

Water & Sleep



**WHY HYDRATION
& REST ARE
UNDERRATED**



WHY DO WE SLEEP?

Why exactly do we sleep? While we do not yet know all the details it seems some important functions of sleep are linked to the reorganisation and coding of daily events in the brain and repair of the body's damaged cellular components. But scientists are finding out more and more about the vast array of unexpected ways our body is impacted by sleep.

HOW DO WE SLEEP?

Sleep has two main components—REM (Rapid Eye Movement) sleep and non-REM sleep. As you begin to fall asleep at night, you enter the stages of non-REM sleep—from very light sleep through to very deep sleep, which is characterised by very low frequency brain waves called delta waves.¹ Throughout an eight-hour sleep, your brain cycles four to six times through non-REM and REM phases with a period of approximately 90 minutes.²

Benefits of sleep

RESTORATION

One of the most obvious benefits of sleep is its restorative properties. Most people feel and even look better after a good night's sleep. How does this happen?

In recent years, scientific studies have found that many of the major restorative functions in the body occur mostly or only during sleep.⁴ As you enter the deep sleep phase of the sleep cycle, growth hormone is released from your pituitary gland.⁵ As well as helping young children grow and develop normally,⁶ growth hormone strengthens bones,⁷ increases muscle mass,⁸ promotes fat breakdown,⁹ supports insulin production,¹⁰ and regulates the immune system.¹¹ Sleep rejuvenates all the tissues in your body.

We have a sensation of being tired when we have a build up of adenosine—a by-product of neuron activity in the brain. As long as we are awake, adenosine continues to accumulate. Only once we are asleep can the body clear it away—another reason why we wake up feeling mentally refreshed.¹²

LEARNING AND MEMORY

Researchers are excited by what they're finding out about the link between sleep and memory. Studies have shown that new information or skills are best learned and remembered if a good night's sleep is enjoyed after the training session. Until you sleep on it, even important information is only held in temporary memory.¹³

Sleep doesn't just convert memory into a more permanent form, it converts it into an enhanced form.⁸ More than just remembering information, sleep allows the brain to organise information, and to integrate it within the context of your other memories as well as your values and beliefs.⁹ These changes to the structure and organisation of the brain—via the creation of connections between nerve cells—are referred to as *brain plasticity*.¹⁴

Brain plasticity is still being explored and understood, but it is becoming clear that sleep plays a critical role in brain development in infants and young



children, with one study providing clear evidence that sleep—especially deep sleep—plays an active role in child memory consolidation.¹⁵ Research has also found that in adults, different types of learning benefit from different stages of the sleep cycle.¹⁶

MENTAL HEALTH

Most people have experienced the effect of a poor night's sleep on their emotions and mental health. Studies in which people experience prolonged periods of inadequate sleep result in increased feelings of stress, sadness, anger and mental exhaustion, as well as declining levels of optimism and sociability.¹⁷⁻¹⁹

Inadequate sleep has been shown to cause serotonin receptors in the brain to become less sensitive,²⁰ potentially leading to aggressive or angry behaviour and clinical depression. Chronic sleep issues have been correlated with depression, anxiety, and mental distress.²¹

IMMUNITY

Healthy sleep patterns result in the release of growth hormone, which has a variety of benefits including stimulating the immune system.

Research has found that animals that have more deep sleep following microbial infection have a better chance of survival.²² Animals exposed to complete sleep deprivation lose all immune function and die within weeks.²³ In a study among 153 people voluntarily infected with a cold virus, those who averaged less than seven hours of sleep each night were nearly three times more likely to get sick than those with eight hours or more.²⁴

Melatonin is a hormone secreted by the pineal gland in the brain. It maintains the human circadian rhythm and helps us feel sleepy.²⁵ More melatonin is produced when it's dark, and less when it's light. This cycle can be disturbed by bright lights in the evening or by too little light during the day.²⁶ Melatonin is also a strong anti-oxidant and may strengthen the immune system.²⁷ Hence, if we stifle our production of melatonin by staying up too late in bright environments too often, we may suppress our immune system.

Researchers working in the area of sleep and immunity believe sleep is so important in boosting immune function that it is probably the key reason we sleep.²⁸

ILLNESS PREVENTION

Studies have linked a lack of sleep—and in some cases too much sleep—to a number of significant health conditions including the following:

OBESITY AND WEIGHT GAIN

Studies have shown that people who routinely sleep less than six hours per night are much more likely to have a higher than average body mass index (BMI), while people who sleep seven to eight hours have the lowest BMI.²⁹ One study found that people who slept less than six hours per night were 30% more likely to become obese than those getting seven to eight hours sleep.²⁹ Lack of sleep alters the production of hormones involved in hunger regulation and glucose metabolism, including cortisol and insulin.^{10,30} Inadequate sleep—even for just a couple of days—decreases the levels of leptin (a hormone that suppresses eating) and increases the levels of ghrelin (a hormone that stimulates hunger) by as much as 20–30%.³¹

DIABETES

Numerous studies have shown a link between sleeping less than five hours per night and a greatly increased risk of developing diabetes.³² In a study of short-term sleep restriction in healthy adults, the subjects very quickly developed impaired glucose tolerance, which is a first step toward diabetes.³³ Another feature of diabetes is impaired insulin sensitivity, and this too has been linked to sleep.³⁴ One study found that even in adolescents, sleeping less than five hours each night is associated with reduced insulin sensitivity.³⁵

INFLAMMATION

Studies of short term sleep deprivation have found a variety of potentially harmful effects, including increased inflammation in a manner that's normally associated with stress.³⁶ If sleep deprivation continues long term, chronic low-level inflammation may result—the underlying condition that's associated with heart attack, stroke and diabetes.³⁷

OTHER

A raft of other key illnesses and conditions are linked to sleep. People who have normal sleep patterns are less likely to get cancer.³⁸ Too much sleep—beyond seven to eight hours—increases breast cancer risk by 6% for each excess hour.³⁹ A person's heart attack risk increases by 45% with five hours sleep a night or less, and by 38% with more than nine hours sleep per night.⁴⁰ Inadequate sleep also induces eight hours of high blood pressure in previously healthy subjects—after just one night.⁴¹



HOW CAN WE IMPROVE OUR SLEEP?

To ensure we reap the full benefits of sleep, we need to get the right amount, which appears to be between seven to eight hours per night, or no more than nine. To assist in falling and staying asleep, and achieving the full range of sleep stages, experts recommend the following behaviours:⁴²

- 1 AVOID CAFFEINE, ALCOHOL, NICOTINE** and other sleep-disturbing chemicals for four to six hours before bedtime.
- 2 HAVE A QUIET, DARK, COOL AND PLEASANT ENVIRONMENT** in your bedroom, and keep the TV and laptop out.
- 3 FOLLOW A RELAXING PRE-SLEEP ROUTINE** Ease the transition from wake to sleep by engaging in relaxing activities such as reading a book or taking a bath.
- 4 IF YOU GET UP AT NIGHT, DON'T TURN ON BRIGHT LIGHTS** This will disturb your melatonin production.
- 5 BE SURE TO GET SOME OUTDOOR TIME** during the day to support your circadian (daily) rhythm.
- 6 EAT LIGHT MEALS EARLY IN THE EVENING** Finish dinner several hours before going to bed and avoid foods that cause indigestion.
- 7 DON'T EXERCISE TOO CLOSE TO BEDTIME** and allow at least a three-hour break.
- 8 FOLLOW A CONSISTENT SLEEP ROUTINE** including going to bed at the same time each night.

Water

Individuals committed to achieving optimal wellbeing usually aim to drink eight glasses of water each day as part of their healthy lifestyle. But do we really need those magical eight glasses—are they really that beneficial?

Recently, the eight glasses a day mantra has been questioned, with experts pointing out that there's no well-founded scientific basis for the number.⁴³ According to Kidney Health Australia, "After our medical team conducted a critical review of the published literature on this topic, we found there is a distinct lack of evidence supporting this position."⁴⁴

Our bodies are about 70% water, and every cell contains water. It's the medium in which all our metabolic reactions take place, and it's necessary for functions such as digestion,⁴⁵ absorption of nutrients,⁴⁶ circulation,⁴⁷ creation of saliva,⁴⁸ transporting nutrients,^{46,47} maintaining body temperature,⁴⁹ removal of wastes via urine,⁵⁰ and much more. Water is vital to human survival—we can generally only last a week without fluid.⁵¹

The basic reason for drinking water is to replace what's lost from our bodies through urine, bowel motions, sweat and exhaled breath. Active people, or those in hot environments, will lose more water and hence need to replace more.⁵² Maintaining fluid balance is certainly a priority for our bodies, with mechanisms in place to reduce urine output if the volume of water in our blood becomes too low.^{53,54}

According to Kidney Health Australia, people living in "temperate regions and not exercising strenuously should (drink to) satisfy thirst."⁴⁴ In our busy lives, however, it's often easy to ignore or not even notice our thirst, so it can be useful to set a goal and keep track of our intake.

Importantly, although beverages such as tea, coffee and juices can contribute to our fluid intake, it is best to avoid drinks containing sugar, caffeine or alcohol as these substances can reduce water availability in the body and may cause or worsen health related problems. Water is the recommended fluid.⁵³

So what are the benefits of drinking more water rather than less? Some researchers have found that drinking water increases metabolism slightly.⁵⁵ Other researchers have found that drinking good amounts of water protects against kidney stones and bowel cancer.^{56,57} Some researchers have even found that greater water intake (five or more glasses per day compared to two or fewer) protects against heart attack, while increasing intake of other beverages increased heart attack risk.⁵⁸ In contrast, a

review of the overall evidence published in the Journal of the American Society of Nephrology concluded that, "There is no clear evidence of benefit from drinking increased amounts of water. ... there is also no clear evidence of lack of benefit. In fact, there is simply a lack of evidence in general."⁵⁹

By evidence, they mean results from well-constructed scientific studies. But there's also anecdotal evidence—personal accounts of an experience. This is not considered to be as reliable as scientific evidence, but should not be completely dismissed. It is often what directs scientists down a fruitful research pathway.

Anecdotally, many people report some worthwhile benefits from drinking a good amount of water (not necessarily eight glasses) each day instead of other beverages. Reported benefits include feeling more energetic and focused, improved weight control, less water retention, softer bowel motions, and enhanced skin appearance.

While we may not need eight glasses of water each day for optimal health, the evidence for or against is still a poor reason to completely throw the idea out. Until more focused research is conducted, it is wise to continue to provide our bodies with plenty of fresh, pure water—kilojoule and drug (side-effect) free—to optimise their functioning and our health and wellbeing.



THE BOTTOM LINE

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- ✓ AVOID SLEEP-DISTURBING CHEMICALS SUCH AS ALCOHOL, CAFFEINE AND NICOTINE BEFORE BED
 - ✓ MAKE YOUR BEDROOM AS CONDUCIVE TO SLEEP AS POSSIBLE
 - ✓ KEEP A REGULAR WAKE-SLEEP ROUTINE THROUGHOUT THE WEEK
 - ✓ LET LIGHT BE A GUIDE—GET OUTDOORS DURING THE DAY AND DIM LIGHTS AT NIGHT
 - ✓ FINISH DINNER AND EXERCISE AWAY FROM BEDTIME
 - ✓ DRINK PLENTY OF WATER

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Written by Julie Hoey, Maddison Fox, Dr Darren Morton, Dr Christiana Leimena, & Dr Ross Grant.
Edited by Christina Hawkins, Lyle Southwell, Sue Robinson, Maddison Fox & Jade Guest.

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JULIE HOEY

BSc (Nutrition and Food Science),
Grad Dip Dietetics, Grad Dip Ed

A qualified dietitian and science teacher, Julie loves reading the latest research into the amazing human body. With her husband and six-year old daughter, she lives on 100 acres of bush in New South Wales, and works at Avondale College of Higher Education.



MADDISON FOX

BSc (Nutrition), Hons (Dietetics), APD, AN,
BAppSc (Exercise and Sport Science), Sports Dietitian

Maddison is passionate about healthy food and its interaction with the health of body, mind, heart and spirit. She utilises the latest nutritional science to teach others how to create healthy food, reduce obesity and the risk of disease and chronic conditions.



DR ROSS GRANT

PhD (NeuroPharmacology), MAppSc (Clin Chemistry)
BEd (Sc) (Biochemistry/Chemistry)

Dr Grant is a Biochemical Pharmacologist in the School of Medical Sciences University of New South Wales, Clinical Associate Professor at the University of Sydney Medical School and Head of the Australasian Research Institute at Sydney Adventist Hospital.



DR DARREN MORTON

PhD (Human Physiology), MAppSc (Human Movement),
BEd (Distinction), Senior Lecturer at Avondale College of Higher Education

Darren is passionate about empowering others to live more. He has delivered hundreds of presentations on lifestyle related topics all over the world, written numerous publications and is a key presenter on the Complete Health Improvement Program (CHIP). He enjoys family time, triathlon and hang gliding.



DR CHRISTIANA LEIMENA

PhD (Cell Biology and Inherited Heart Disease),
BSc Hons (Biomedical Science)

As a medical science researcher, Christiana has worked in the field of inherited heart disease for over a decade, and continues to research the latest in medical health. Christiana loves to be active in the outdoors and is passionate in sharing with others on how to live a healthy, abundant life, both physically and spiritually.



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