

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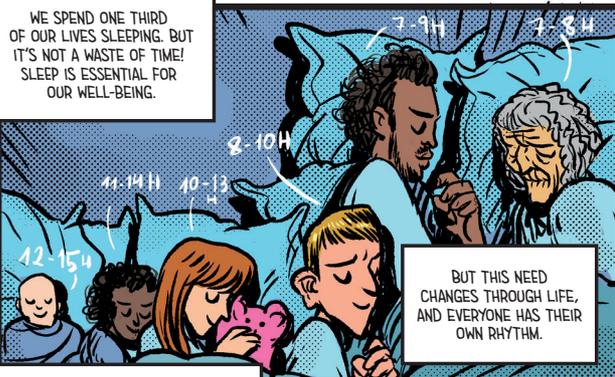
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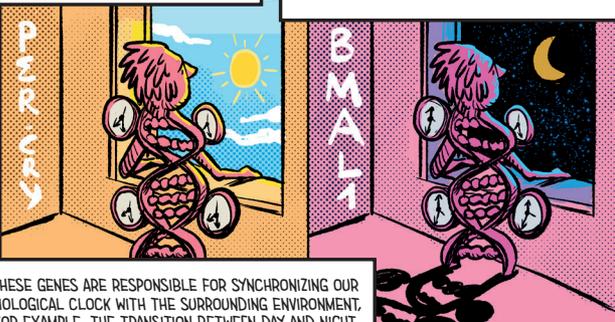
WE SPEND ONE THIRD OF OUR LIVES SLEEPING. BUT IT'S NOT A WASTE OF TIME! SLEEP IS ESSENTIAL FOR OUR WELL-BEING.



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.

THERE ARE SCIENTISTS WORLDWIDE THAT STUDY SLEEP. FOUNDED IN 1991, THE PORTUGUESE SLEEP ASSOCIATION PROMOTES RESEARCH, DEVELOPMENT AND DISSEMINATION RELATED TO SLEEP AND ITS DISORDERS.



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



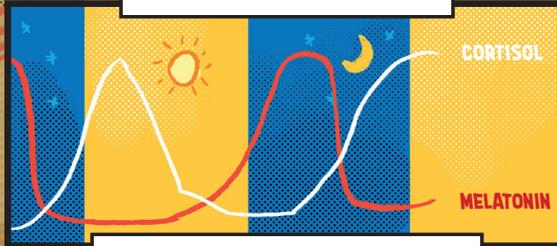
THE CENTRAL CLOCK IS THE MAESTRO THAT SYNCHRONIZES ALL THE PERIPHERAL CLOCKS IN THE BODY, BALANCING THE WHOLE SYSTEM.

MICHAEL ROSBASH

MICHAEL WARREN YOUNG

JEFFREY CONNOR HALL

MELATONIN 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.



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

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.



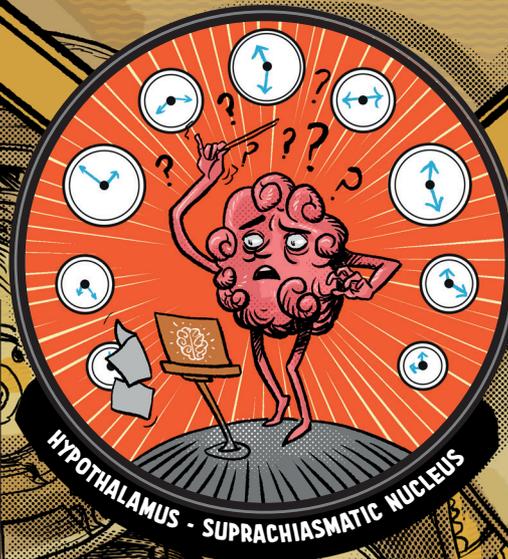
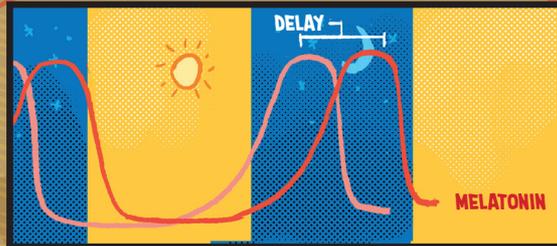
AFTER A LONG PLANE TRIP THERE IS MISMATCH BETWEEN THE TIME OF DAY AT ARRIVAL AND DEPARTURE, CAUSING A DEREGLATION IN THE BIOLOGICAL RHYTHMS. THIS PHENOMENON IS CALLED JET-LAG.



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

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.



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.

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.



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

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!

