**NREM**: Deep sleep is essential for restoring energy and allowing the body to undergo maintenance. While in NREM sleep:

* Wounds are healed
* white blood cells are created to aid your bodies defenses
* The muscles are restored
* The growth hormone is released
* Without enough deep sleep, all of these processes will be hampered.

While under the deepest levels of sleep the brain reorganizes the many mental pathways within the cortex. This process is critical for learning and ongoing brain development.

**REM**: Whilst in NREM sleep the brainwaves become progressively slower and deeper, while in REM sleep the brainwaves are almost identical as if you’re awake. REM sleep is known as paradoxical sleep. It may look like you’re fast asleep, but there’s a lot happening inside your brain.

For this reason, REM isn’t really what we would consider sleep. We’re not asleep in the sense that the body turns itself off, but we’re not awake either. So what’s the point of REM if we’re neither asleep nor awake?

When you’re awake the majority of your mental input is coming from your surroundings, but when you’re in REM, all this mental stimulus being generated by the brain itself.

This internal mental processing is believed to help to process memories and form new skills. The brain is awake but the body isn’t, so it’s the perfect time for your brain to reorganize the vast amount of thoughts gained during the day.

Dreams, which make up a lot of REM sleep, are believed to help you with this too. Songbirds have been shown to practice new mating calls in their dreams that they heard then they were awake.

**Which type of sleep is most important?**

You go into NREM sleep as soon as we fall asleep, suggesting that NREM might be the most important. REM only gets its turn later in the night after you’ve first completed a cycle of NREM sleep.

When you’re deprived of NREM sleep, the body tries to make up for it whenever it next gets the chance. The body also tries to make up for REM, although not as much as it does for NREM.

While we need NREM, we don’t appear to need REM sleep after childhood. The brain stimulation is critical for proper brain development. When we were still a fetus or a small child who hadn’t yet developed the senses, REM sleep is the only proper stimulation the brain would get. But when we’re older we can get this stimulation from the outside world.

People deprived of REM sleep, either through an experiment or through the use of some types of antidepressants (that have the effect of blocking REM sleep) don’t appear to develop any major health problems.

REM interrupts deep sleep in 90 minutes cycles throughout the night. Maybe this is because deep sleep cannot be sustained for long periods of time. Such inactivity could be bad for the brain. Maybe coming out of deep sleep prevents us from having too much sleep, which we know can be harmful.

Maybe then REM is a way of waking up the body, without causing you to regain awareness. If the body woke you up then you would be faced with having to fall asleep again. Many people find it hard to fall asleep the first time at night, never mind after every 90 minutes of previous sleep. Instead, if the brain becomes active but keeps you asleep, it removes the need to wake up and fall back to sleep, and the brain can send you back to sleep whenever it wishes.

Source: <http://www.sleepforall.com/types-of-sleep.htm>

The period of NREM sleep is made up of stages 1-4. Each stage can last from 5 to 15 minutes. A completed cycle of sleep consists of a progression from stages 1-4 before REM sleep is attained, then the cycle starts over again.

**Stage 1:** Polysomnography (sleep readings) shows a reduction in activity between wakefulness and stage 1 sleep. The eyes are closed during Stage 1 sleep. One can be awakened without difficulty, however, if aroused from this stage of sleep, a person may feel as if he or she has not slept. Stage 1 may last for five to 10 minutes. Many may notice the feeling of falling during this stage of sleep, which may cause a sudden muscle contraction (called hypnic myoclonia).

**Stage 2:** This is a period of light sleep during which polysomnographic readings show intermittent peaks and valleys, or positive and negative waves. These waves indicate spontaneous periods of muscle tone mixed with periods of muscle relaxation. The heart rate slows and the body temperature decreases. At this point, the body prepares to enter deep sleep.

**Stages 3 and 4:** These are deep sleep stages, with stage 4 being more intense than Stage 3. These stages are known as slow-wave, or delta, sleep. If aroused from sleep during these stages, a person may feel disoriented for a few minutes.

During the deep stages of NREM sleep, the body repairs and regenerates tissues, builds bone and muscle, and appears to strengthen the immune system. As you get older, you sleep more lightly and get less deep sleep. Aging is also associated with shorter time spans of sleep, although studies show the amount of sleep needed doesn't appear to diminish with age.

Usually, REM sleep occurs 90 minutes after sleep onset. The first period of REM typically lasts 10 minutes, with each recurring REM stage lengthening, and the final one may last up to an hour. Polysomnograms show brainwave patterns in REM to be similar to that recorded during wakefulness. In people without sleep disorders, heart rate and respiration speed up and become erratic during REM sleep. During this stage the eyes move rapidly in different directions.

Intense dreaming occurs during REM sleep as a result of heightened brain activity, but paralysis occurs simultaneously in the major voluntary muscle groups. REM is a mixture of encephalic (brain) states of excitement and muscular immobility. For this reason, it is sometimes called paradoxical sleep.

The percentage of REM sleep is highest during infancy and early childhood. During adolescence and young adulthood, the percentage of REM sleep declines. Infants can spend up to 50% of their sleep in the REM stage of sleep, whereas adults spend only about 20% in REM.

Source: <http://www.webmd.com/sleep-disorders/excessive-sleepiness-10/sleep-101>

Note that this is why it is important to ensure people are being exposed to daylight for at least 15 minutes a day.

RE: Melatonin:

Melatonin is a natural hormone made by your body's pineal (pih-knee-uhl) gland. This is a pea-sized gland located just above the middle of the brain. During the day the pineal is inactive. When the sun goes down and darkness occurs, the pineal is "turned on" by the SCN and begins to actively produce melatonin, which is released into the blood. Usually, this occurs around 9 pm. As a result, melatonin levels in the blood rise sharply and you begin to feel less alert. Sleep becomes more inviting. Melatonin levels in the blood stay elevated for about 12 hours - all through the night - before the light of a new day when they fall back to low daytime levels by about 9 am. Daytime levels of melatonin are barely detectable.

Besides adjusting the timing of the clock, bright light has another effect. It directly inhibits the release of melatonin. That is why melatonin is sometimes called the "Dracula of hormones" - it only comes out in the dark. Even if the pineal gland is switched "on" by the clock, it will not produce melatonin unless the person is in a dimly lit environment. In addition to sunlight, artificial indoor lighting can be bright enough to prevent the release of melatonin.

The amount of melatonin released at night varies among individuals, but it is somewhat related to age. Children on average secrete more melatonin than adults, which decreases further with age. However, research has shown that older people with sleep problems do not always have lower melatonin levels than people who experience normal sleep.

Source: <http://www.sleepfoundation.org/article/sleep-topics/melatonin-and-sleep>

**Immune system:** Research shows a close relationship between sleep and your immune system. Losing sleep can impair your body’s ability to fight off illness.

**Chronic illness:** Both short sleep durations (less than 5 hours per night) and long sleep durations (9 or more hours per night) have been shown to have a negative impact on heart health, according to an analysis published in the European Heart Journal.

In particular, your chances of developing heart disease or having a stroke are greatly increased with less sleep.

Shortened sleep is associated with higher rates of breast, colon and prostate cancers. Overnight shift workers may take the brunt of this burden. People who don’t get enough sleep increase their risk of developing diabetes.

7 to 8 hours of rest is the optimal range to keep blood sugar balanced and insulin regulated.

**Brain:** Even missing one night of sleep can lead to cognitive issues. Brain functions like memory, decision making, reasoning and problem solving (executive functions) are impacted along with focus, alertness, locking in memory, and overall learning. Confirmed by a study in Experimental Brain Research. These effects on the brain have a major impact on productivity

**Weight gain :** Lack of sleep can cause you to pack on pounds.

A study examined the relationship between sleep and weight in 21,469 adults over the age of 20. The people who slept less than 5 hours each night over the course of the three-year study were more likely to gain weight and eventually become obese.

Those who slept between 7 and 8 hours gained less weight. Chronic sleep deprivation may cause weight gain by affecting the way our bodies process and store carbohydrates and by altering levels of hormones that affect our appetites.

**Accidents:** 4 hours less or sleep at night increases your risk of a car accident by 3 times. Those working shift work, commercial drivers, business travelers and those working odd hours were more vulnerable.

**Appearance:** Lack of sleep ages you faster causing an impact on your skin such as fine lines, wrinkles, uneven skin color, and marked looseness of the skin. It also impacted self esteem with subjects being more dissatisfied with their appearance in comparison to their counterparts.

**Mood:** Studies have shown that even partial sleep deprivation has a significant effect on mood. University of Pennsylvania researchers found that subjects who were limited to only 4.5 hours of sleep a night for one week reported feeling more stressed, angry, sad, and mentally exhausted. Sleep loss may result in irritability, impatience, inability to concentrate and moodiness. Too little sleep can also leave you too tired to do the things you like to do.

If you are going to read in bed, switch your bedside lamp to a 15 watt bulb. Low lighting is key to signaling your body to prepare for sleep.

Other sources:

<http://healthysleep.med.harvard.edu/need-sleep/whats-in-it-for-you/mood>
<http://www.sleepforall.com/types-of-sleep.htm>
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