MedicalXpress

Study Shows Brain Functions Same Way Awake or Asleep

November 3 2008

(PhysOrg.com) -- Johns Hopkins researchers have found strong evidence supporting the view that the sleeping mind functions the same as the waking mind, a discovery that could significantly alter basic understanding of the normal and abnormal brain.

The evidence comes from a study, to appear online this month in the journal Human Brain Mapping, of 11 healthy male and female participants whose rapid eye movements (REM) in "dream" sleep were timed using a video camera. The REM tracking was accompanied by special MRI images designed to visualize brain activity.

Results revealed activity in areas of the brain that control sight, hearing, smell, touch, balance and body movements.

"This is the first time we have been able to detect brain activity associated with REM in areas that control senses other than sight," says lead researcher Charles Hong, M.D., Ph.D., assistant professor in the Department of Psychiatry and Behavioral Sciences at the Johns Hopkins University School of Medicine. "After comparing our data to other studies on awake people, we learned that our findings lend great support to the view that the waking brain functions in a similar way."

Hong says this method may allow simultaneous examination of major brain systems that are activated when REMs occur and are reported to be abnormal in some psychiatric diseases.

In addition, Hong says, their method may be useful in people with Alzheimer's disease or schizophrenia and even infants. In awake studies, it's required that subjects follow instructions and perform tasks to stimulate brain activity, tasks that these groups might have difficulty completing.

Their method may also be useful in people with movement disorders like Parkinson's disease.

"Head movements can create false data in MRI studies," says Hong, "while conveniently, REM sleep greatly reduces muscle tone, thus head movements."

Finally, Hong says that in order to obtain reliable results from awake participants it would require studying multiple subjects.

"In contrast, only six minutes of MRI data from a single participant in our REM study produced robust results," says Hong.

He added that the ability to draw results from a single person permits researchers to compare results with other data that is specific to an individual.

"We can also analyze changes over time within a single person with a psychiatric disease. Our method may make a powerful tool to study the development of the brain starting from birth," he says.

Provided by Johns Hopkins University