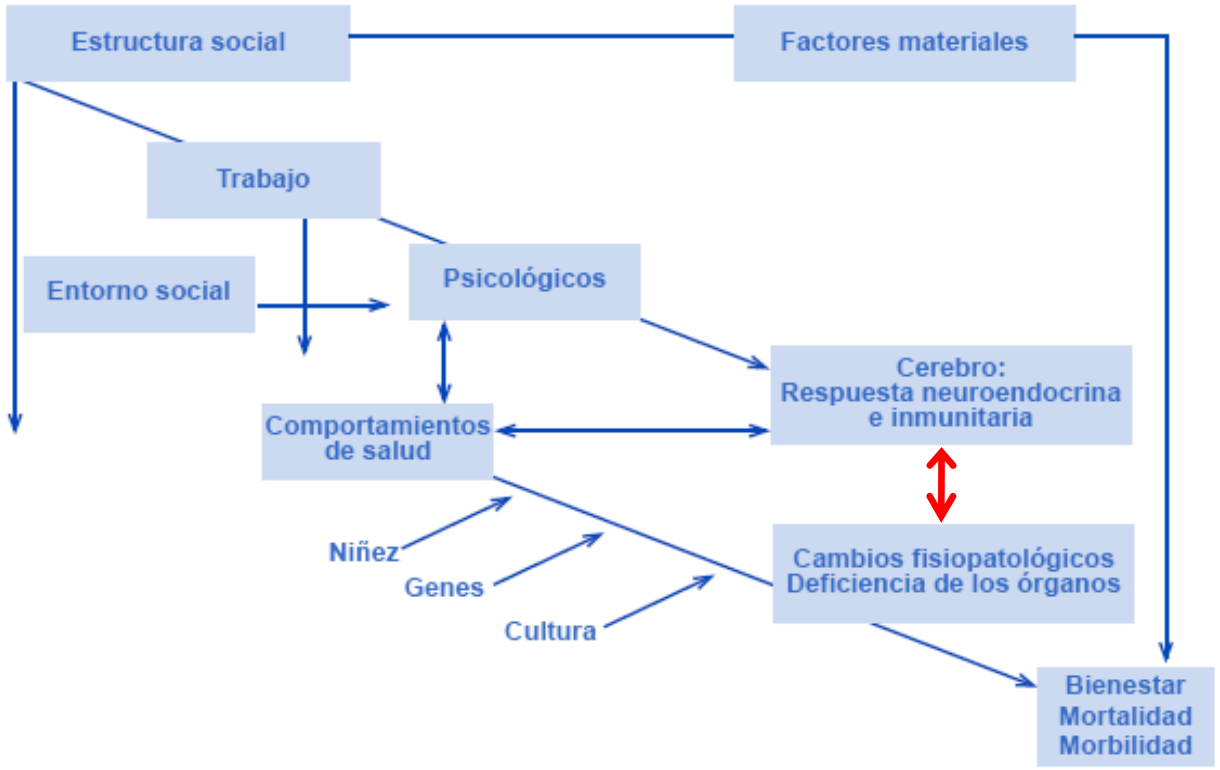
# Trastornos de sueño

Tabla 1. Clasificación internacional de los trastornos del sueño, 2005.

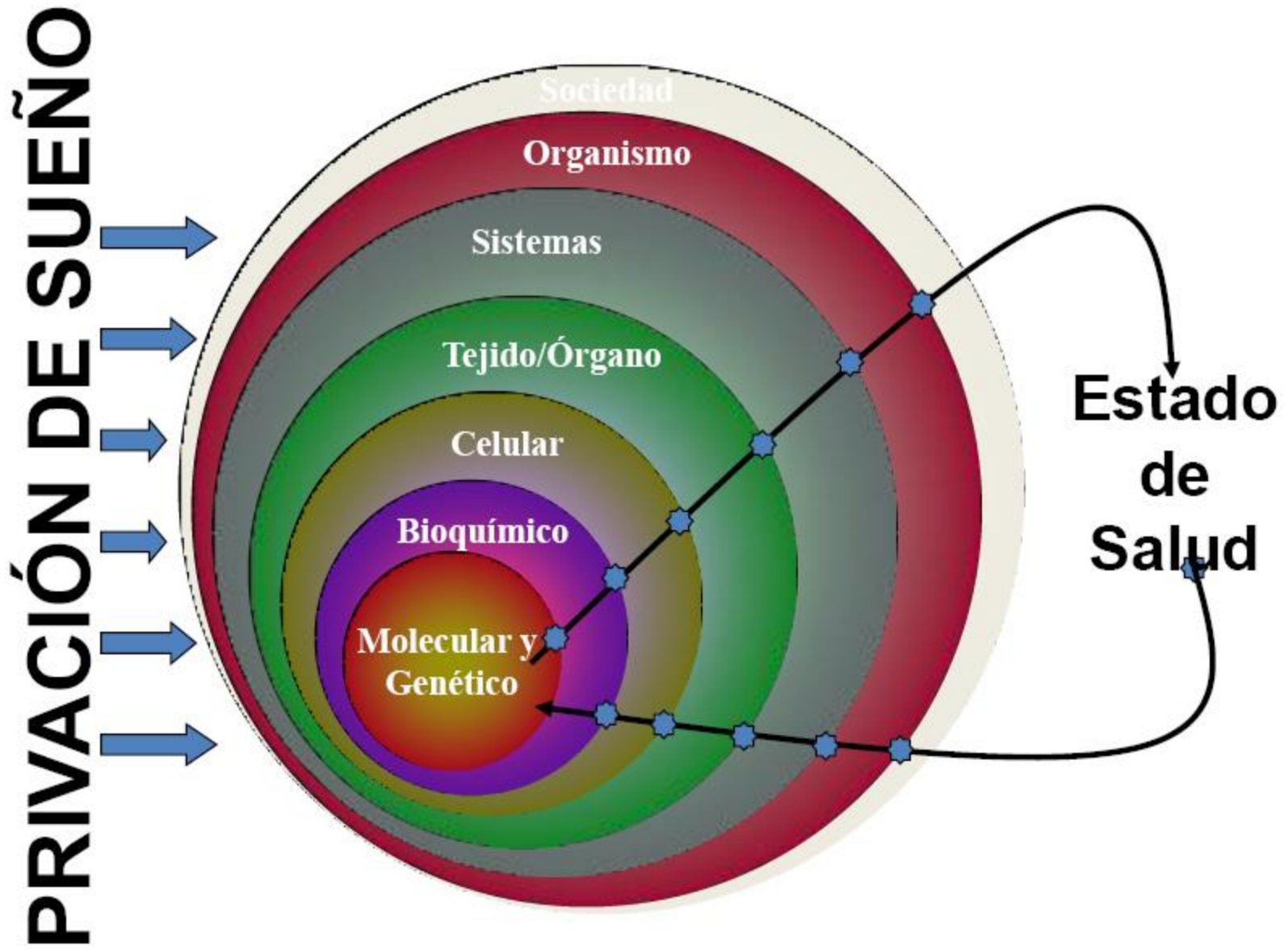
| ICSD-2 |
| --- |
| I. Insomnio (11) |
| II. Trastornos respiratorios relacionados con el sueño (14) |
| III. Hipersomnias de origen central* (12) |
| IV. TS de los ritmos circadianos (9) |
| V. Parasomnias (15) |
| VI. Trastornos del movimiento relacionados con el sueño (8) |
| VII. Síntomas aislados, variantes de la normalidad, cuestiones sin resolver (9) |
| VIII. Otros TS (3) |

*Apéndice A: TS asociados a cuadros médicos (7)*
*Apéndice B: TS asociados a cuadros psiquiátricos y conductuales (6)*

**Figura 3: Modelo de Brunner, Marmot y Wilkinson de producción de inequidades en salud a lo largo de la vida.**




- **Abordar en forma bio-psico-social los trastornos de sueño**
- **Abordar desde el sueño los trastornos bio-psico-sociales**


PRIVACIÓN DE SUEÑO
Sociedad
Organismo
Sistemas
Tejido/Órgano
Celular
Bioquímico
Molecular y Genético
Estado de Salud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## Factores de transcripción

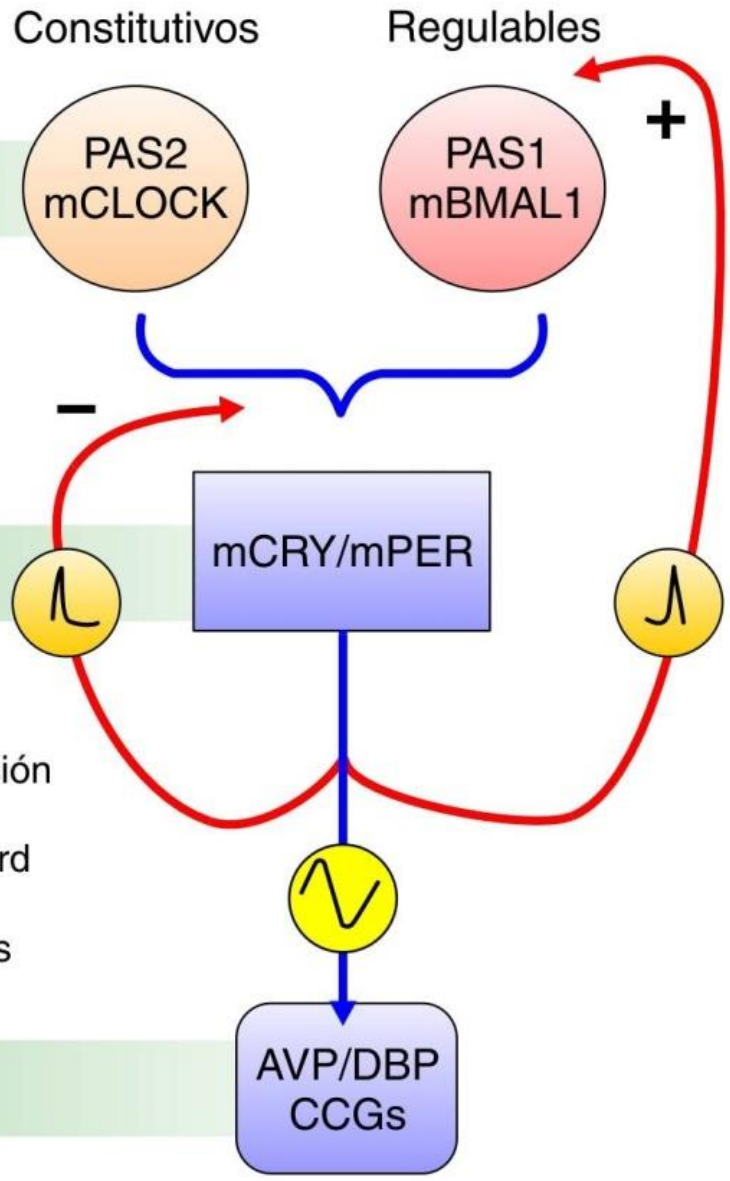
Dimerización transitoria (*mCLOCK-mBMAL1*) desencadena expresión de los genes del reloj

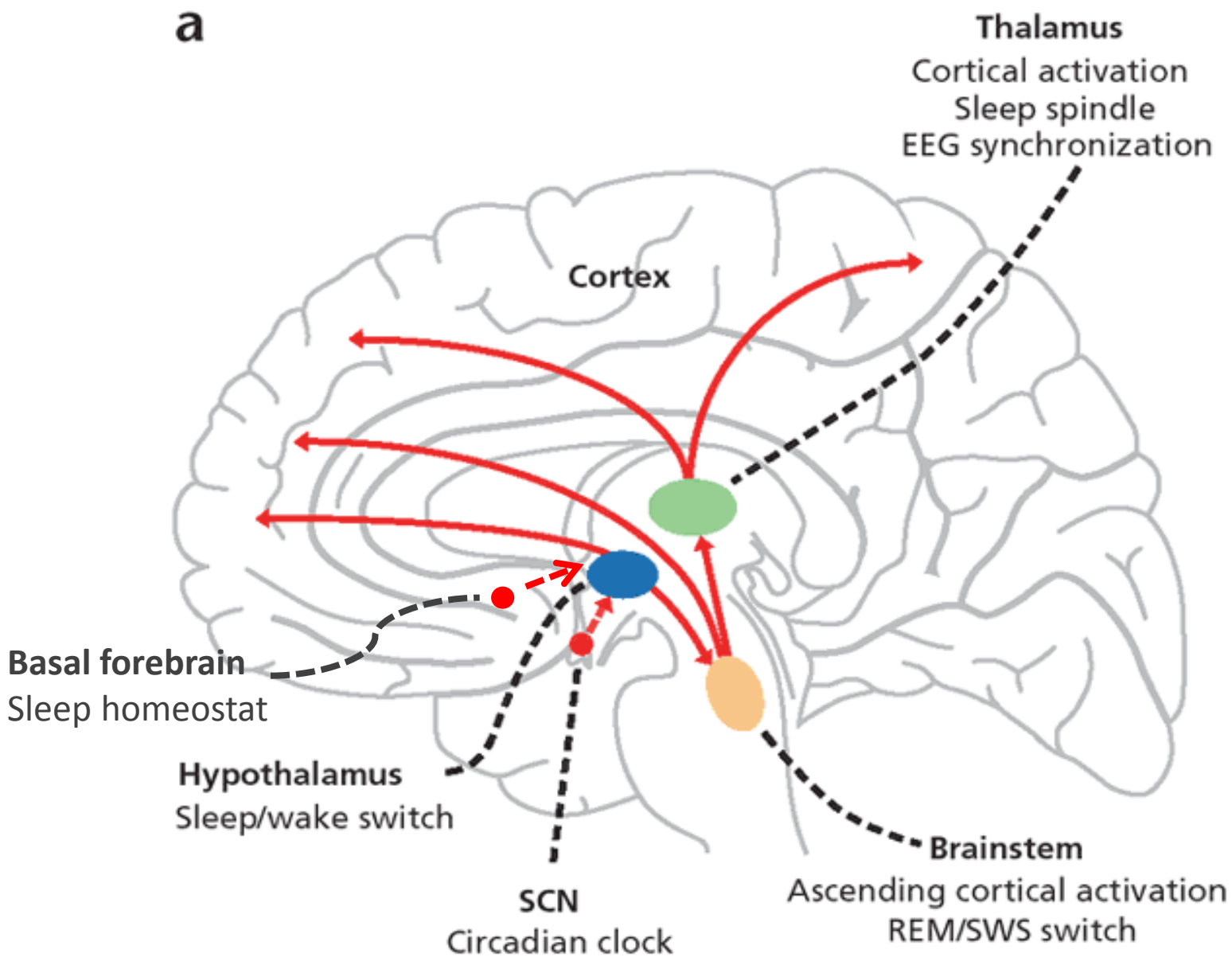
## Genes del reloj

Las proteínas del reloj:

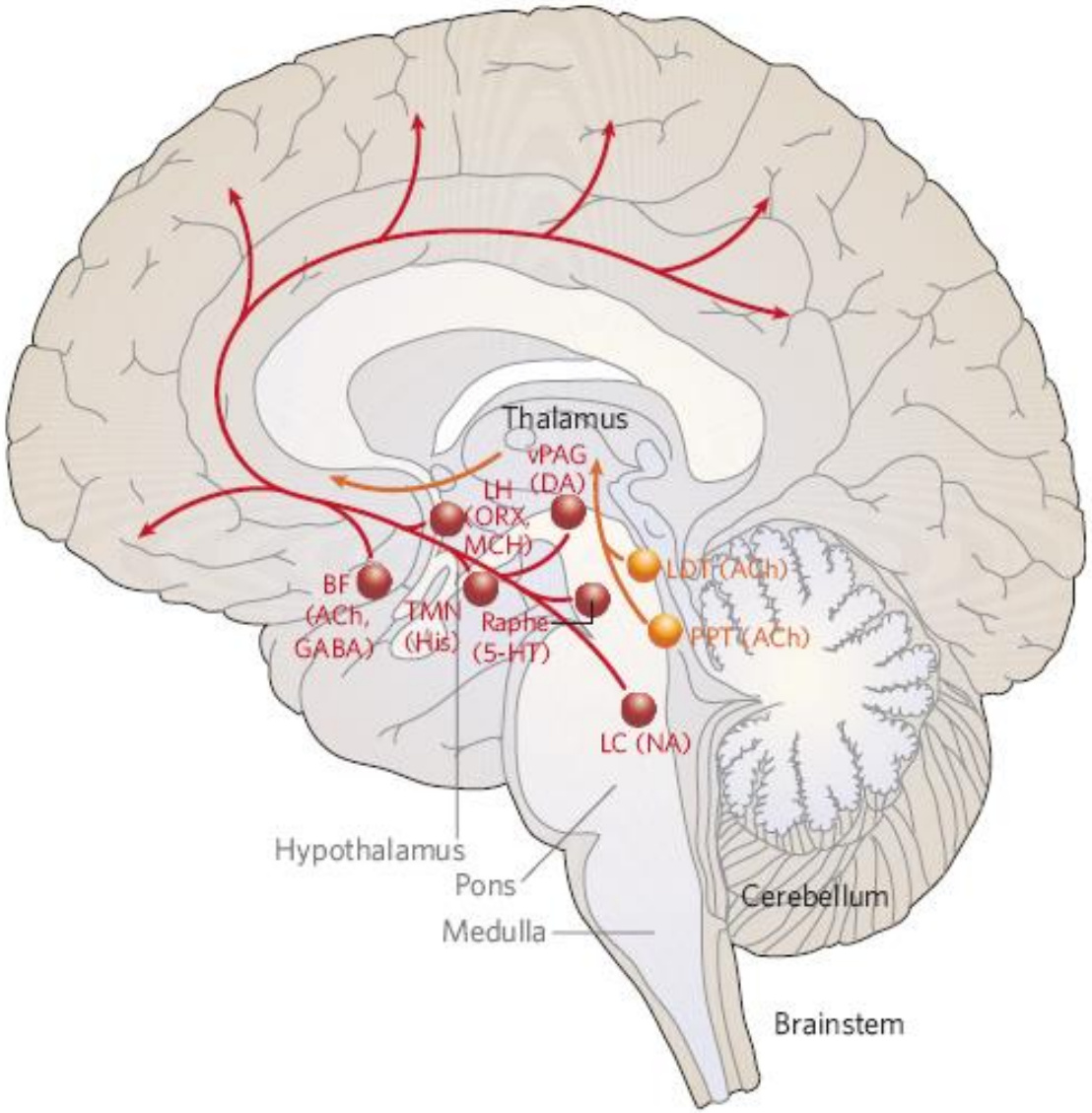
- Entran en el núcleo e inhiben su expresión (feedback negativo)
- Estimulan síntesis de PAS1 (feed-forward positivo)
- Aumentan actividad de genes regulados

## Genes "río abajo"

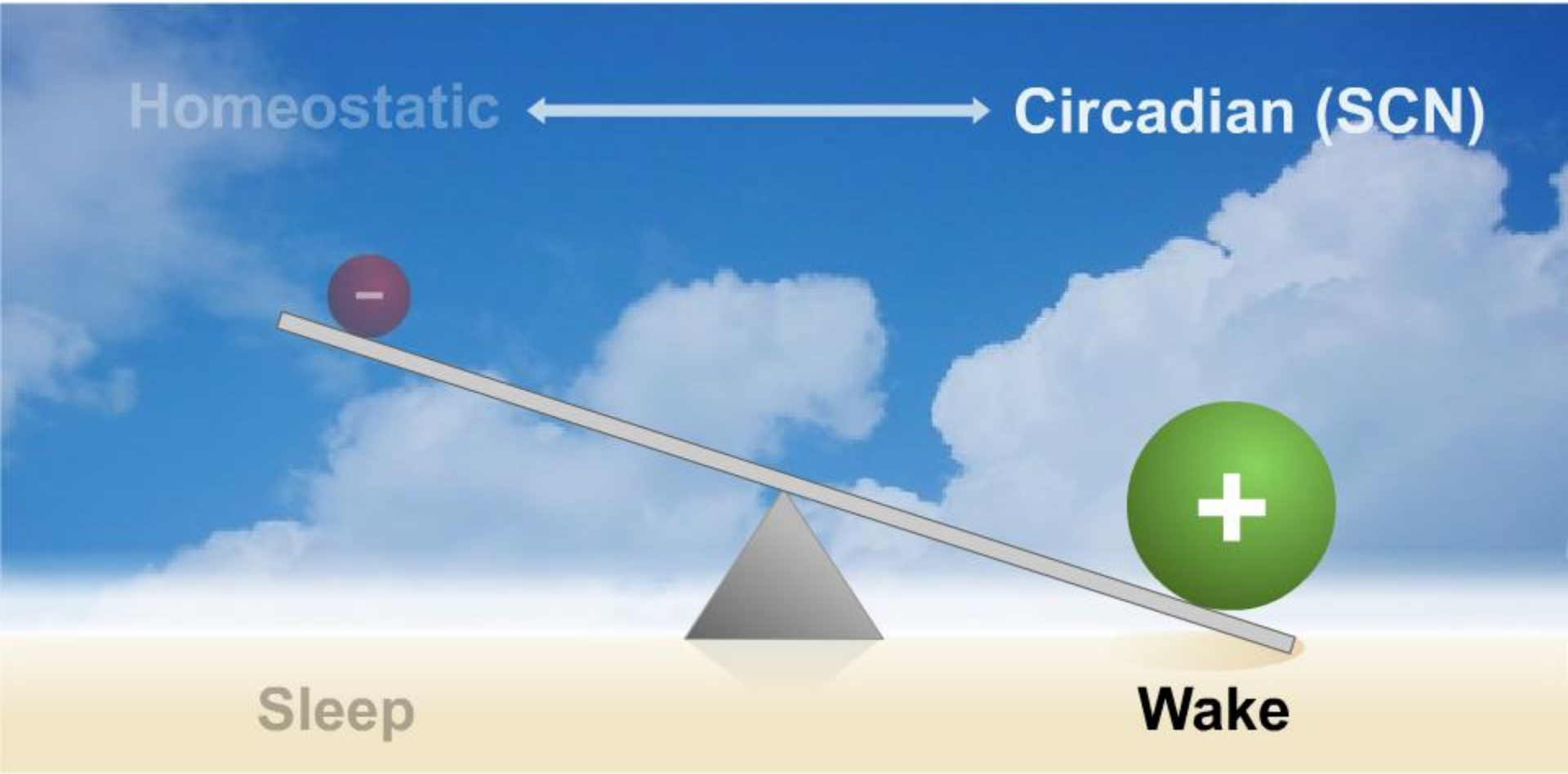


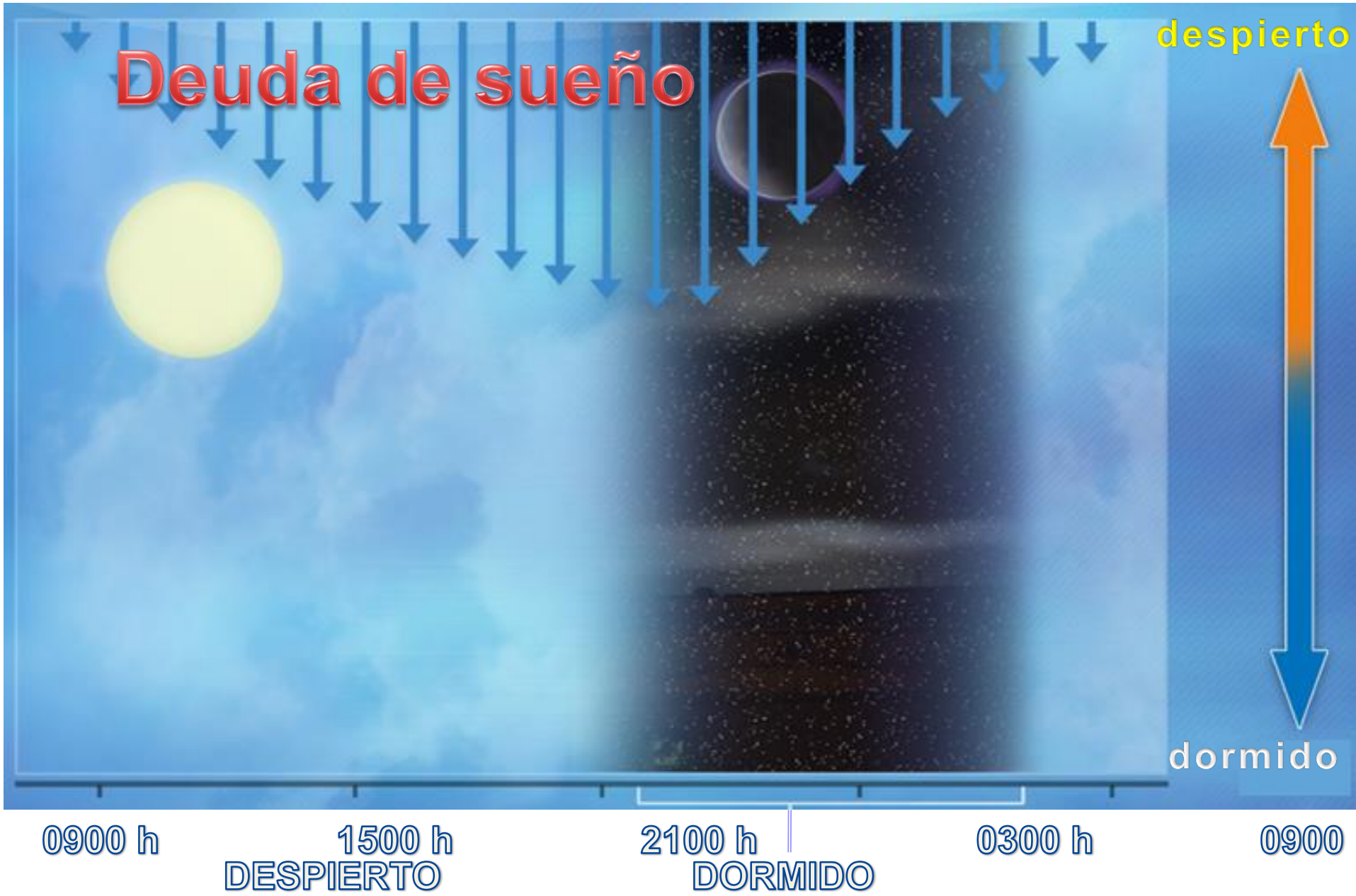


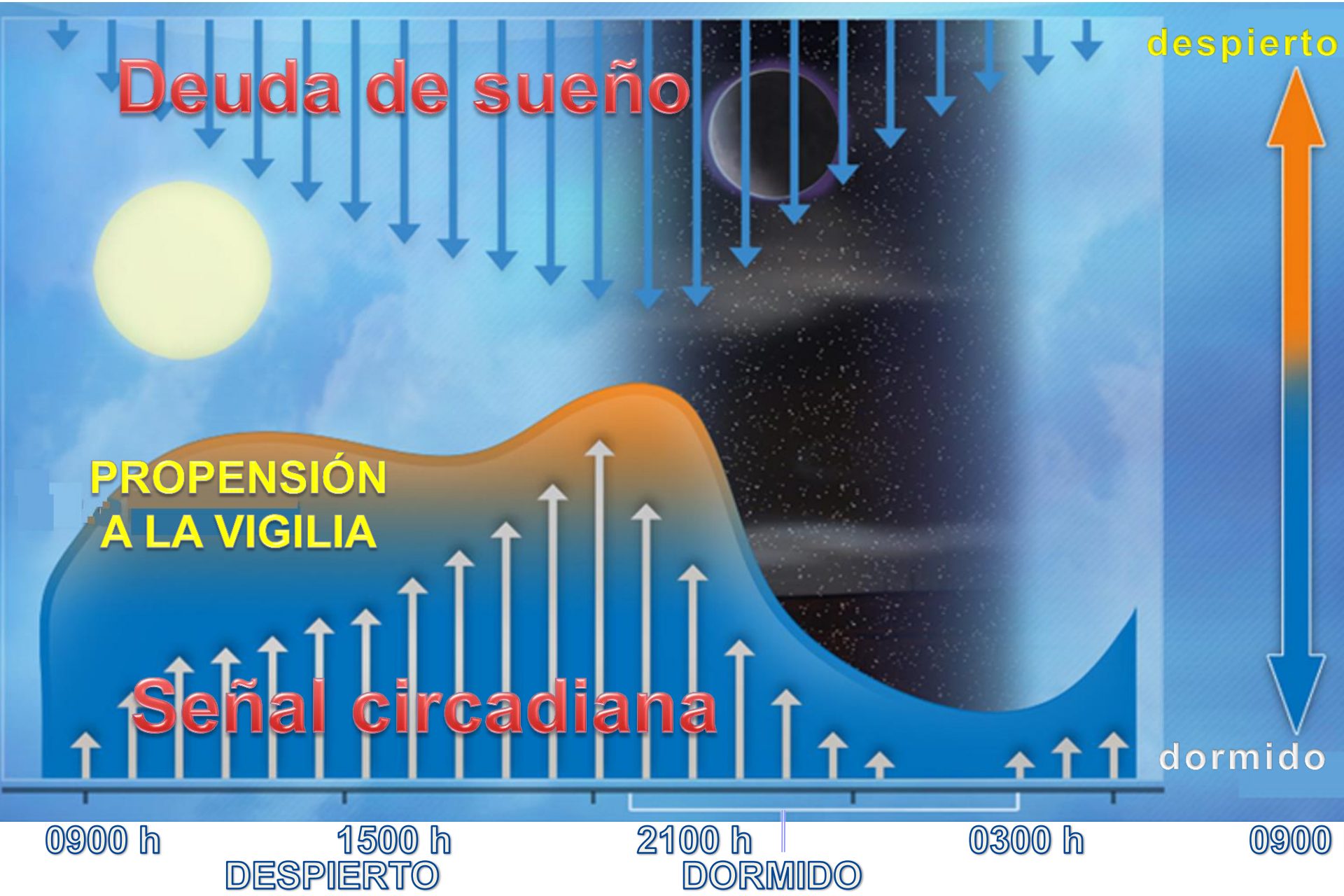

Mignot et al. Sleeping with the hypothalamus: emerging therapeutic targets for sleep disorders. *Nature Neuroscience* 5, 1071 - 1075 (2002)

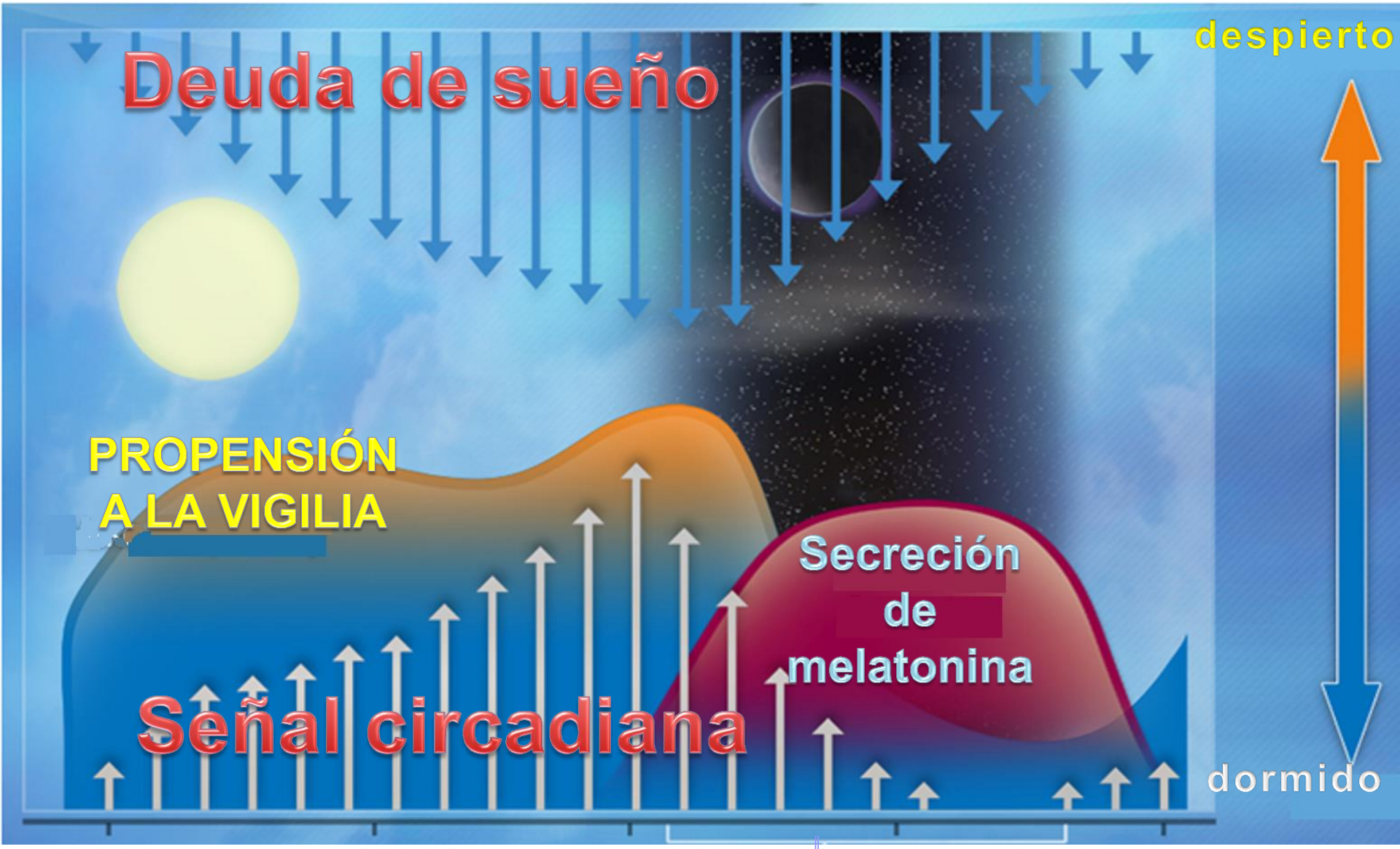


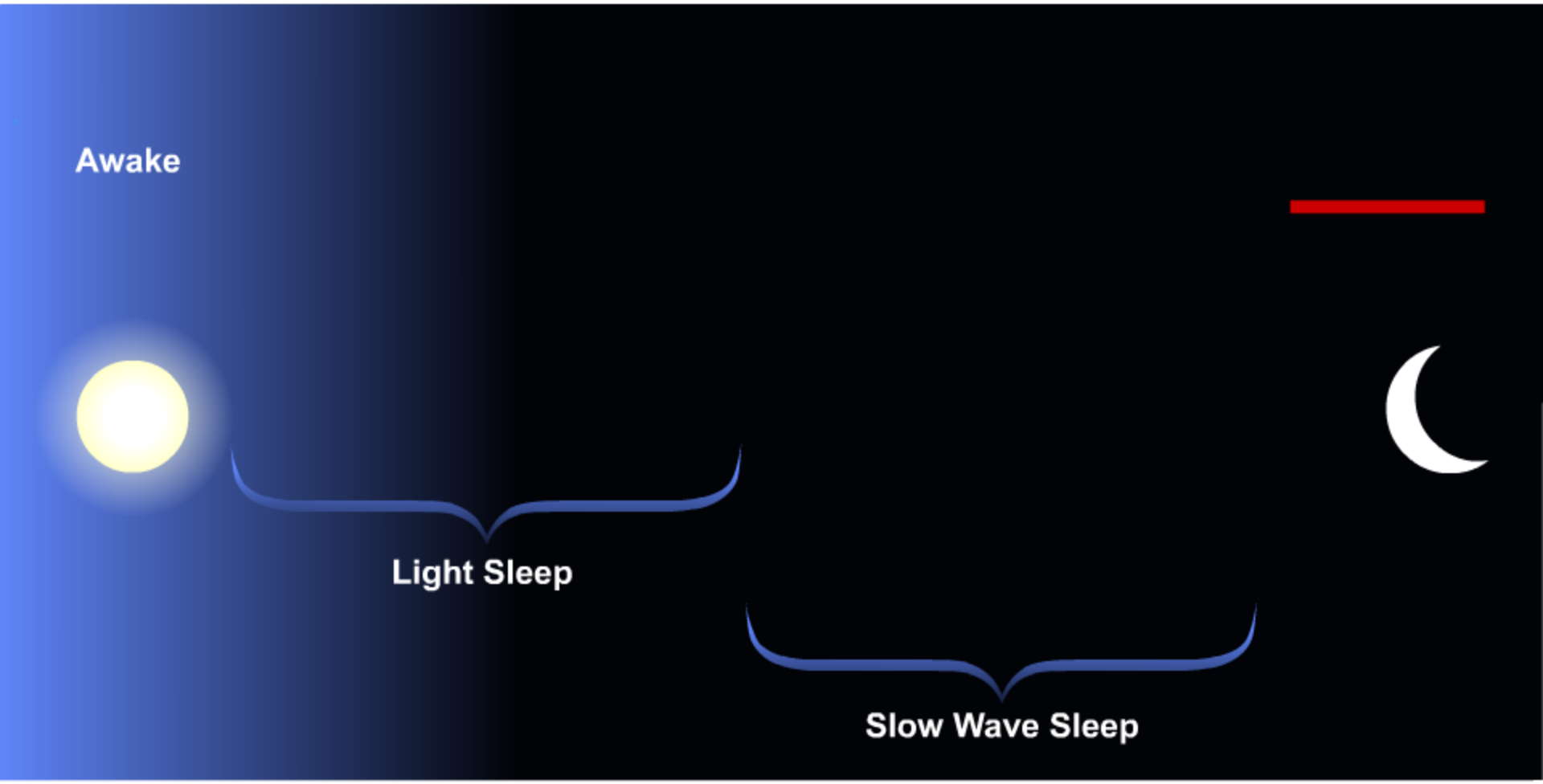

Saper et al. Hypothalamic regulation of sleep and circadian rhythms. NATURE|Vol 437|27 October 2005


Homeostatic
Circadian (SCN)
–
+
Sleep
Wake


Deuda de sueño
despierto
dormido
0900 h
1500 h
DESPIERTO
2100 h
DORMIDO
0300 h
0900


Deuda de sueño
despierto
PROPENSIÓN
A LA VIGILIA
Señal circadiana
dormido
0900 h
1500 h
DESPIERTO
2100 h
DORMIDO
0300 h
0900


Deuda de sueño
despierto
PROPENSIÓN
A LA VIGILIA
Secreción
de
melatonina
Señal circadiana
dormido
0900 h
1500 h
DESPIERTO
2100 h
DORMIDO
0300 h
0900


Awake
Light Sleep
Slow Wave Sleep


Vivimos en Tres Estados Fisiológicos
Sistema para-simpático
Inmunidad celular
↓PA
GH, insulina, leptina
Anorexia
Vigilia
Sueño Lento
Sueño REM
76 años
55 años
15 años
6 años
Sistema simpático
Inmunidad humoral
hipercoagulabilidad
vasoconstricción
Ingesta de alimentos
Parálisis somática y desregulación autonómica
Actividad onírica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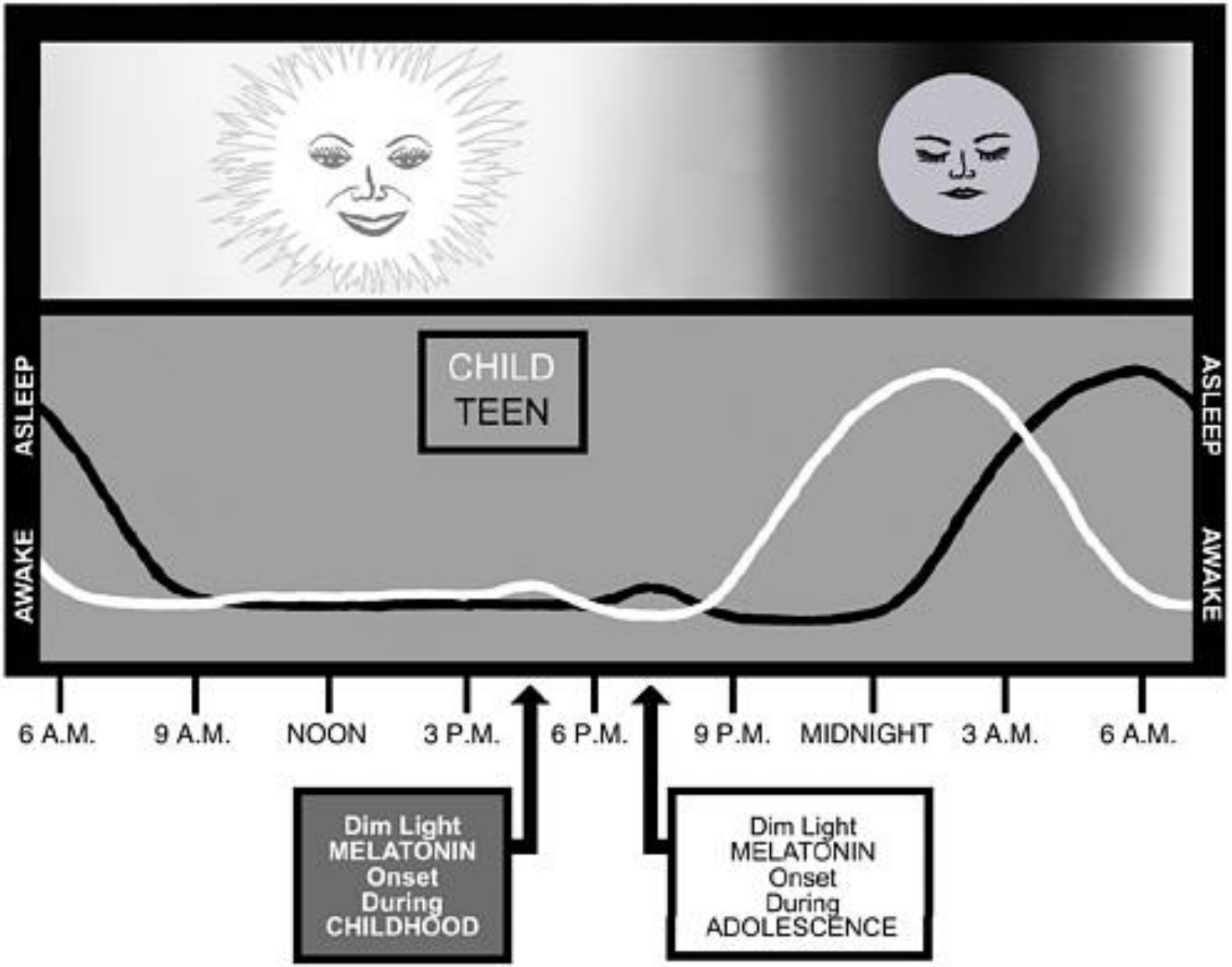
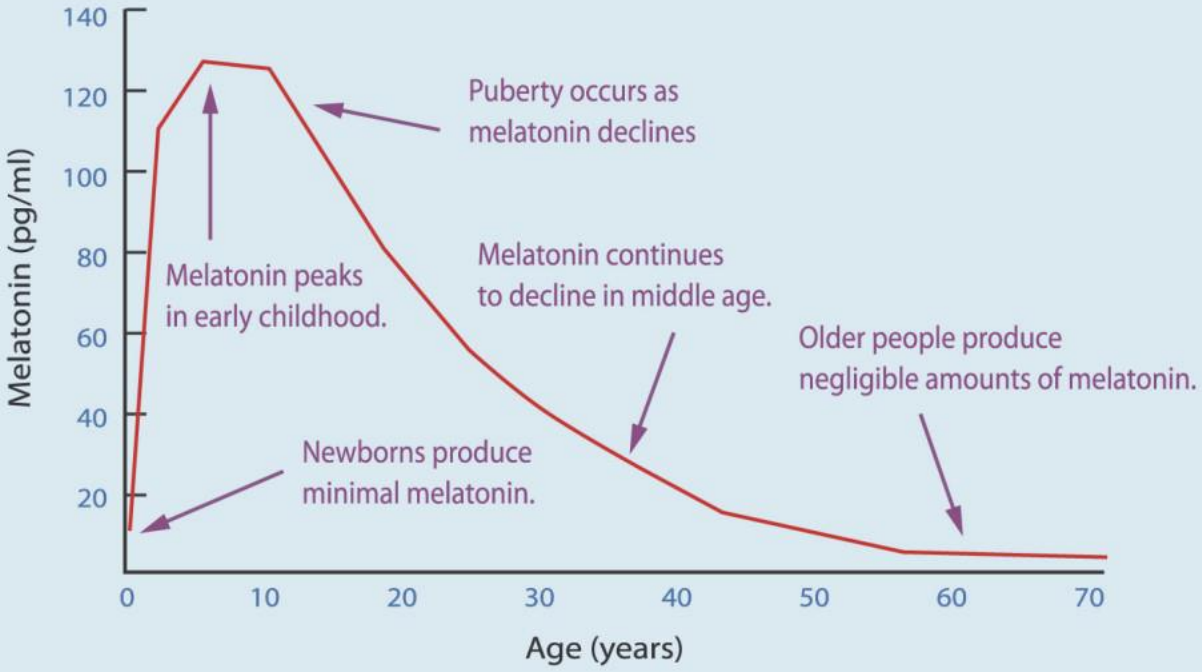
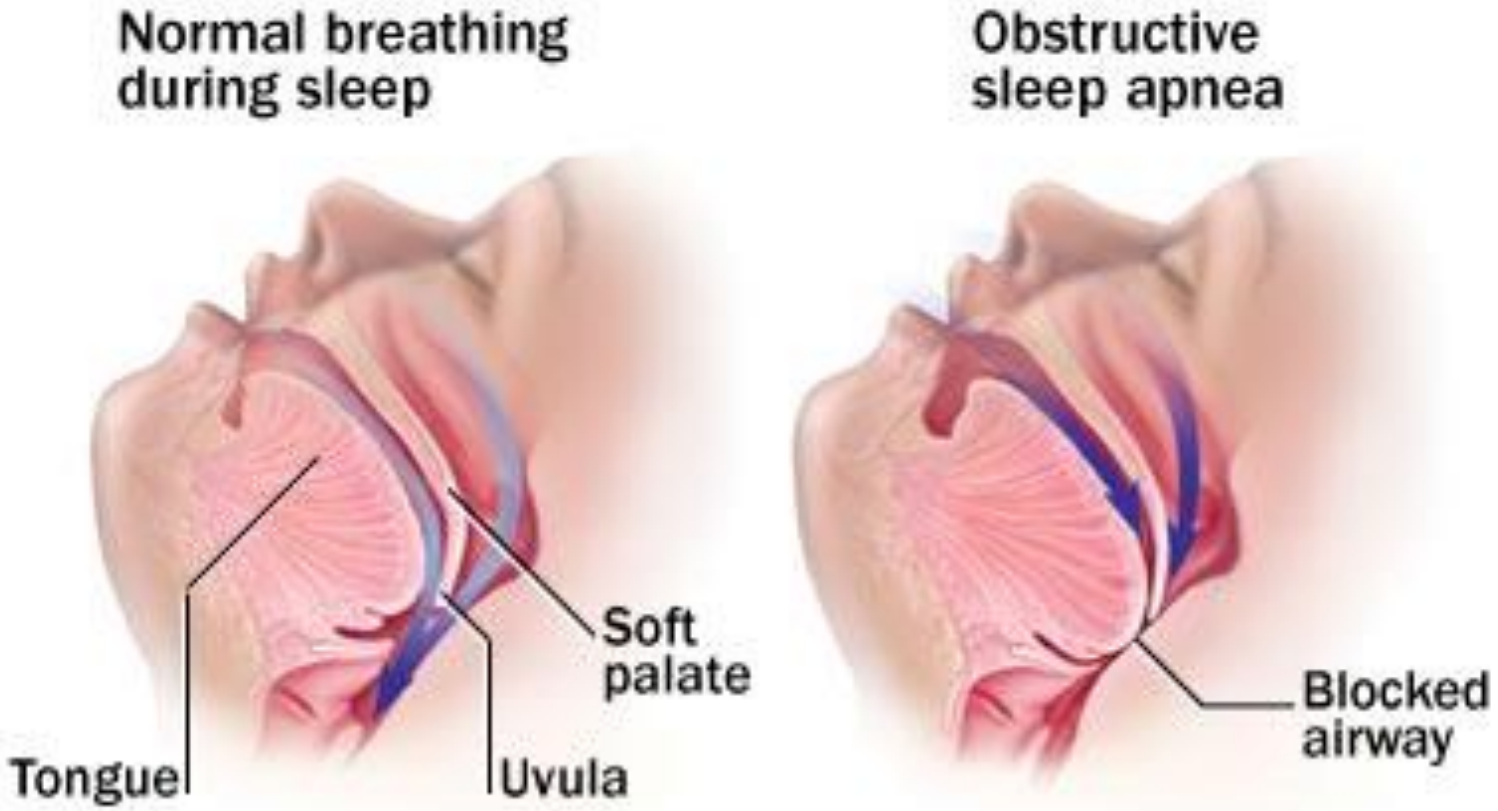
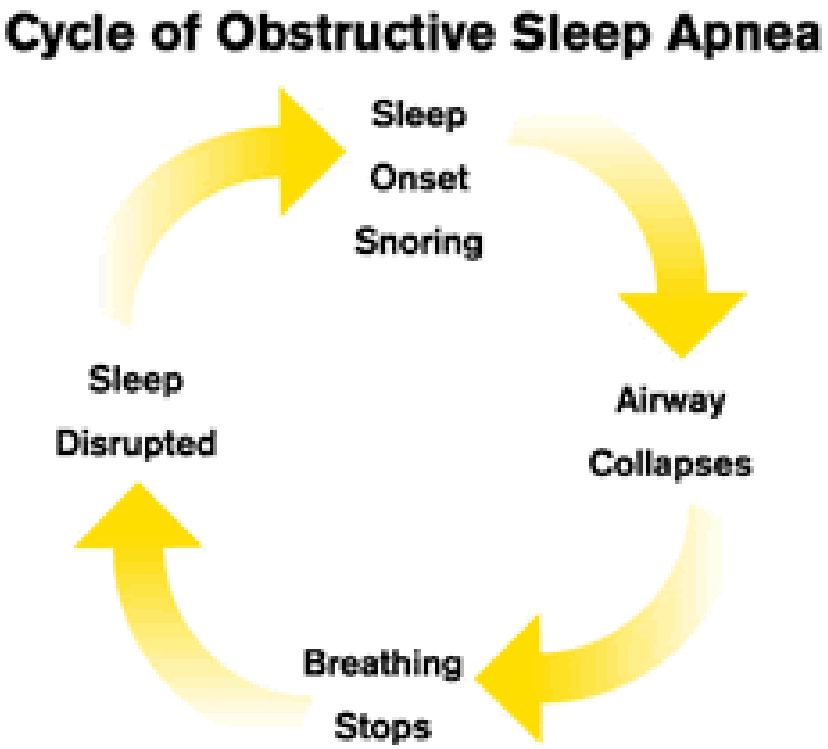
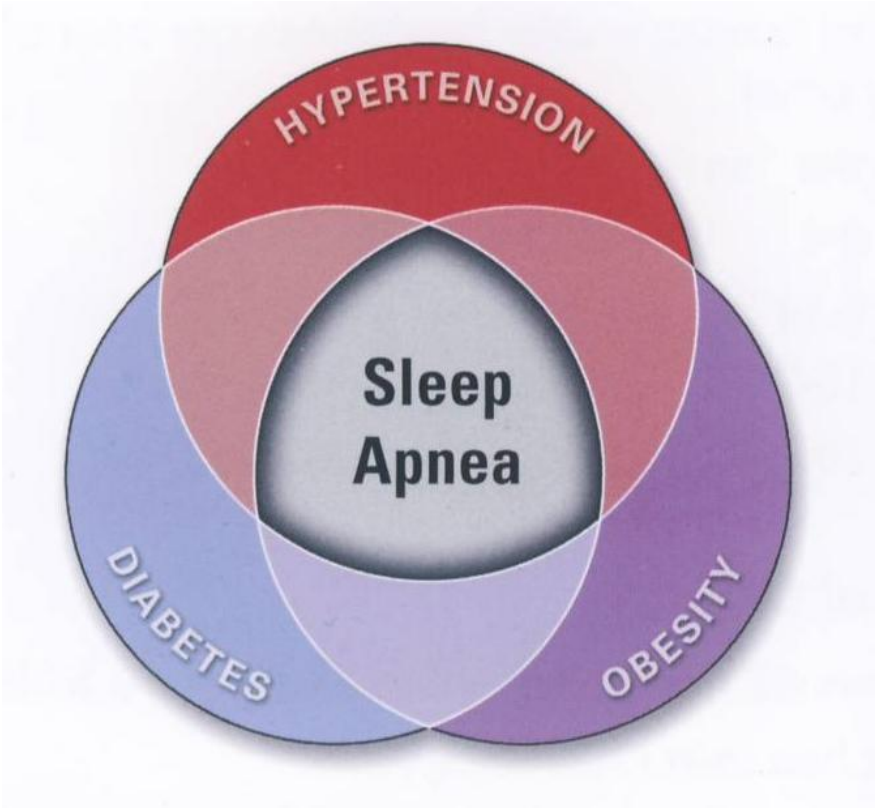
5. *Conclusión*


ASLEEP
AWAKE
CHILD
TEEN
ASLEEP
AWAKE
6 A.M.
9 A.M.
NOON
3 P.M.
6 P.M.
9 P.M.
MIDNIGHT
3 A.M.
6 A.M.
Dim Light
MELATONIN
Onset
During
CHILDHOOD
Dim Light
MELATONIN
Onset
During
ADOLESCENCE


Melatonin (pg/ml)
140
120
100
80
60
40
20
0
10
20
30
40
50
60
70
Age (years)
Puberty occurs as melatonin declines
Melatonin peaks in early childhood.
Melatonin continues to decline in middle age.
Older people produce negligible amounts of melatonin.
Newborns produce minimal melatonin.




Cycle of Obstructive Sleep Apnea
Sleep
Onset
Snoring
Airway
Collapses
Breathing
Stops
Sleep
Disrupted


HYPERTENSION
Sleep
Apnea
DIABETES
OBESITY

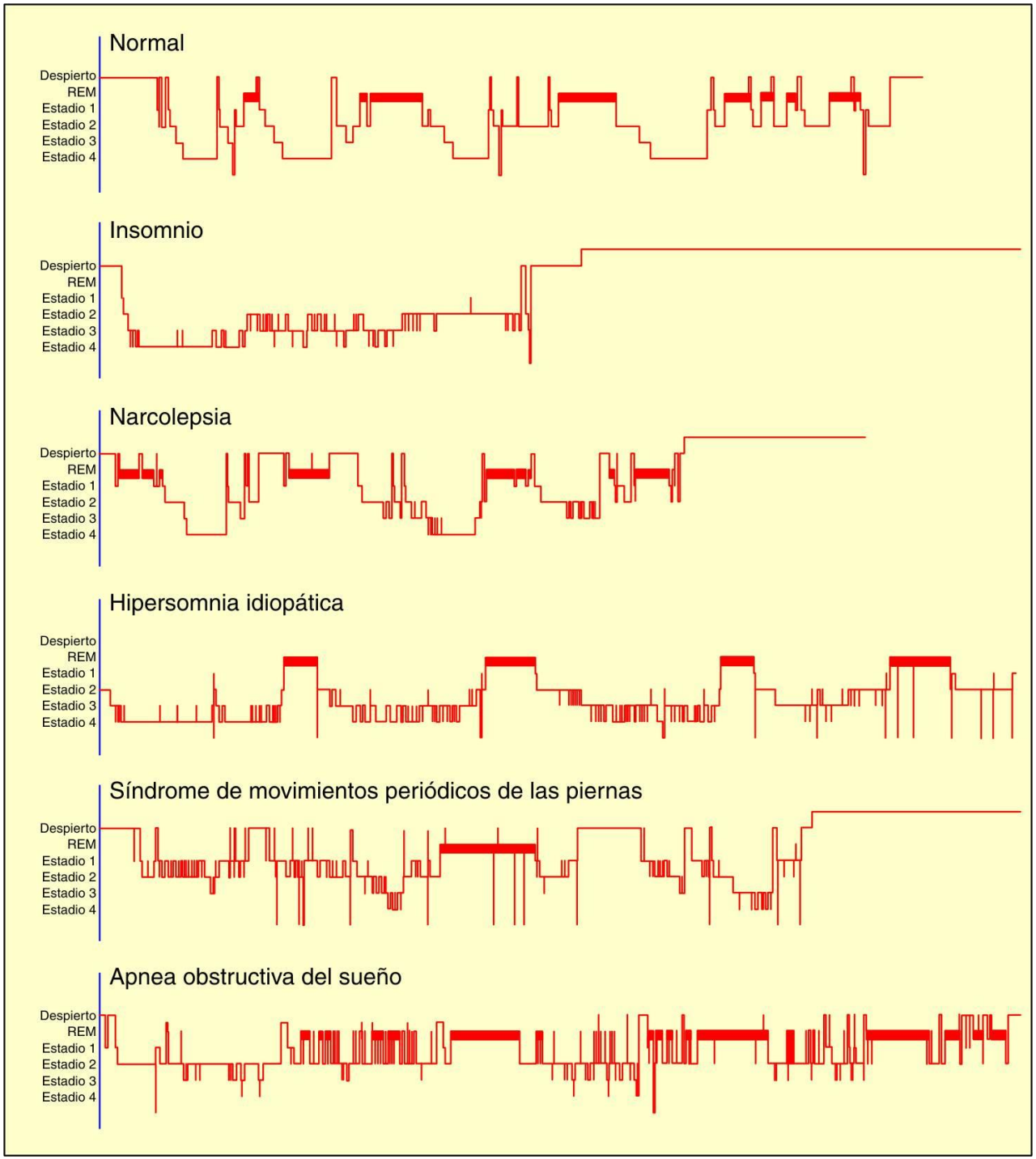

Normal
Despierto
REM
Estadio 1
Estadio 2
Estadio 3
Estadio 4
Insomnio
Despierto
REM
Estadio 1
Estadio 2
Estadio 3
Estadio 4
Narcolepsia
Despierto
REM
Estadio 1
Estadio 2
Estadio 3
Estadio 4
Hipersomnia idiopática
Despierto
REM
Estadio 1
Estadio 2
Estadio 3
Estadio 4
Síndrome de movimientos periódicos de las piernas
Despierto
REM
Estadio 1
Estadio 2
Estadio 3
Estadio 4
Apnea obstructiva del sueño
Despierto
REM
Estadio 1
Estadio 2
Estadio 3
Estadio 4

**TABLE 1**

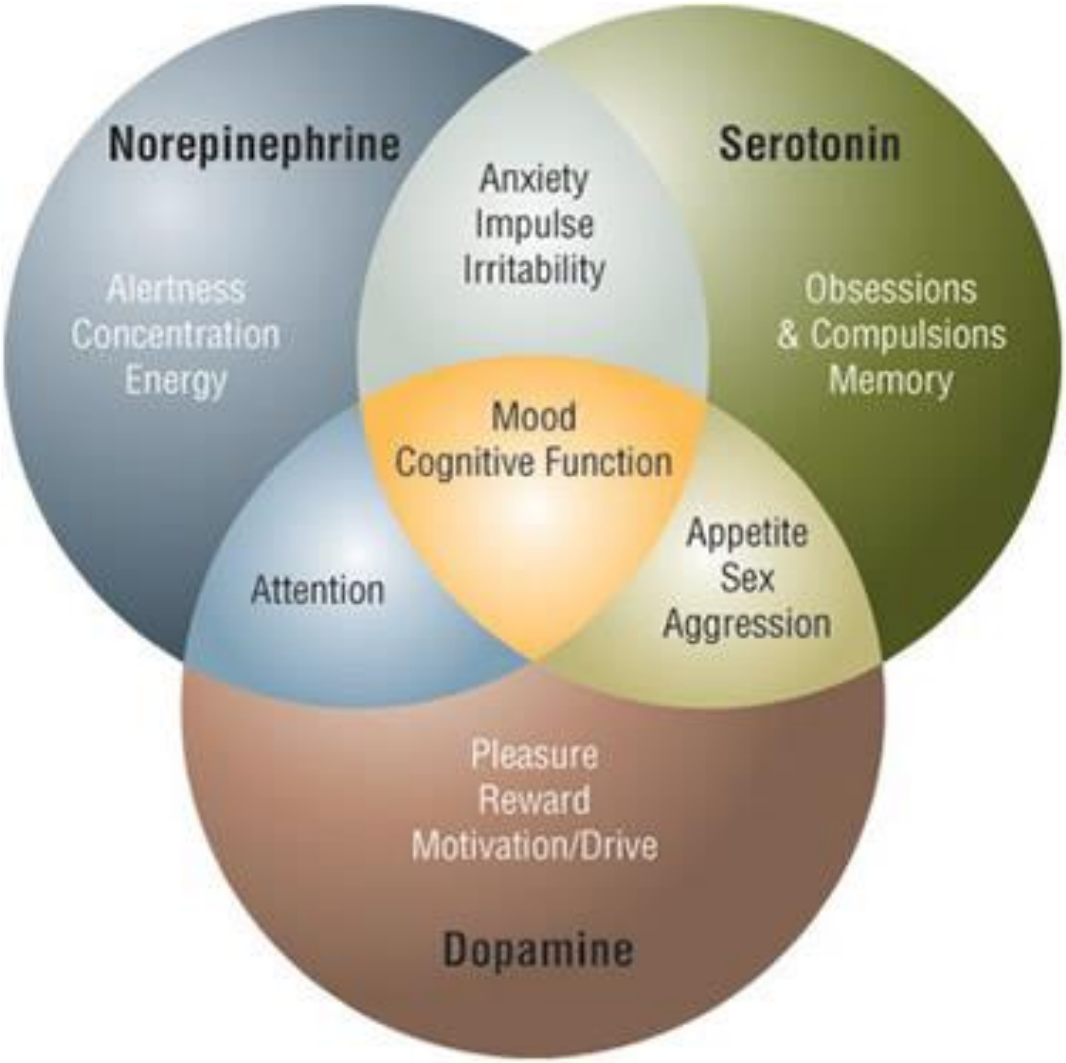
*DSM-IV-TR Diagnoses Listing Sleep Disturbance as a Criterion (Excluding the Sleep Disorders Section; American Psychiatric Association, 2000)*

| Diagnosis | DSM-IV-TR criteria |
|---|---|
| Separation anxiety disorder | Persistent reluctance or refusal to go to sleep without being near a major attachment figure or to sleep away from home* |
| | Repeated nightmares involving the theme of separation** |
| Alcohol withdrawal | Insomnia** |
| Amphetamine withdrawal | Insomnia or hypersomnia** |
| Caffeine intoxication | Insomnia** |
| Cocaine withdrawal | Insomnia or hypersomnia** |
| Nicotine withdrawal | Insomnia** |
| Opioid withdrawal | Insomnia** |
| Sedative, hypnotic, or anxiolytic withdrawal | Insomnia** |
| Major depressive disorder | Insomnia or hypersomnia nearly every day** |
| Dysthymic disorder | Insomnia or hypersomnia** |
| Bipolar disorder | Manic or hypomanic episode = decreased need for sleep** |
| | Depressive episode = insomnia or hypersomnia** |
| Posttraumatic stress disorder | Recurrent distressing dreams of the event** |
| | Difficulty falling or staying asleep** |
| Acute stress disorder | Reexperiencing of the traumatic event in dreams** |
| | Difficulty sleeping** |
| Generalized anxiety disorder | Sleep disturbance (difficulty falling or staying asleep, or restless unsatisfying sleep)** |
| Diagnoses listed in the DSM-IV-TR as warranting further study | |
| Postconcussional disorder | Disordered sleep** |
| Premenstrual dysphoric disorder | Hypersomnia or insomnia** |
| Minor depressive disorder | Insomnia or hypersomnia nearly every day** |
| Mixed anxiety-depressive disorder | Sleep disturbance (difficulty falling } asleep or restless unsatisfying sleep)** |

**Note.** *= symptom *must* be present, **= symptom is one of a *choice* of symptoms that must be present.


Harvey A. **Insomnia, Psychiatric Disorders, and the Transdiagnostic Perspective.** Current Directions in Psychological Science 2008 17: 299-303.

Harvey A. et al. **Sleep disturbance as transdiagnostic: Consideration of neurobiological mechanisms .** Clinical Psychology Review 31 (2011) 225–235.




Lanni C. et al. Depression and antidepressants: molecular and cellular aspects Cell. Mol. Life Sci. (2009) 66:2985–3008

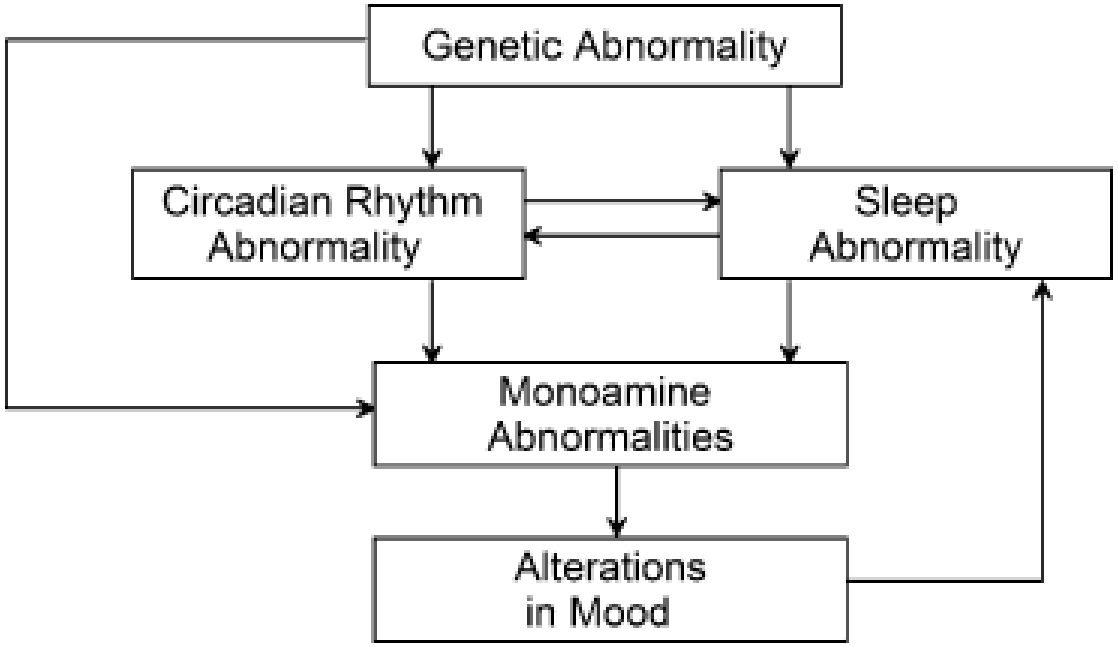
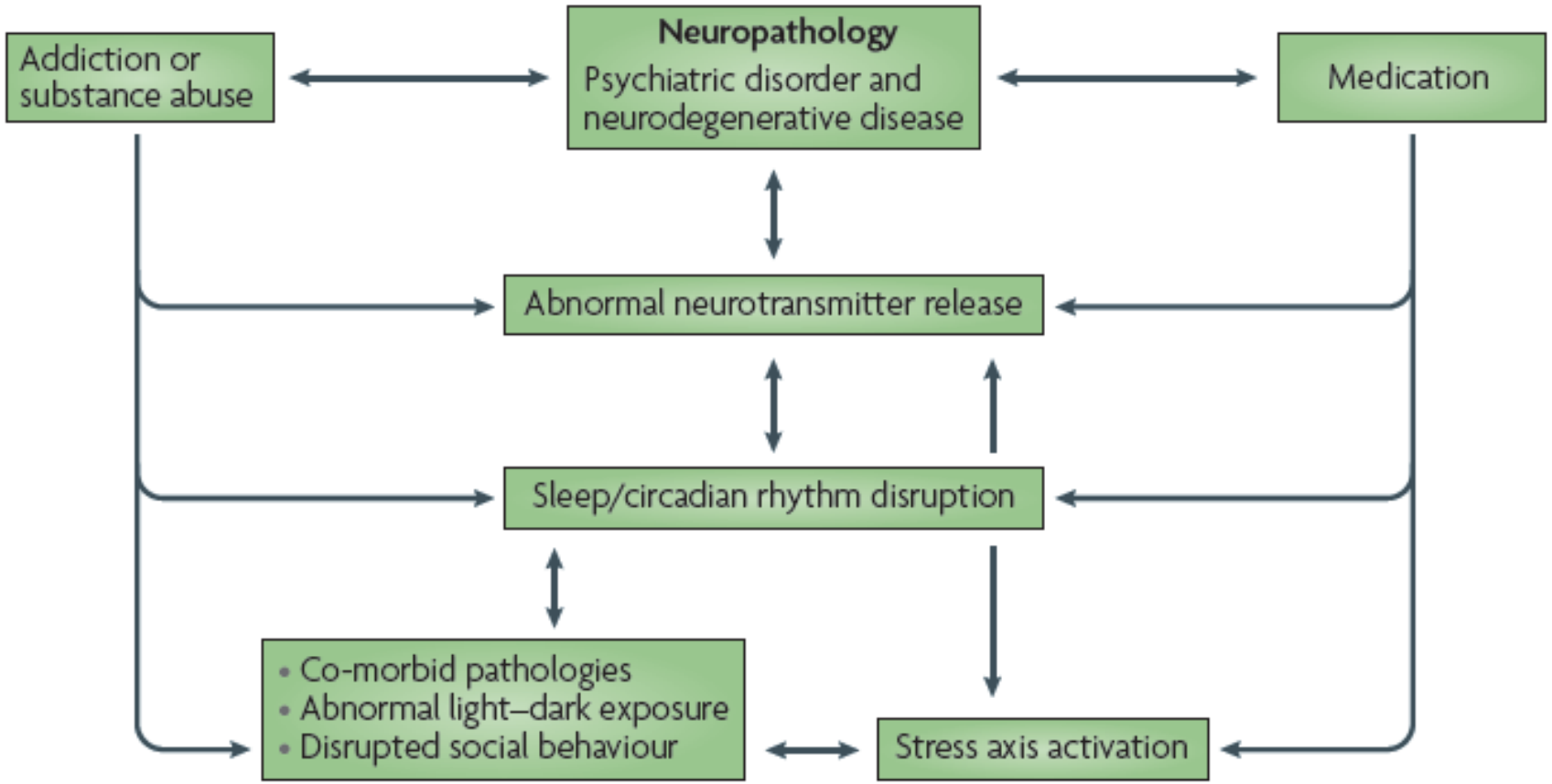



Fig. 3. Bidirectional relationships between circadian rhythms, sleep and mood. It is proposed that disturbed circadian rhythm regulation impacts on sleep rhythms to produce changes in monoamine regulation of mood. The altered mood can then influence sleep.

Pandi-Perumal et al. Bidirectional communication between sleep and circadian rhythms and its implications for depression: Lessons from agomelatine. Progress in Neurobiology 88 (2009) 264–271




Wulf et al. Sleep and circadian rhythm disruption in psychiatric and neurodegenerative disease. Nature Review Neuroscience Volume 11 | August 2010 |

# Un mundo cambiado…

**1960** **Duración del sueño: 8 h diarias**

vigilia

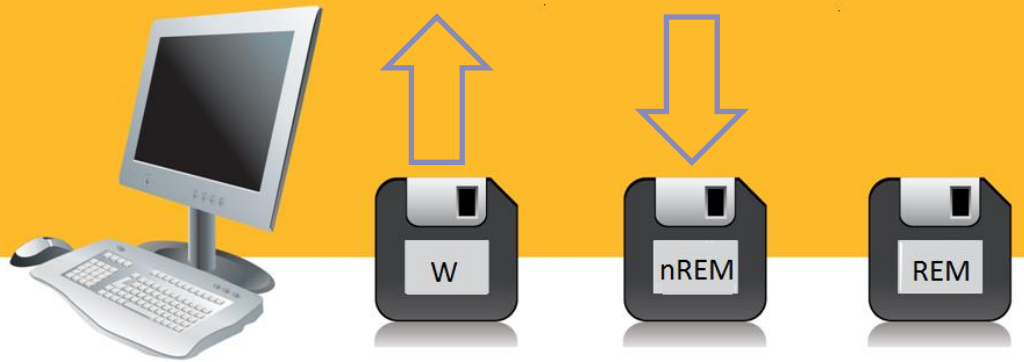
Sueño lento

Sueño REM


76 años 50 años 20 años 6 años

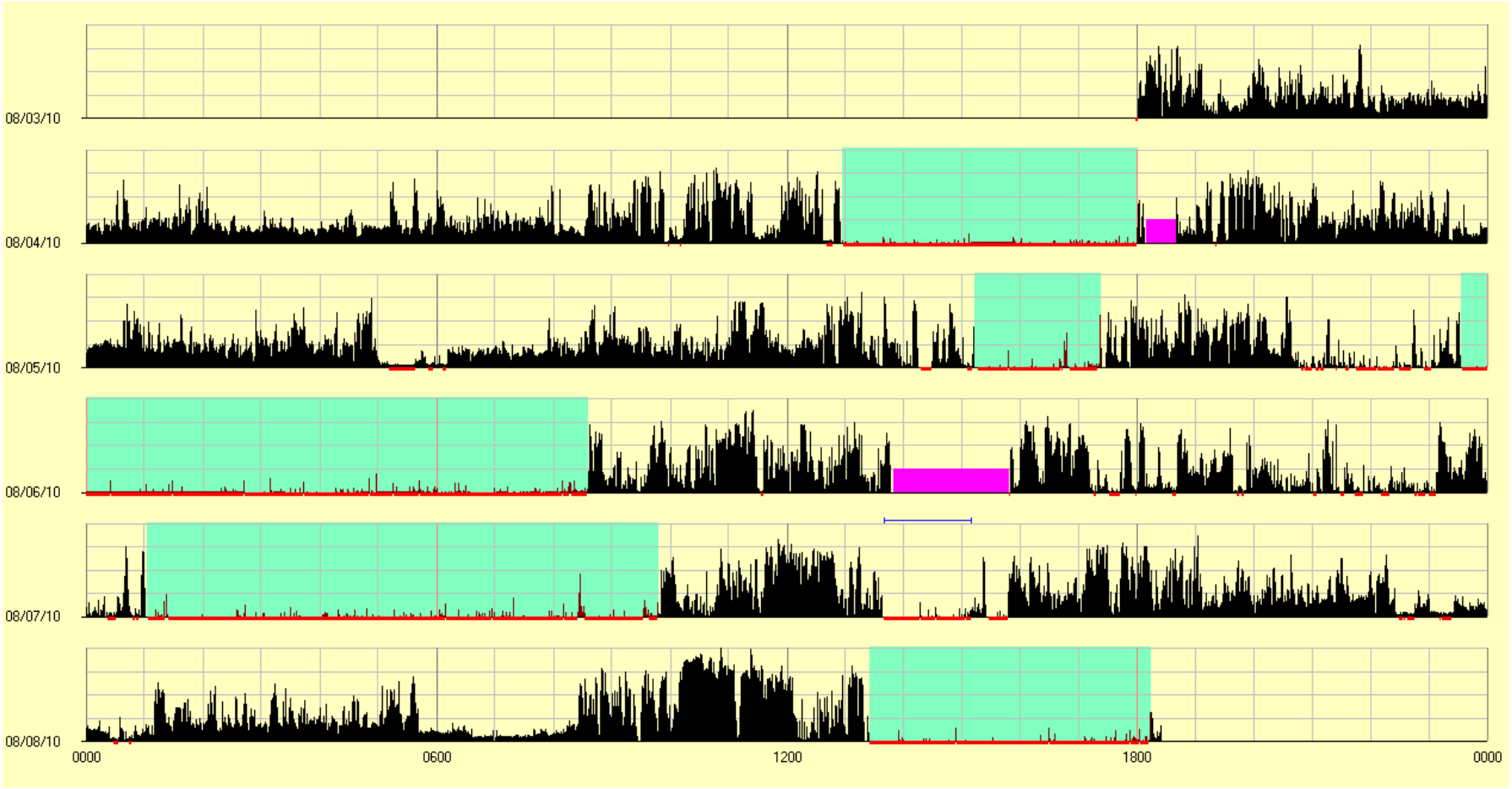
**Sociedad 24/7**

**2013** **Duración del sueño: 6 h diarias**




76 años **55 años** **15 años** 6 años

# Actigrafía: conductor de larga distancia

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http://dx.doi.org/xxxxxxxxxxxxxxx

# Sleep and Quality of Life in Urban Poverty: The Effect of a Slum Housing Upgrading Program

Guido Simonelli[1]; Yvan Leanza, PhD[2]; Alexandra Boilard, BA[2]; Martín Hyland[1]; Jura Augustinavicius, BA[3,4]; Daniel P. Cardinali, MD, PhD[1,5]; Annie Vallières, PhD[2]; Daniel Pérez-Chada, MD[6]; Daniel E. Vigo, MD, PhD[1,5]

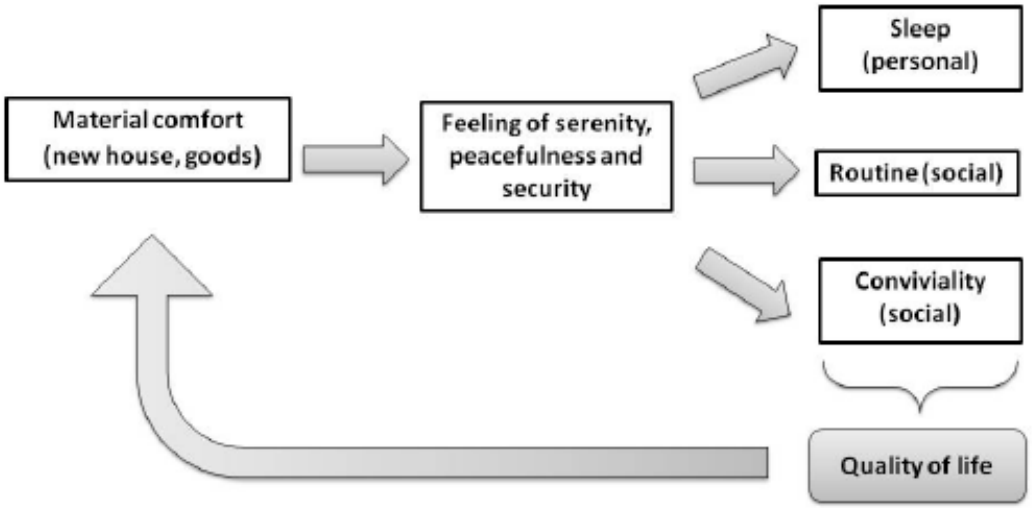
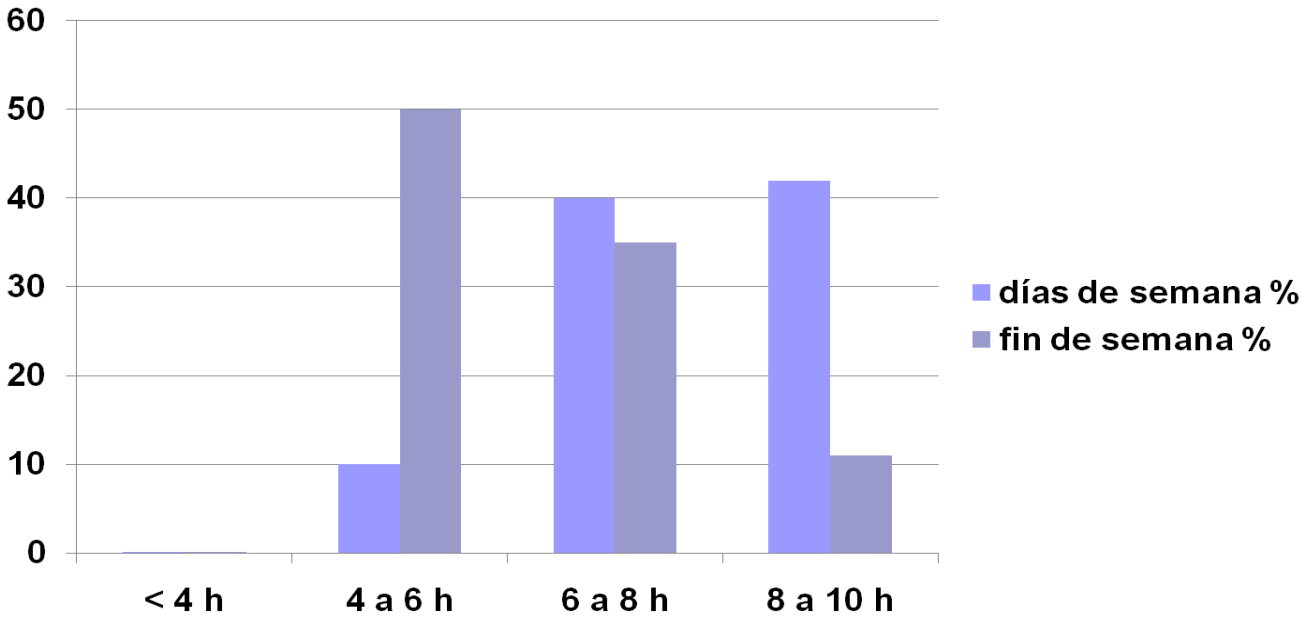



**Figure 2**—The serenity cycle ("El ciclo tranquilo"). Improved housing conditions provoke feelings of safety and serenity on the participants that affects on sleep, social interactions and daily routine. These changes affect quality of life, motivating them to move on.

# A Multi-Step Pathway Connecting Short Sleep Duration to Daytime Somnolence, Reduced Attention, and Poor Academic Performance: An Exploratory Cross-Sectional Study in Teenagers

Santiago Perez-Lloret, M.D., Ph.D.[1,2]; Alejandro J. Videla, M.D.[3]; Alba Richaudeau, M.D.[3]; Daniel Vigo, M.D.[1]; Malco Rossi, M.D.[4]; Daniel P. Cardinali, M.D., Ph.D.[1]; Daniel Perez-Chada, M.D.[3]; On behalf of the Buenos Aires Sleep Disorders Study Group

*Journal of Clinical Sleep Medicine, Vol. 9, No. 5, 2013*

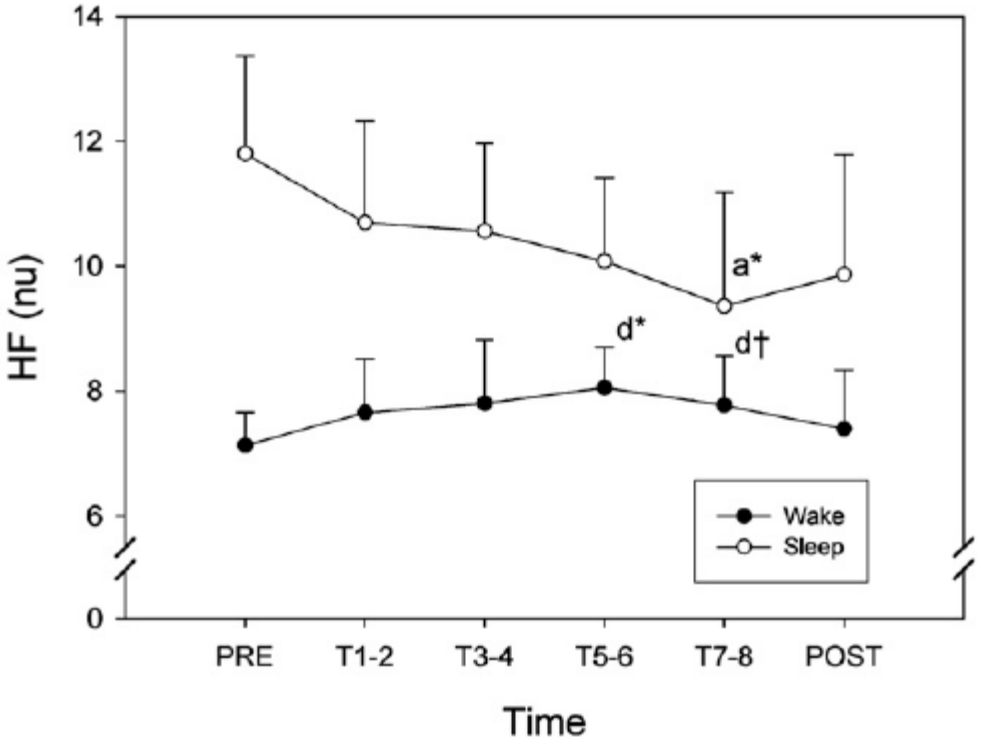


# Circadian Rhythm of Autonomic Cardiovascular Control During Mars500 Simulated Mission to Mars

*Aviation, Space, and Environmental Medicine*

*Vol. 84, No. 9 • September 2013*

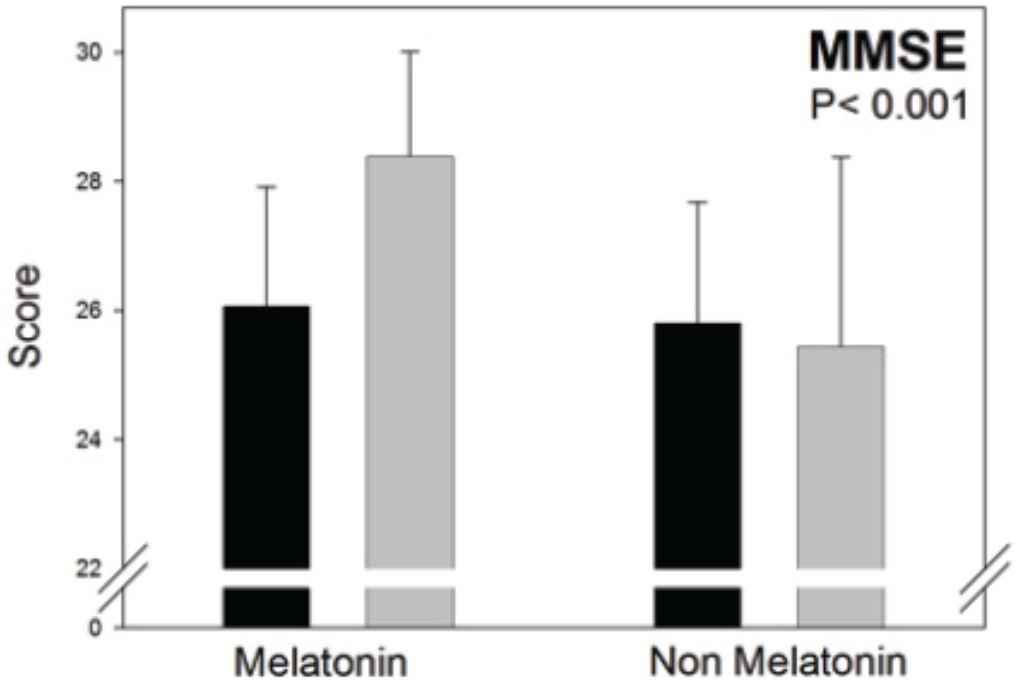
Daniel E. Vigo, Francis Tuerlinckx, Barbara Ogrinz, Li Wan, Guido Simonelli, Evgeny Bersenev, Omer Van den Bergh, and André E. Aubert



# Therapeutic application of melatonin in mild cognitive impairment

Am J Neurodegener Dis 2012;1(3):280-291

Daniel P Cardinali[1], Daniel E Vigo[1], Natividad Olivar[2], María F Vidal[1], Analía M Furio[2], Luis I Brusco[2]



# Sleep Habits, Alertness, Cortisol Levels, and Cardiac Autonomic Activity in Short-Distance Bus Drivers

*Joaquín J. Diez, MD, Daniel E. Vigo, MD, PhD, Santiago Pérez Lloret, MD, PhD, Stephanie Rigters, MD, Noelia Role, BSc, Daniel P. Cardinali, MD, PhD, and Daniel Pérez Chada, MD*

*JOEM* • Volume 53, Number 7, July 2011

**Table 3.** Sleep Questionnaires and Actigraphy

| | Morning Shift (n = 16) | Afternoon Shift (n = 31) | Total (n = 47) | *P* |
|---|---|---|---|---|
| Actigraphy | | | | |
| Bedtime (hh:mm) | 23:20 ± 00:17 | 01:04 ± 00:11 | 00:29 ± 00:12 | <0.001 |
| Waking time (hh:mm) | 05:54 ± 00:16 | 08:37 ± 00:13 | 07:43 ± 00:16 | <0.001 |
| Sleep onset (hh:mm) | 23:48 ± 00:17 | 01:34 ± 00:11 | 00:58 ± 00:12 | <0.001 |
| Sleep offset (hh:mm) | 05:44 ± 00:17 | 08:28 ± 00:13 | 07:33 ± 00:16 | <0.001 |
| TIB (min) | 397 ± 20 | 450 ± 9 | 432 ± 10 | 0.010 |
| TST (min) | 323 ± 18 | 381 ± 9 | 362 ± 10 | 0.003 |
| TST < 7 hs | 15 (100%) | 30 (100%) | 45 (100%) | NA |
| WASO (min) | 38 ± 5 | 36 ± 3.0 | 37 ± 3 | 0.719 |
| SP (%) | 82.7 ± 1.5 | 84.4 ± 1.1 | 83.8 ± 0.9 | 0.387 |
| SE (%) | 90.6 ± 0.9 | 91.3 ± 0.7 | 91.1 ± 0.5 | 0.556 |
| SE < 90% | 6 (40%) | 9 (30%) | 15 (33.3%) | 0.513 |
| SOL (min) | 25 ± 4 | 30 ± 3 | 28 ± 2 | 0.390 |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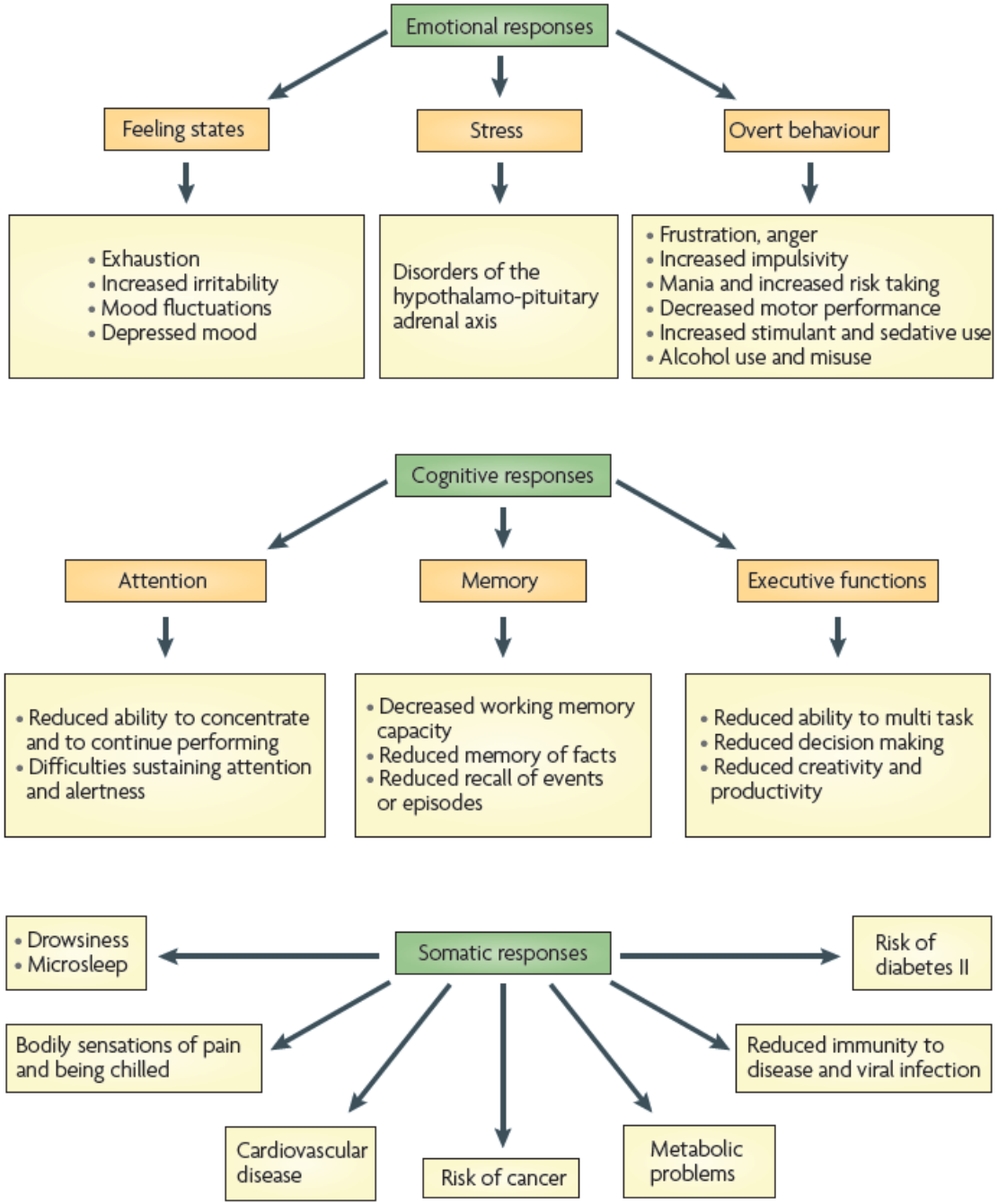
Emotional responses
Feeling states
Stress
Overt behaviour
• Exhaustion
• Increased irritability
• Mood fluctuations
• Depressed mood
Disorders of the hypothalamo-pituitary adrenal axis
• Frustration, anger
• Increased impulsivity
• Mania and increased risk taking
• Decreased motor performance
• Increased stimulant and sedative use
• Alcohol use and misuse
Cognitive responses
Attention
Memory
Executive functions
• Reduced ability to concentrate and to continue performing
• Difficulties sustaining attention and alertness
• Decreased working memory capacity
• Reduced memory of facts
• Reduced recall of events or episodes
• Reduced ability to multi task
• Reduced decision making
• Reduced creativity and productivity
Somatic responses
• Drowsiness
• Microsleep
Risk of diabetes II
Bodily sensations of pain and being chilled
Reduced immunity to disease and viral infection
Cardiovascular disease
Risk of cancer
Metabolic problems

# Terapéutica basada en principios fisiológicos

- Tratamiento de patologías / situaciones de base.
- Higiene del sueño, alimentación y actividad física.
- Terapia cognitivo conductual.
- Luz y melatonina.
- Hipnóticos.

# Conclusión

468. Lo que se ha de tener por cosa muy mala es que el enfermo no pueda dormir ni de día ni de noche, porque este desvelo dimana o de dolor o de trabajo grande que el paciente tiene, o es significativo de perturbación de la mente.

Hipócrates

Aforismos. s.V a.C.