



## Editorial

### Explorations of Human Brain

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The journal titled Journal of Experimental and Clinical Neurosciences (JECNS) appears in online format to fulfill the promise of providing more data to explore human mind and establish a forum for researchers to disseminate their discoveries. The topics provided in this issue vary but all aimed at increasing our understanding of the complex nature of human nervous system. Our nervous system is who we are. And understanding this complex system will help us to understand ourselves and the universe around us.

A very important topic in this regard relates to sleep deprivation and guidelines for animal models of sleep deprivation that can be used to explore effects of sleep deprivation on our nervous system. Why sleep is important as it relates to our brain function? Why we need to be concerned about sleep? Does sleep deprivation affect our nervous system?

Decades of research strives to respond to these questions. During sleep, majority of systems in the body slow down. Our metabolic rate diminishes; our heart decelerates; our respiratory system reduces its function and retains carbon dioxide, and our gastrointestinal tract relaxes. But what happens to our nervous system?

Sleep consists of various states [1]. Research shows that our central nervous system go through distinct states including wakefulness (right before falling asleep), non-rapid eye movement

sleep (NREM), and rapid eye movement sleep (REM) sleep. Each state is characterized with activation of certain circuits in brain. Further, autonomic nervous system has different balance of activity in each sleep states. In general, with sleeping the vagal system dominates except during phasic parts of REM sleep. In contrast the central nervous system goes through states of lower activity and hyperactivity. Interestingly, instability of these states creates various sleep disorders named “Parasomnias” [2]. Many of these diseases are diagnosed and managed by neurologists and are the topic of research by neuroscientists. A typical example is narcolepsy that presents with features of REM sleep including hallucinations when awake, sleep paralysis and loss of muscle tone (cataplexy) while a patient transitions to or from REM to wakefulness [3].

Studies of sleep deprivation clearly indicate significant change in nervous system function. Sleep deprivation affects ability to stay awake, ability to focus, attention span, learning and memory formations. For example, sleep deprivation in young adults preferentially impairs prefrontal cortical function very similar to effects of aging on this region of the brain [4]. Sleep deprivation in animal models act as a stressor and may result in structural changes in regions of brain (hippocampus, amygdala, and prefrontal cortex) involved in memory and emotions [5]. Studies of partial sleep deprivation show impairment of various brain function equal to being intoxicated with alcohol.

Thus, we must agree with Dr. Santiago Ramon y Cajal, the Spanish pathologist, histologist, neuroscientist and Nobel laureate, when he said: “As long as our brain is a mystery, the universe, the reflection of the structure of the brain will also be a mystery.” [6]. As long as we do not know our nervous system, we will not know the universe that we live in. With that in mind, we would like to congratulate the editor and staff of the journal in undertaking such a noble task of providing a medium for researchers to exchange their data and ideas.

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#### Conflict of interest

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