

O Sun God, Savitr!
Thou dazzling fount of life-persuasive light!
Sublimest mystery speeding from afar!
Swift became that burst too potent on the sight!
This radiant type of strength and youth!
Glowing eternally!



శ్రీ వేపచేదు విద్యా పీఠము

VEPACHEDU EDUCATIONAL FOUNDATION

The Telangana Science Journal

Health and Nutrition

TIACS-subscribe@yahoo.com (The Indian American Chemical Society)

May the golden-eyed Savitar, come hither!
Shining forth he rises from the lap of the dawn!
Praised by singers, my God Savitar!
Stepped forth and never missed his place!
He steps forth the splendor of the sky the wide!
Seeing, far-shining, the shining wanderer!
- Rig Veda, vii, 65

He alone shines!
All luminaries get illuminated by His Illumination!
The whole Universe is enlightened by His light!
- Kathapanisad

ॐ भूर्भुवः स्वः तत्सवितुर्वरेण्यं भर्गो देवस्य धीमहि धियो यो नः प्रचोदयात् ॥

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Issue 237

Chief Editor: Dr. Sreenivasarao Vepachedu¹

THE BIOLOGICAL CLOCK

Sleep is a state that is characterized by changes in brain wave activity, breathing, heart rate, body temperature, and other physiological functions. The characteristics that define sleep are a) a period of reduced activity, b) a typical posture, such as lying down with eyes closed in humans, c) a decreased responsiveness to external stimuli, and d) an easily reversible state, a distinction between sleep and other states of reduced consciousness, such as hibernation and coma.

We sleep each night controlled by two interacting systems, the internal biological clock and the sleep-wake homeostat. Together, they determine the timing of our transitions from wakefulness to sleep and vice versa. These two systems also explain why, under normal conditions, we typically stay awake during the day and sleep at night.

According to the US Centers for Disease Control and Prevention, a third of US get fewer than seven hours of sleep per night. In addition, 50 million to 70 million Americans suffer from sleep disorders such as sleep apnea, insomnia, and restless leg syndrome, which can ruin a good night's shut-eye. According to World Sleep Day statistics, sleep deprivation is threatening the health of up to 45% of the world's population. Research has associated poor slumber with high blood pressure, weakened immune system, weight gain, lack of libido, mood swings, paranoia, depression, and higher risk of diabetes, stroke, cardiovascular disease, dementia and some cancers². Poor sleep timing stresses our system so much that it is one of the reasons that night-shift workers often suffer higher-than-normal rates of cancer, potentially fatal heart conditions, and other chronic disease, like metabolic syndrome and diabetes³.

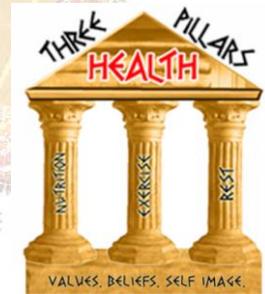
*"Nityam hitaharaviharasevi samikshyakari vishayeshvasaktah
Data samah satyaparah kshamavan aptopasevi cha bhavat-y-arogah"*
- Charaka Samhita⁴

Sound sleep is one of the pillars of good health along with a balanced diet and regular exercise⁵. Sleep problems constitute a global epidemic that threatens health and quality of life for up to 45% of the world's population. Most sleep disorders are preventable or treatable. Three elements of good quality sleep are:

Duration: The length of sleep should be sufficient for the sleeper to be rested and alert the following day.

Continuity: Sleep periods should be seamless without fragmentation.

Depth: Sleep should be deep enough to be restorative⁶.



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Swasti Sri Hevilambi Year, BHADRAPADA Month

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ॐ असतो मा सद्गमय । तमसो मा ज्योतिर्गमय । मृत्योर्मा अमृतं गमय । ॐ शान्तिः शान्तिः शान्तिः ॥

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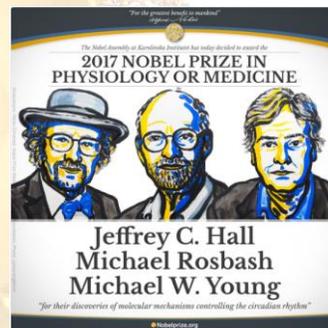
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On Earth, our daily exposure to light from the sun keeps us synchronized to the 24-hour day. However, for most people, the circadian rhythm is a little longer than 24 hours. The Circadian Performance Simulation Software (CPSS) developed by Brigham and Women's Hospital consistently predicts the effects of sleep-wake schedules and light exposure on the human biological clock. It was reported that when subjects slept in alignment with their biological clock promoting sleep, they slept longer and used fewer sleep medications. When the biological clocks were misaligned with their sleep, they had more disrupted sleep and required more sleep medication⁷.

Circadian rhythm and astrology were dumped in the same basket – the mysterious black box, until recently. American scientists Jeffrey Hall, Michael Rosbash and Michael Young will share the 2017 Nobel Prize



in the field of physiology/medicine for unravelling the secret of the circadian rhythm in fruit flies with vast implications for our health and wellbeing. The circadian rhythm is a clock ticking always in every cell of plants and animals (including humans). The disruption of circadian rhythm affects memory formation and increases the risk of diseases, including type 2 diabetes, cancer and heart disease. A section of DNA called the period gene implicated in the circadian rhythm, isolated by Hall and Rosbash, contains instructions for making a protein called PER, the levels of which control its own genetic instructions. As a result, levels of the PER protein oscillate over a 24-hour cycle - rising during the night and falling during the day. Michael Young identified genes called timeless and doubletime, which affect the stability of PER. If PER is more stable then the clock ticks more slowly, if it is less stable then it runs too fast. The stability of PER is one reason some of us are morning larks and others are night owls⁸!



Polymorphisms in PER gene may increase the risk of getting certain cancers. Decline in clock genes with age has been reported in many species indicating that the key to the fountain of youth may be somewhere in PER gene⁹.

REFERENCES AND NOTES

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² Sacrificing sleep? Here's what it will do to your health <http://www.cnn.com/2017/07/19/health/dangers-of-sleep-deprivation/index.html>

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⁷ NASA Research Reveals Biological Clock Misalignment Effects on Sleep for Astronauts <https://www.nasa.gov/feature/ames/nasa-research-reveals-biological-clock-misalignment-effects-on-sleep-for-astronauts>; Natural Patterns of Sleep <http://healthysleep.med.harvard.edu/healthy/science/what/sleep-patterns-rem-nrem>

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