RESEARCH ARTICLE ON SLEEP pdf

1: Sleep Health - Journal - Elsevier

Nov. 2, â€" New research suggests that sleep is not only important for physical, mental, and cognitive well-being, but also seems to play a pivotal role in the recovery of the brain following.

Pinterest Matthew Walker photographed in his sleep lab. One night, however, he read a scientific paper that changed everything. It described which parts of the brain were being attacked by these different types of dementia: I realised my mistake. I had been measuring the brainwave activity of my patients while they were awake, when I should have been doing so while they were asleep. Sleep, it seemed, could be a new early diagnostic litmus test for different subtypes of dementia. After this, sleep became his obsession. I was always curious, annoyingly so, but when I started to read about sleep, I would look up and hours would have gone by. No one could answer the simple question: That seemed to me to be the greatest scientific mystery. I was going to attack it, and I was going to do that in two years. But I was naive. Formerly a professor of psychiatry at Harvard Medical School, he is now professor of neuroscience and psychology at the University of California. Does his obsession extend to the bedroom? Does he take his own advice when it comes to sleep? I give myself a non-negotiable eight-hour sleep opportunity every night, and I keep very regular hours: I take my sleep incredibly seriously because I have seen the evidence. His problem then, as always in these situations, was that he knew too much. His brain began to race. In the end, it seems, even world experts in sleep act just like the rest of us when struck by the curse of insomnia. He turned on a light and read for a while. Can too little sleep ruin your relationship? Read more Will Why We Sleep have the impact its author hopes? But what I can tell you is that it had a powerful effect on me. After reading it, I was absolutely determined to go to bed earlier â€" a regime to which I am sticking determinedly. In a way, I was prepared for this. But in another way, it was unexpected. I am mostly immune to health advice. The evidence Walker presents, however, is enough to send anyone early to bed. Without sleep, there is low energy and disease. With sleep, there is vitality and health. More than 20 large scale epidemiological studies all report the same clear relationship: When your sleep becomes short, moreover, you are susceptible to weight gain. Among the reasons for this are the fact that inadequate sleep decreases levels of the satiety-signalling hormone, leptin, and increases levels of the hunger-signalling hormone, ghrelin. However, processed food and sedentary lifestyles do not adequately explain its rise. Sleep has a powerful effect on the immune system, which is why, when we have flu, our first instinct is to go to bed: Reduce sleep even for a single night, and your resilience is drastically reduced. If you are tired, you are more likely to catch a cold. The well-rested also respond better to the flu vaccine. As Walker has already said, more gravely, studies show that short sleep can affect our cancer-fighting immune cells. A number of epidemiological studies have reported that night-time shift work and the disruption to circadian sleep and rhythms that it causes increase the odds of developing cancers including breast, prostate, endometrium and colon. The reasons for this are difficult to summarise, but in essence it has to do with the amyloid deposits a toxin protein that accumulate in the brains of those suffering from the disease, killing the surrounding cells. During deep sleep, such deposits are effectively cleaned from the brain. The loss of deep sleep caused by this assault therefore lessens our ability to remove them from the brain at night. More amyloid, less deep sleep; less deep sleep, more amyloid, and so on. Away from dementia, sleep aids our ability to make new memories, and restores our capacity for learning. When your mother told you that everything would look better in the morning, she was wise. Here he details the various ways in which the dream state connects to creativity. He also suggests that dreaming is a soothing balm. If we sleep to remember see above , then we also sleep to forget. Deep sleep â€" the part when we begin to dream â€" is a therapeutic state during which we cast off the emotional charge of our experiences, making them easier to bear. Sleep, or a lack of it, also affects our mood more generally. In children, sleeplessness has been linked to aggression and bullying; in adolescents, to suicidal thoughts. Insufficient sleep is also associated with relapse in addiction disorders. A prevailing view in psychiatry is that mental disorders cause sleep disruption. But Walker believes it is, in fact, a two-way street. Regulated sleep can improve the health of, for instance, those with bipolar disorder. What is it, exactly? Each cycle comprises two kinds of sleep. When Walker talks about these cycles,

which still have their mysteries, his voice changes. He sounds bewitched, almost dazed. Researchers were once fooled that this state was similar to a coma. But nothing could be further from the truth. Vast amounts of memory processing is going on. To produce these brainwaves, hundreds of thousands of cells all sing together, and then go silent, and on and on. Meanwhile, your body settles into this lovely low state of energy, the best blood-pressure medicine you could ever hope for. Your heart and nervous system go through spurts of activity: You need four or five cycles to get all the benefit. But I do think 14 hours is too much. Too much water can kill you, and too much food, and I think ultimately the same will prove to be true for sleep. Walker thinks we should trust our instincts. Those who would sleep on if their alarm clock was turned off are simply not getting enough. Ditto those who need caffeine in the afternoon to stay awake. Schools should consider later starts for students; such delays correlate with improved IQs. Companies should think about rewarding sleep. Productivity will rise, and motivation, creativity and even levels of honesty will be improved. Sleep can be measured using tracking devices, and some far-sighted companies in the US already give employees time off if they clock enough of it. Sleeping pills, by the way, are to be avoided. Among other things, they can have a deleterious effect on memory. That will be a seismic shift, and we will then start to develop methods by which we can amplify different components of human sleep, and do that from the bedside. Sleep will come to be seen as a preventive medicine. For a while, he is quiet. I would still like to know where we go, psychologically and physiologically, when we dream. Dreaming is the second state of human consciousness, and we have only scratched the surface so far. But I would also like to find out when sleep emerged. I like to posit a ridiculous theory, which is: Perhaps it was the thing from which wakefulness emerged. If you drive having had four hours, you are To successfully initiate sleep, your core temperature needs to drop about 1C.

2: Lack of sleep puts you at higher risk for colds, first experimental study finds | Science | AAAS

Featured Articles The following featured articles include those from NICHD researchers or NICHD-supported researchers.

Outcomes are inconsistent in various dual tasks used for measuring divided attention. Sleep deprivation of 24 h impaired performance in one study Wright and Badia , whereas in two others, performance was maintained after 25â€”35 h of SD Drummond et al ; Alhola et al The divergent findings in these studies may be explained by the uneven loads between different subtests as well as by uncontrolled practice effect. Although dividing attention between different tasks puts high demands on cognitive capacity, subjects often attempt to reduce the load by automating some easier procedures of a dual or multitask. In the study by Wright and Badia , the test was not described; in the study by Alhola et al , subjects had to count backwards and carry out a visual search task simultaneously, and in the study by Drummond et al subjects had to memorize words and complete a serial subtraction task sequentially. In addition, differences in essential study elements, like the age and gender of participants, as well as the duration of SD, further complicate comparison of the results. In the tasks measuring attention or working memory, two aspects of performance are important: In practice, people can switch their emphasis between the two with attentional focusing Rinkenauer et al Oftentimes, concentrating on improving one aspect leads to the deterioration of the other. Some SD studies have found impairment only in performance speed, whereas accuracy has remained intact De Gennaro et al ; Chee and Choo In others, the results are the opposite Kim et al ; Gosselin et al De Gennaro et al proposed that in self-paced tasks, there is likely to be a stronger negative impact on speed, while accuracy remains intact. In experimenter-paced tasks, the effect would be the opposite. However, many studies show detrimental effect on both speed and accuracy eg, Smith et al ; Jennings et al ; Chee and Choo ; Habeck et al ; Choo et al It has been argued that low signal rates increase fatigue during performance in SD studies and that subjects may even fall asleep during the test Dorrian et al Therefore, tasks with different signal loads may produce different results in terms of performance speed and accuracy. Long-term memory Long-term memory can be divided between declarative and non-declarative procedural memory. Declarative memory is explicit and limited, whereas non-declarative memory is implicit and has a practically unlimited capacity. Declarative memory includes semantic memory, which consists of knowledge about the world, and episodic memory, which holds autobiographical information. The contents of declarative memory can be stored in visual or verbal forms and they can be voluntarily recalled. Non-declarative or procedural memory includes the information needed in everyday functioning and behavior, eg, motor and perceptual skills, conditioned functions and priming. In previous studies, long-term memory has been measured with a variety of tasks, and the results are somewhat inconsistent. In verbal episodic memory, SD of 35 h impaired free recall, but not recognition Drummond et al The opposite results were obtained with one night of SD Forest and Godbout In addition, Drummond et al used a within-subject design, whereas Forest and Godbout had a between-subject design. In visual memory, recognition was similar in the experimental and control groups when the measurement was taken once after 36 h SD Harrison and Horne , whereas the practice effect in visual recall was postponed by SD in a study with three measurements baseline, 25 h SD, recovery; Alhola et al Performance was impaired in probed forced memory recall Wright and Badia , and memory search McCarthy and Waters , but no effect was found in episodic memory Nilsson et al , implicit memory, prose recall, crystallized semantic memory, procedural memory, or face memory Quigley et al In the studies failing to find an effect, however, the subjects spent only the SD night under controlled conditions Quigley et al ; Nilsson et al Free recall and recognition are both episodic memory functions which seem to be affected differently by SD. Temporal memory for faces recall deteriorated during 36 h of SD, although in the same study, face recognition remained intact Harrison and Horne In verbal memory, the same pattern was observed Drummond et al One explanation may be different neural bases, which supports the prefrontal vulnerability hypothesis. Episodic memory is strongly associated with the functioning of the medial temporal lobes Scoville and Milner , but during free recall in a rested state, even stronger brain activation is found in the prefrontal cortex Hwang and Golby It is unclear whether this

prefrontal activation reflects episodic memory function, the organization of information in working memory, or the executive control of attention and memory. Recognition, instead, presumably relies on the thalamus in addition to medial temporal lobes Hwang and Golby Since SD especially disturbs the functioning of frontal brain areas Drummond et al ; Thomas et al , it is not surprising that free recall is more affected than recognition. Although the prefrontal cortex vulnerability hypothesis has received wide support in the field of SD research, other brain areas are also involved. For instance, the exact role of the thalamus remains unknown. Some studies measuring attention or working memory have noted an increase in thalamic activation during SD eg, Portas et al ; Chee and Choo ; Habeck et al ; Choo et al This may reflect an increase in phasic arousal or an attempt to compensate attentional performance during a demanding condition of low arousal caused by SD Coull et al In other cognitive tasks such as verbal memory Drummond and Brown or logical reasoning Drummond et al , no increase in thalamic activation was found despite the fact that behavioral deterioration occurred. However, it is possible that the brain activation patterns during SD reflect something more than merely different cognitive domains. Harrison and Horne stated that their results may also reflect the difficulty of the task assigned to subjects. Other cognitive functions Sleep deprivation impairs visuomotor performance, which is measured with tasks of digit symbol substitution, letter cancellation, trail-making or maze tracing Table 1. It is believed that visual tasks would be especially vulnerable to sleep loss because iconic memory has short duration and limited capacity Raidy and Scharff Another suggestion is that SD impedes engagement of spatial attention, which can be observed as impairments in saccadic eye movements Bocca and Denise Decreased oculomotor functioning is associated with impaired visual performance De Gennaro et al and sleepiness eg, De Gennaro et al ; Zils et al However, further research is needed to confirm this explanation, since not all studies have found oculomotor impairment with cognitive performance decrements Quigley et al Again the results are inconsistent deteriorated performance was reported by Blagrove et al ; McCarthy and Waters ; Monk and Carrier , and Harrison and Horne ; no effects were noted by Linde and Bergstrom ; Quigley et al , or Drummond et al The studies reporting no effect have mainly used SD of ca. Thus reasoning ability seems to be maintained during short-term SD. However, choosing divergent study designs may result in different outcomes. Monk and Carrier repeated the cognitive test every 2 h and found deterioration after as little as 16 h of SD. In the studies with longer SD, the tests have been conducted either in the late afternoon McCarthy and Waters ; Harrison and Horne or have been repeated several times Blagrove et al ; Monk and Carrier Therefore, the different results may reflect the effect of circadian rhythm on alertness and cognitive performance. In the morning or before noon, the circadian process reaches its peak, inducing greater alertness, whereas the timing of the circadian nadir coincides with the late afternoon testing see Achermann In addition to the cognitive domains already introduced, total SD affects several other cognitive processes as well. It increases rigid thinking, perseveration errors, and difficulties in utilizing new information in complex tasks requiring innovative decision-making Harrison and Horne Deterioration in decision-making also appears as more variable performance and applied strategies Linde et al , as well as more risky behavior Killgore et al Several other tasks have been used in the sleep deprivation studies Table 1. For example, motor function, rhythm, receptive and expressive speech, and memory measured with the Luria-Nebraska Neuropsychological Battery deteriorated after one night of SD, whereas tactile function, reading, writing, arithmetic and intellectual processes remain intact Kim et al The adverse effects of total SD shown in experimental designs have also been confirmed in real-life settings, mainly among health care workers, professional drivers and military personnel Samkoff and Jacques ; Otmani et al ; Philibert ; Russo et al Performance of residents in routine practice and repetitive tasks requiring vigilance becomes more error-prone when wakefulness is prolonged for a review, see Samkoff and Jacques However, in new situations or emergencies, the residents seem to be able to mobilize additional energy sources to compensate for the effects of tiredness. More recent meta-analysis shows that SD of less than 30 h causes a significant decrease in both the clinical and overall performance of both residents and non-physicians Philibert Motivation What role does motivation play in cognitive performance? Can high motivation reverse the adverse effect of SD? Does poor motivation further deteriorate performance? According to a commonly held opinion, high motivation compensates for a decrease in performance, but only a few attempts have been made

to confirm this theory. Estimating the compensatory effect of motivation in performance during SD is generally difficult, because persons participating in research protocols, especially in SD studies, usually have high initial motivation. Harrison and Horne , suggest that the deterioration of cognitive performance during SD could be due to boredom and lack of motivation caused by repeated tasks, especially if the tests are simple and monotonous. They used short, novel, and interesting tasks to abolish this motivational gap, yet still noted that SD impaired performance. In contrast, other researchers suggest that sleep-deprived subjects could maintain performance in short tasks by being able to temporarily increase their attentional effort. When a task is longer, performance deteriorates as a function of time. A meta-analysis by Pilcher and Huffcutt provides support for that: Based on this, it is probably necessary to make a distinction between mere attentional effort and more general motivation. Although attentional effort reflects motivational aspects in performance, motivation in a broader sense can be considered a long-term process such as achieving a previously set goal, eg, completing a study protocol. If one has already invested a great deal of time and effort in the participation, motivation to follow through may be increased. Different aspects of motivation were investigated in a study with 72 h SD, where the subjects evaluated both motivation to perform the tasks and motivation to carry out leisure activities Mikulincer et al Cognitive tasks were repeated every two hours. Performance motivation decreased only during the second night of SD, whereas leisure motivation decreased from the second day until the end of the study on the third day. The authors concluded that the subjects were more motivated to complete experimental testing than to enjoy leisure activities because by performing the tasks, they could advance the completion of the study. Providing the subjects with feedback on their performance or rewarding them for effort or good performance is shown to help maintain performance both in normal, non-deprived conditions Tomporowski and Tinsley and during SD Horne and Pettitt ; Steyvers ; Steyvers and Gaillard As result, no deteriorating effect on cognitive performance was found. Unfortunately, a non-motivated control group was not included and thus the effect of motivation remained uncertain. In general, since this issue has not been addressed sufficiently, it is difficult to specify the role of motivation in performance. It seems that motivation affects performance, but it also appears that SD can lead to a loss of motivation. Self-evaluation of cognitive performance It has been suggested that the self-evaluation of cognitive performance is impaired by SD. During 36 h SD, the subjects became more confident that their answers were correct as the wakefulness continued Harrison and Horne Confidence was even stronger when the answer was actually wrong. In another study, performance was similar between sleep-deprived and control groups in several attentional assessments, but the deprived subjects evaluated their performance as moderately impaired Binks et al The controls considered that their performance was high. Young people seem to underestimate the effect of SD, whereas older people seem to overestimate it. In a simple reaction time task, both young aged 20â€”25 years and aging aged 52â€”63 years subjects considered that their performance had deteriorated after 24 h SD, although performance was actually impaired only in young subjects Philip et al When it comes to the study design and methodology, the way in which the self-evaluation is done may affect the outcome. The answers possibly reflect presuppositions of the subjects or their desire to please the researcher. The repetition of tasks is also essential. Evaluation ability is poor in studies with one measurement only Binks et al ; Harrison and Horne ; Philip et al , whereas in repeated measures, the subjects are shown to be able to assess their performance quite reliably during 60â€”64 h SD and recovery Baranski et al ; Baranski and Pigeau Thus, self-evaluation is likely to be more accurate when subjects can compare their performance with baseline.

RESEARCH ARTICLE ON SLEEP pdf

3: Sleep Disorders | MedlinePlus

SLEEP is the official journal of the Sleep Research Society (SRS). Publishes content on sleep, sleep medicine and circadian research. We use cookies to enhance your experience on our website.

Sleep deficiency is a broader concept. It occurs if you have one or more of the following: Sleeping is a basic human need, like eating, drinking, and breathing. Like these other needs, sleeping is a vital part of the foundation for good health and well-being throughout your lifetime. Sleep deficiency can lead to physical and mental health problems, injuries, loss of productivity, and even a greater risk of death. Non-REM sleep includes what is commonly known as deep sleep or slow wave sleep. Dreaming typically occurs during REM sleep. This clock typically follows a hour repeating rhythm called the circadian rhythm. The rhythm affects every cell, tissue, and organ in your body and how they work. For more information, go to "What Makes You Sleep? You may not feel refreshed and alert when you wake up. Sleep deficiency can interfere with work, school, driving, and social functioning. You might have trouble learning, focusing, and reacting. Sleep deficiency also can make you feel frustrated, cranky, or worried in social situations. The signs and symptoms of sleep deficiency may differ between children and adults. Children who are sleep deficient might be overly active and have problems paying attention. They also might misbehave, and their school performance can suffer. Outlook Sleep deficiency is a common public health problem in the United States. People in all age groups report not getting enough sleep. As part of a health survey for the Centers for Disease Control and Prevention, about 7â€”19 percent of adults in the United States reported not getting enough rest or sleep every day. Nearly 40 percent of adults report falling asleep during the day without meaning to at least once a month. Also, an estimated 50 to 70 million Americans have chronic ongoing sleep disorders. Sleep deficiency is linked to many chronic health problems, including heart disease , kidney disease, high blood pressure , diabetes, stroke , obesity , and depression. Sleep deficiency also is associated with an increased risk of injury in adults, teens, and children. For example, driver sleepiness not related to alcohol is responsible for serious car crash injuries and death. In the elderly, sleep deficiency might be linked to an increased risk of falls and broken bones. In addition, sleep deficiency has played a role in human errors linked to tragic accidents, such as nuclear reactor meltdowns, grounding of large ships, and aviation accidents. A common myth is that people can learn to get by on little sleep with no negative effects. However, research shows that getting enough quality sleep at the right times is vital for mental health, physical health, quality of life, and safety. What Makes You Sleep? Many factors play a role in preparing your body to fall asleep and wake up. The body clock typically has a hour repeating rhythm called the circadian rhythm. Two processes interact to control this rhythm. This drive for sleep reaches a peak in the evening, when most people fall asleep. A compound called adenosine ah-DEN-o-seen seems to be one factor linked to this drive for sleep. The increasing level of this compound signals a shift toward sleep. While you sleep, your body breaks down adenosine. A second process involves your internal body clock. This clock is in sync with certain cues in the environment. Light, darkness, and other cues help determine when you feel awake and when you feel drowsy. For example, light signals received through your eyes tell a special area in your brain that it is daytime. This area of your brain helps align your body clock with periods of the day and night. Your body releases chemicals in a daily rhythm, which your body clock controls. When it gets dark, your body releases a hormone called melatonin mel-ah-TONE-in. The amount of melatonin in your bloodstream peaks as the evening wears on. Researchers believe this peak is an important part of preparing your body for sleep. Exposure to bright artificial light in the late evening can disrupt this process, making it hard to fall asleep. Examples of bright artificial light include the light from a TV screen, computer screen, or a very bright alarm clock. As the sun rises, your body releases cortisol KOR-tih-sol. This hormone naturally prepares your body to wake up. The rhythm and timing of the body clock change with age. Teens fall asleep later at night than younger children and adults. One reason for this is because melatonin is released and peaks later in the hour cycle for teens. For example, newborns may sleep more than 16 hours a day, and preschool-aged children need to take naps. Young children tend to sleep more in the early evening. Teens tend to sleep more in the morning. Also, older adults tend to go to bed earlier

and wake up earlier. The patterns and types of sleep also change as people mature. For example, newborn infants spend more time in REM sleep. The amount of slow-wave sleep a stage of non-REM sleep peaks in early childhood and then drops sharply after puberty. It continues to decline as people age. Sleep plays a vital role in good health and well-being throughout your life. Getting enough quality sleep at the right times can help protect your mental health, physical health, quality of life, and safety. During sleep, your body is working to support healthy brain function and maintain your physical health. In children and teens, sleep also helps support growth and development. The damage from sleep deficiency can occur in an instant such as a car crash , or it can harm you over time. For example, ongoing sleep deficiency can raise your risk for some chronic health problems. It also can affect how well you think, react, work, learn, and get along with others. Sleep also helps you pay attention, make decisions, and be creative. Studies also show that sleep deficiency alters activity in some parts of the brain. Sleep deficiency also has been linked to depression, suicide, and risk-taking behavior. Children and teens who are sleep deficient may have problems getting along with others. They may feel angry and impulsive, have mood swings, feel sad or depressed, or lack motivation. They also may have problems paying attention, and they may get lower grades and feel stressed. Physical Health Sleep plays an important role in your physical health. For example, sleep is involved in healing and repair of your heart and blood vessels. Ongoing sleep deficiency is linked to an increased risk of heart disease , kidney disease, high blood pressure , diabetes, and stroke. Sleep deficiency also increases the risk of obesity. For example, one study of teenagers showed that with each hour of sleep lost, the odds of becoming obese went up. Sleep deficiency increases the risk of obesity in other age groups as well. Sleep helps maintain a healthy balance of the hormones that make you feel hungry ghrelin or full leptin. Sleep also affects how your body reacts to insulin, the hormone that controls your blood glucose sugar level. Sleep deficiency results in a higher than normal blood sugar level, which may increase your risk for diabetes. Sleep also supports healthy growth and development. Deep sleep triggers the body to release the hormone that promotes normal growth in children and teens. This hormone also boosts muscle mass and helps repair cells and tissues in children, teens, and adults. Sleep also plays a role in puberty and fertility. Your immune system relies on sleep to stay healthy. This system defends your body against foreign or harmful substances. Ongoing sleep deficiency can change the way in which your immune system responds. Daytime Performance and Safety Getting enough quality sleep at the right times helps you function well throughout the day. People who are sleep deficient are less productive at work and school. They take longer to finish tasks, have a slower reaction time, and make more mistakes. Lack of sleep also may lead to microsleep. For example, have you ever driven somewhere and then not remembered part of the trip? If so, you may have experienced microsleep. In reality, though, you may have slept through part of the lecture and not been aware of it. Even with limited or poor-quality sleep, they may still think that they can function well. For example, drowsy drivers may feel capable of driving.

RESEARCH ARTICLE ON SLEEP pdf

4: Brain Basics: Understanding Sleep | National Institute of Neurological Disorders and Stroke

Medical journal for sleep research applicable for the diagnosis and treatment of sleep disorders, find studies on sleep apnea, insomnia, treatments and topics in sleep medicine Journal of Clinical Sleep Medicine - Research & Review Articles in Sleep Medicine.

Where can I get more information? Introduction Sleep is an important part of your daily routineâ€”you spend about one-third of your time doing it. Quality sleep â€” and getting enough of it at the right times -- is as essential to survival as food and water. Sleep is important to a number of brain functions, including how nerve cells neurons communicate with each other. In fact, your brain and body stay remarkably active while you sleep. Recent findings suggest that sleep plays a housekeeping role that removes toxins in your brain that build up while you are awake. Everyone needs sleep, but its biological purpose remains a mystery. Sleep affects almost every type of tissue and system in the body â€” from the brain, heart, and lungs to metabolism, immune function, mood, and disease resistance. Research shows that a chronic lack of sleep, or getting poor quality sleep, increases the risk of disorders including high blood pressure, cardiovascular disease, diabetes, depression, and obesity. Sleep is a complex and dynamic process that affects how you function in ways scientists are now beginning to understand. This booklet describes how your need for sleep is regulated and what happens in the brain during sleep. Anatomy of Sleep Several structures within the brain are involved with sleep. The hypothalamus, a peanut-sized structure deep inside the brain, contains groups of nerve cells that act as control centers affecting sleep and arousal. Within the hypothalamus is the suprachiasmatic nucleus SCN â€” clusters of thousands of cells that receive information about light exposure directly from the eyes and control your behavioral rhythm. Some people with damage to the SCN sleep erratically throughout the day because they are not able to match their circadian rhythms with the light-dark cycle. The brain stem, at the base of the brain, communicates with the hypothalamus to control the transitions between wake and sleep. The brain stem includes structures called the pons, medulla, and midbrain. Sleep-promoting cells within the hypothalamus and the brain stem produce a brain chemical called GABA, which acts to reduce the activity of arousal centers in the hypothalamus and the brain stem. The thalamus acts as a relay for information from the senses to the cerebral cortex the covering of the brain that interprets and processes information from short- to long-term memory. During most stages of sleep, the thalamus becomes quiet, letting you tune out the external world. But during REM sleep, the thalamus is active, sending the cortex images, sounds, and other sensations that fill our dreams. People who have lost their sight and cannot coordinate their natural wake-sleep cycle using natural light can stabilize their sleep patterns by taking small amounts of melatonin at the same time each day. The basal forebrain, near the front and bottom of the brain, also promotes sleep and wakefulness, while part of the midbrain acts as an arousal system. Release of adenosine a chemical by-product of cellular energy consumption from cells in the basal forebrain and probably other regions supports your sleep drive. Caffeine counteracts sleepiness by blocking the actions of adenosine. The amygdala, an almond-shaped structure involved in processing emotions, becomes increasingly active during REM sleep. Each is linked to specific brain waves and neuronal activity. Stage 1 non-REM sleep is the changeover from wakefulness to sleep. During this short period lasting several minutes of relatively light sleep, your heartbeat, breathing, and eye movements slow, and your muscles relax with occasional twitches. Your brain waves begin to slow from their daytime wakefulness patterns. Stage 2 non-REM sleep is a period of light sleep before you enter deeper sleep. Your heartbeat and breathing slow, and muscles relax even further. Your body temperature drops and eye movements stop. Brain wave activity slows but is marked by brief bursts of electrical activity. You spend more of your repeated sleep cycles in stage 2 sleep than in other sleep stages. Stage 3 non-REM sleep is the period of deep sleep that you need to feel refreshed in the morning. It occurs in longer periods during the first half of the night. Your heartbeat and breathing slow to their lowest levels during sleep. Your muscles are relaxed and it may be difficult to awaken you. Brain waves become even slower. REM sleep first occurs about 90 minutes after falling asleep. Your eyes move rapidly from side to side behind closed eyelids. Mixed frequency brain wave activity becomes closer to that seen in wakefulness. Your breathing becomes faster and

irregular, and your heart rate and blood pressure increase to near waking levels. Your arm and leg muscles become temporarily paralyzed, which prevents you from acting out your dreams. As you age, you sleep less of your time in REM sleep. Sleep mechanisms Two internal biological mechanismsâ€”circadian rhythm and homeostasisâ€”work together to regulate when you are awake and sleep. Circadian rhythms direct a wide variety of functions from daily fluctuations in wakefulness to body temperature, metabolism, and the release of hormones. They control your timing of sleep and cause you to be sleepy at night and your tendency to wake in the morning without an alarm. Circadian rhythms synchronize with environmental cues light, temperature about the actual time of day, but they continue even in the absence of cues. Sleep-wake homeostasis keeps track of your need for sleep. The homeostatic sleep drive reminds the body to sleep after a certain time and regulates sleep intensity. This sleep drive gets stronger every hour you are awake and causes you to sleep longer and more deeply after a period of sleep deprivation. Factors that influence your sleep-wake needs include medical conditions, medications, stress, sleep environment, and what you eat and drink. Perhaps the greatest influence is the exposure to light. Specialized cells in the retinas of your eyes process light and tell the brain whether it is day or night and can advance or delay our sleep-wake cycle. Exposure to light can make it difficult to fall asleep and return to sleep when awakened. Night shift workers often have trouble falling asleep when they go to bed, and also have trouble staying awake at work because their natural circadian rhythm and sleep-wake cycle is disrupted. In the case of jet lag, circadian rhythms become out of sync with the time of day when people fly to a different time zone, creating a mismatch between their internal clock and the actual clock. Your need for sleep and your sleep patterns change as you age, but this varies significantly across individuals of the same age. Babies initially sleep as much as 16 to 18 hours per day, which may boost growth and development especially of the brain. School-age children and teens on average need about 9. Most adults need hours of sleep a night, but after age 60, nighttime sleep tends to be shorter, lighter, and interrupted by multiple awakenings. Elderly people are also more likely to take medications that interfere with sleep. In general, people are getting less sleep than they need due to longer work hours and the availability of round-the-clock entertainment and other activities. Many people feel they can "catch up" on missed sleep during the weekend but, depending on how sleep-deprived they are, sleeping longer on the weekends may not be adequate. You spend about 2 hours each night dreaming but may not remember most of your dreams. Events from the day often invade your thoughts during sleep, and people suffering from stress or anxiety are more likely to have frightening dreams. Dreams can be experienced in all stages of sleep but usually are most vivid in REM sleep. Some people dream in color, while others only recall dreams in black and white. The Role of Genes and Neurotransmitters Chemical signals to sleep Clusters of sleep-promoting neurons in many parts of the brain become more active as we get ready for bed. GABA is associated with sleep, muscle relaxation, and sedation. Norepinephrine and orexin also called hypocretin keep some parts of the brain active while we are awake. Other neurotransmitters that shape sleep and wakefulness include acetylcholine, histamine, adrenaline, cortisol, and serotonin. Genes and sleep Genes may play a significant role in how much sleep we need. Scientists have identified several genes involved with sleep and sleep disorders, including genes that control the excitability of neurons, and "clock" genes such as Per, tim, and Cry that influence our circadian rhythms and the timing of sleep. Genome-wide association studies have identified sites on various chromosomes that increase our susceptibility to sleep disorders. Also, different genes have been identified with such sleep disorders as familial advanced sleep-phase disorder, narcolepsy, and restless legs syndrome. Some of the genes expressed in the cerebral cortex and other brain areas change their level of expression between sleep and wake. Several genetic modelsâ€”including the worm, fruit fly, and zebrafishâ€”are helping scientists to identify molecular mechanisms and genetic variants involved in normal sleep and sleep disorders. Additional research will provide better understand of inherited sleep patterns and risks of circadian and sleep disorders. Sleep studies Your health care provider may recommend a polysomnogram or other test to diagnose a sleep disorder. A polysomnogram typically involves spending the night at a sleep lab or sleep center. It records your breathing, oxygen levels, eye and limb movements, heart rate, and brain waves throughout the night. Your sleep is also video and audio recorded. The data can help a sleep specialist determine if you are reaching and proceeding properly through the various sleep stages. Results may be used to develop a treatment

plan or determine if further tests are needed. Smart technology can record sounds and movement during sleep, journal hours slept, and monitor heart beat and respiration. Using a companion app, data from some devices can be synced to a smartphone or tablet, or uploaded to a PC. Other apps and devices make white noise, produce light that stimulates melatonin production, and use gentle vibrations to help us sleep and wake. Here are a few tips to improve your sleep: Set a schedule â€" go to bed and wake up at the same time each day. Exercise 20 to 30 minutes a day but no later than a few hours before going to bed. Avoid caffeine and nicotine late in the day and alcoholic drinks before bed. Relax before bed â€" try a warm bath, reading, or another relaxing routine. See a doctor if you have a problem sleeping or if you feel unusually tired during the day. Most sleep disorders can be treated effectively. A key focus of research is to understand the risks involved with being chronically sleep deprived and the relationship between sleep and disease. People who are chronically sleep deprived are more likely to be overweight, have strokes and cardiovascular disease, infections, and certain types of cancer than those who get enough sleep.

5: SLEEP | Oxford Academic

Research shows that most people require seven or eight hours of sleep to function optimally. From infancy to old age, the effects of inadequate sleep can profoundly affect memory, learning, creativity, productivity and emotional stability, as well as your physical health.

6: New Research on Sleep and Memory - Sleep Center - Everyday Health

Introduction. Lack of sleep is a common condition in everyday life, either related to psychosocial demands or related to working shift hours. In healthy individuals, this may induce decreased alertness and vigilance, together with a general decline in mood.

7: Sleep Deprivation and Deficiency | National Heart, Lung, and Blood Institute (NHLBI)

New research shows a good night's rest isn't a luxury--it's critical for your brain and for your health.

8: Sleep Apnea | MedlinePlus

The sleep diaries (Karolinska sleep diary) included information on sleep latency, quality, duration, and sleepiness. Participants sent a text message to the research assistant by mobile phone (SMS) at bedtime and when they got up on the night before sleep deprivation.

9: Sleep deprivation: Impact on cognitive performance

While more research is needed to explore the links between chronic sleep loss and health, it's safe to say that sleep is too important to shortchange. To continue reading this article, you must login.

RESEARCH ARTICLE ON SLEEP pdf

The Encyclopedia of Poisons and Antidotes (Facts on File Library of Health and Living) Sourcebook of County Demographics (Community Sourcebook of County Demographics) Forever undecided Moral education in a secular society How to Make Your Realtor Get You the Best Deal: North Carolina Edition Oscillators counters Recent Developments in Electronic Materials and Devices Langenscheidt universal Finnish dictionary Pride and prejudice full novel Seeking the truth of change in the church The New York Times Will Shortzs Favorite Sunday Crossword Puzzles Various and ingenious machines of Agostino Ramelli Travelers guide to Jewish landmarks of Europe Reading Nonfiction 1 Teachers Manual (Reading in Context) Vassilisa the Wise Gods church for today More battles with racism, sexism, and Kirbyism Introduction to wireless and le systems agrawal Black hole bucky sinister Dont give it away! The design and analysis of parallel algorithms The technology of cities and buildings Assuring child support Outlines of history, by Edward A. Freeman . Modern technique of rock blasting Product policy and goals John B. Lord Meeting Lew Wai Hing Truth about tongues Helping prosecutors The author and the novel. A brief history of straight Atlantic Coast Lighthouses 2003 Calendar Measuring the indirect employment effects of multinational enterprises 4th grade multiplication and division word problems Holt mcdougal algebra 2 textbook Hole`s Essentials of Human Anatomy and Physiology (Cram101 Textbook Outlines Textbook NOT Included) CLEMENT OF ALEXANDRIA 105 Better Book Reports Seneca Patriots The White Indian (No. 22 in Series) Historical dictionary of aid and development organizations