We all need sleep. For most of us we need between six and nine hours of good quality sleep a day in order to function efficiently.

Of course there are people who apparently need fewer hours and Mrs Thatcher famously (and allegedly) needed only three hours.

**How Sleep Works**

The brain consists of millions and millions of nerve cells which communicate with each other by chemicals.

There are minute gaps between nerve cells and these are called *synapses*.

The chemicals are released by the end of one nerve, cross the space between the nerves and are picked up by receptors in the adjacent nerve.

The chemicals are called *neurotransmitters* and link the components of the electrical system.

The neurotransmitters act on different groups of neurones in various parts of the brain to control whether the individual is asleep or awake.

There are a large number of the transmitters which act on specific areas of the brain to encourage or inhibit types of sleep.

Prominent amongst them is histamine which is often described as the *wakefulness master*.

Histamine is at its highest levels during waking and at low levels during sleep (which is why antihistamines used for such things as hay fever result in drowsiness). Serotonin is part of a chain action which
acts on key areas of the brain to encourage sleep [for that reason SSRI drugs (selective serotonin reuptake inhibitors) may interfere with sleep when treating depression].

Serotonin is also used in the manufacture of Melatonin, also called the Sleep Hormone. Melatonin regulates the circadian (Biological) clock and therefore the sleep/wake cycle. Its production is inhibited by light.

In simple terms, there are two mechanisms which influence our sleep patterns. We have the influence of our circadian clock (this is a built-in rhythm based on a roughly twenty-four hour cycle).

It is generated within the body but it can be influenced by external cues such as variation in daylight or temperature. The second factor is the homeostatic drive to sleep. (this is an inbuilt system operating towards a sleep-wake homeostatis which forms a balance against the circadian element.

It can be thought of as an internal biochemical system acting as a timer ensuring that being asleep or awake are within required parameters and providing the drive to sleep and regulating the intensity of the sleep).

When we go to sleep, it starts with a period of light, dreamless sleep lasting 15-30 minutes. This is known as Stage 1. It is then followed by longer periods of sleep of two distinct types; REM sleep and Slow-wave sleep.

REM (rapid eye movement) sleep (Stage 2) is something of a mystery. It occurs for about 25% of sleep time for periods up to two hours at a time. It is characterised by rapid eye movements, more bodily movement, a more rapid pulse and increased breathing rate. Its purpose is not understood but it seems to be associated with periods of dreaming with visual images and it certainly coincides with

Cleverly, whales and dolphins have a mechanism where only one hemisphere of the brain sleeps at a time so that they can still surface from the water to breathe

The brain’s mechanism for sleeping is extremely complex. The ‘wakefulness’ system seems to be located in various parts of the brain rather than being located in any one part (as was originally thought). There is an area in the hypothalamus which is very influential in the sleeping/waking interface. The area has been described as the sleep switch. The electrical signals which keep us awake are interrupted by signals from the thalamus to the cerebral cortex when sleep is required. The signals effectively switch off the wakefulness information going to the cortex and the thalamus is called the gatekeeper of sleep.

When the areas of the brain most associated with being alert are active, signals are sent to the cerebral cortex (which does the learning, thinking and organising) and other inhibitory signals go to the areas of the brain responsible for promoting sleep. The result is a stable period of wakefulness.

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increased electrical activity in the visual part of the brain. Sexual arousal is also common in both men and women during REM sleep irrespective of whether dreaming is occurring and whether any dreams are erotic in nature. The precise function of REM sleep is unclear but it is clearly a necessity and may be associated with the updating of memory.

**Slow-wave sleep (Stage 3)** is non-rapid eye movement sleep. It is the deepest part of the sleep cycle with slow EEG (brain recording) waves. During this slow wave period the brain becomes less responsive to external stimuli. It is the hardest stage from which to awaken. Dreams do occur in this type of sleep as well. Researchers believe that slow wave sleep is important for cerebral restoration and recovery. However, as with other components of sleep, many questions remain unanswered.

**So, to summarise,** the brain processes memory through sleep. We dream in either REM sleep or slow-wave sleep but the characteristics of the dreams do differ considerably.

During the day we store information we have learned, much of it in the **hippocampus.** During slow wave sleep, the information is passed from the hippocampus to the frontal cortex. The information is compressed and reorganised and often becomes emotionally charged. Nightmares and dreams about terrifying events occur during slow wave sleep. So does bed-wetting or sleep-walking. In effect, the brain is filing data.

Dreams appear to be influenced by gender. Women report bright colours, glitter and dreams about their partners. Men do not report colours and appear to dream much less about their partners. Much of the time, dreams are bland and unexciting. They do not include the dreamer him or herself until puberty and beyond.

Interestingly, sleep quality is affected by bed sharing. Men’s quality of sleep is unaffected by or may benefit from sleeping with a partner; women appear to sleep less well when sharing a bed. Having sex does not appear to influence sleep duration or quality.

On a more practical level, ‘trying’ to get to sleep and disturbances of sleep are issues which concern people and which are responsible for many attendances at the GP annually, often accompanied by a request for sleeping tablets.

Certainly, sleep is **good for your health.** If questioned, 35% of us say that we sleep poorly and it undoubtedly has an adverse effect on our health. Persistent poor sleep increases the risk of physical diseases and shortens life expectancy. In general, if you spend the day wanting a nap, you are probably not getting enough sleep.

If you have a disturbed night, you may feel tired the next day and, heaven forbid, you may even be bad-tempered but it won’t do you any harm and you will probably catch up the next night.

If, however, you have serial poor nights of sleep you will suffer consequences including confusion, memory loss, difficulty concentrating and feelings of depression. Your risk of having an accident increases. For centuries torturers have appreciated the effects of sleep deprivation as a way of breaking the resistance of prisoners.

Sleeping well confers many physical benefits:
- It improves mental health and reduces the risk of anxiety or depression
- It improves mental performance
• It improves your immunity
• It diminishes the risk of heart disease, obesity and diabetes mellitus.
• It increases libido and fertility

Ill-health itself may be a cause of poor sleep
• Chronic fatigue syndrome, also known as myalgic encephalomyelitis, results in chronic tiredness but poor sleep.
• Bowel disorders such as coeliac disease, Crohn’s disease and Ulcerative Colitis can disturb sleep because of pain or diarrhoea.
• Viral illnesses in particular those that are chronic such as glandular fever.
• Hormonal disturbances including diabetes, thyroid disease, ovarian disease and adrenal disorders.
• Anaemia results in tiredness but poor sleep.
• Sleep apnoea, impairs respiration as a result of narrowing of the upper airway during sleep. The result is snoring, periods of cessation of breathing and repeated waking, leaving the sufferer tired during the day.
• Anxiety is a profound cause of loss of sleep. The Mental Health Foundation found that a third of the population lose sleep because of work or money worries. People with mental health problems very commonly feel tired.

A common presenting symptom at surgery is TATT - feeling Tired All The Time.

The Royal College of Psychiatrists have identified that one in five people feels excessively tired and one in ten has prolonged fatigue. Women feel tired more commonly than men.

For many there is a clear cause for feeling so tired.

• Clinical cause, as above, which may be physical or mental in origin
• Other Physical causes, such as pregnancy or obesity
• Environmental causes, such as the location or condition of the bedroom, excessive noise, other family disturbances or circumstances such as working night shifts which disrupt normal sleep patterns.
• Lifestyle causes such as a bad diet, or eating late, drinking alcohol watching too much late night television.

In order to put yourself in the best position to be able to have a good night’s sleep, there are some basic actions which will help although, of course, not all are practicable for everyone.

• Sleep if possible in a comfortable room which is quiet and undisturbed.
• It is worth spending a bit on a comfortable bed and mattress
• Don’t eat too much, avoid coffee and other caffeine containing drinks and don’t consume too much alcohol. All will tend to keep you awake.
• Don’t watch the television immediately before going to sleep
• Exercise is a good idea but not too close to going to bed
• Don’t smoke

Other, more difficult advice for many is:
• Try to keep regular sleeping hours. Easy for some, impossible for others.
• Try not to lie in bed worrying. Those who do find it almost impossible not to. Some suggest having a pad by the side of the bed to write down anything that is worrying or a to-do list for the following day. I have to say that it doesn’t work for me, but it might for you.
So, sleeping is a complicated business and modern lifestyle frequently clashes with adequate relaxing sleep. I terminate this article with two quotes which offer some classic wisdom.

“And if tonight my soul may find her peace in sleep, and sink in good oblivion, and in the morning wake like a new-opened flower then I have been dipped again in God, and new-created.”

-D.H. Lawrence

And, finally, for all those who struggle to sleep, you are in company with William Wordsworth.

“A flock of sheep that leisurely pass by One after one; the sound of rain, and bees Murmuring; the fall of rivers, winds and seas, Smooth fields, white sheets of water, and pure sky - I’ve thought of all by turns, and still I lie Sleepless…”

-William Wordsworth, To Sleep

Sleep well

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