Neurophysiology of sleep

Sleep is naturally recurring state of mind characterized by altered consciousness, relatively inhibited sensory activity and inhibition of all voluntary muscles. This state is typical to all living organisms –from mammals to worms.

Even though humans spend 1/3 of their time sleeping, to this day the functions of the sleep such as information reprocessing, energy storage and mobilization are not fully understood.

The big achievement towards the sleep research was made in 1937 when encephalogram was invented ,which described electrical activity of brain. In mammals sleep is divided in two types: rapid eye movement or REM phase and non-rapid eye movement or NREM phase. REM sleep phase is also known as paradoxical sleep hence the brain's electrical activity is the same as of the awaked brain's. In contrast, NREM is known as orthodoxical sleep during which brain's electrical activity slows down.

There are four frequency ranges of waves that can be distinguished in EEG trace. Beta waves (18-25 cycle per second), low amplitude waves are associated with wakefulness. Both hemisphere of the brain is active, especially frontal part. Alpha (8-17 cycle per second) have high amplitude than beta waves and high electrical activity is shown in cervical part of the brain. Theta (3-7 cycle per second)- electrical activity of cortex and hippocamp. Delta < 2 per second. It's electrical activity is as following: in adults it is in frontal part and in children it's in a back part of the brain.