

VOYAGES WITHOUT INSOMNIA

A PROJECT FROM THE CENTER FOR NEUROSCIENCE AND CELL BIOLOGY (CNC) OF THE UNIVERSITY OF COIMBRA, IN COLLABORATION WITH THE PORTUGUESE SLEEP ASSOCIATION

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DAY

WE SPEND ONE THIRD OF OUR LIVES SLEEPING. BUT IT'S NOT A WASTE OF TIME! SLEEP IS ESSENTIAL FOR OUR WELL-BEING.

BUT THIS NEED CHANGES THROUGH LIFE, AND EVERYONE HAS THEIR OWN RHYTHM.

SLEEP IS REGULATED BY THE SLEEP WAVES AND THE CIRCADIAN RHYTHM -- THE SO-CALLED BIOLOGICAL CLOCK.

THE OSCILLATORY PROFILE OF SLEEP WAVES IS FOLLOWED BY THE RHYTHMIC EXPRESSION OF THE GENES THAT REGULATE THE CIRCADIAN RHYTHM (CLOCK GENES).

THESE GENES ARE RESPONSIBLE FOR SYNCHRONIZING OUR BIOLOGICAL CLOCK WITH THE SURROUNDING ENVIRONMENT, FOR EXAMPLE, THE TRANSITION BETWEEN DAY AND NIGHT.

IN 2017 THE NOBEL PRIZE OF MEDICINE AND PHYSIOLOGY WAS AWARDED TO RESEARCHERS THAT UNCOVERED THE MECHANISMS THAT CONTROL THE CIRCADIAN RHYTHM.

THE CENTRAL CLOCK IS THE MAESTRO THAT SYNCHRONIZES ALL THE PERIPHERAL CLOCKS IN THE BODY, BALANCING THE WHOLE SYSTEM.

MELANONIN IS THE HORMONE THAT TELLS US WHEN IT IS DAY OR NIGHT, AND IS PRODUCED IN THE CENTRAL CLOCK, A REGION OF THE HYPOTHALAMUS, IN THE BRAIN.

MELANONIN PRODUCTION INCREASES IN THE EVENING, AS A SIGNAL TO SLEEP, AND DECREASES AS THE NIGHT GOES ON, ULTIMATELY AS A SIGNAL TO WAKE UP.

CORTISOL

MELANONIN

HYPOTHALAMUS - SUPRACHIASMATIC NUCLEUS

NIGHT

SLEEP IS ESSENTIAL BECAUSE IT'S WHEN THE BODY RESTARTS A NEW CYCLE, PROMOTING A "CLEAN-UP" PROCESS IN THE BRAIN. SLEEP SETS THE BIOLOGICAL CLOCK, INCLUDING MEMORY CONSOLIDATION AND LEARNING ACQUIRED DURING THE DAY, AS WELL AS THE HORMONES THAT CONTROL FOOD INTAKE.

CONSOLIDATE

CLEAN

GUTS

RENEW

SKIN

MICHAEL ROSBASH

MICHAEL WARREN YOUNG

JEFFREY CONNOR HALL

World Sleep Day is an event held on the Friday before Spring Vernal Equinox. On this date it is intended to raise public's awareness for the importance of sleep in health and well-being and to alert that the quality of life of those with sleep disorders can - and should - be improved.

Sleep cycles are essential for the well-being of the body and are regulated by circadian rhythms (from the Latin, *circa* - about - + *diem* - day -). These rhythms are biological oscillations, of about 24 hours, fundamental for all cells and living beings. These oscillations are conditioned by stimuli such as light / dark, temperature, oxygen, and even exercise and eating. In addition to sleep, many of our physiological processes also vary over those 24 hours, such as hormone production or body temperature.

These cyclical variations, occurring in our body throughout the day, are synchronized with the environment and this synchronization is crucial for our health and well-being. In this way, the dysfunction of the biological clock is associated with several sleep disorders, as well as with the development of other diseases.

In 2017, the Nobel Prize in Medicine was awarded to three American researchers who study circadian rhythms, which reinforces the importance that the medical and scientific community provide to this theme. Thus, the World Sleep Society, in 2018, joins it with the slogan "Join the sleep world, preserve your rhythms to enjoy life".

The Portuguese Sleep Association (APS) and the Center for Neuroscience of the University of Coimbra (CNC) intend to mark the World Sleep Day by alerting the population to this circadian clock and the importance of attending to its rhythms to achieve a healthy life.

APS and CNC propose the challenge to everyone, to set the clock on this day, and for life, to promote better sleep for everyone.

AFTER A LONG PLANE TRIP THERE IS MISMATCH BETWEEN THE TIME OF DAY AT ARRIVAL AND DEPARTURE, CAUSING A DEREGLATION IN THE BIOLOGICAL RHYTHMS. THIS PHENOMENON IS CALLED JET-LAG.

SOMETIMES THERE MAY BE A DELAY IN PEAK MELATONIN RELEASE. THERE IS A NATURAL DELAY IN THE ACTIVE PERIOD OF THE TEENAGERS, WHICH DOES NOT OCCUR IN CHILDREN AND ADULTS.

THEREFORE, IN THE EARLY MORNING TEENAGER PRODUCTIVITY IS LOWER, WHICH SHOULD BE CONSIDERED FOR SCHOOL PLANNING.

SLEEP APNEA IS CHARACTERIZED BY RESPIRATORY INTERRUPTIONS DURING SLEEP, LEADING TO SLEEP DEPRIVATION.

AND REGULARITY IS IMPORTANT! SLEEPING A LOT ON WEEKENDS DOES NOT COMPENSATE SLEEP DEPRIVATION DURING THE WEEK.

CHANGES IN WORK SHIFTS ALSO INDUCE BIOLOGICAL RHYTHM DEREGLATION. BUT THE PROBLEM IS NOT WORKING AT NIGHT OR DURING THE DAY, BUT THE REGULARITY OF THIS ACTIVITY.

THIS DELAY COULD LEAD TO INSOMNIA THAT PROMOTES SLEEP DEPRIVATION.

SLEEP DEPRIVATION COULD ALSO BE RELATED WITH OTHER PATHOLOGIES SUCH AS NEURODEGENERATIVE DISORDERS (ALZHEIMER, MACHADO-JOSEPH, PARKINSON, HUNTINGTON), METABOLIC DISEASES, INFERTILITY, CARDIOVASCULAR DISEASE AND CANCER.

EVERYONE HAS THEIR OWN RHYTHM AND MAINTAINING REGULAR SLEEP HOURS IS AS IMPORTANT AS OTHER ASPECTS OF A HEALTHY LIFESTYLE. PRESERVE OUR RHYTHMS AND ENJOY LIFE!

WHICH IN TURN AFFECTS MEMORY, THE SYNTHESIS AND RELEASE OF HORMONES, AND WEAKENS THE IMMUNE SYSTEM, CAUSING MANY OTHER RELATED DISORDERS.

World Sleep Day

HYPOTHALAMUS - SUPRACHIASMATIC NUCLEUS

MELATONIN

DELAY

TUESDAY

WEDNESDAY

THURSDAY

FRIDAY

WORLD SLEEP DAY

