Findings reveal brain mechanisms at work during sleep

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New findings presented today report the important role sleep plays, and the brain mechanisms at work as sleep shapes memory, learning, and behavior. The findings were presented at Neuroscience 2012, the annual meeting of the Society for Neuroscience and the world's largest source of emerging news about brain science and health.

One in five American adults show signs of chronic sleep deprivation, making the condition a widespread public health problem. Sleeplessness is related to health issues such as obesity, cardiovascular problems, and memory problems.

Today's findings show that:

- Sleepiness disrupts the coordinated activity of an important network of brain regions; the impaired function of this network is also implicated in Alzheimer's disease (Andrew Ward, abstract 909.05, see attached summary).
- Sleeplessness plays havoc with communication between the hippocampus, which is vital for memory, and the brain's "default mode network;" the changes may weaken event recollection (Hengyi Rao, PhD, abstract 626.08, see attached summary).
- In a mouse model, fearful memories can be intentionally weakened during sleep, indicating new possibilities for treatment of post-traumatic stress disorder (Asya Rolls, abstract 807.06, see attached summary).

- Loss of less than half a night's sleep can impair memory and alter the normal behavior of brain cells (Ted Abel, PhD, abstract 807.13, see attached summary).

Other recent findings discussed show:

- How sleep enables the remodeling of memories—including the weakening of irrelevant memories—and the coherent integration of old and new information (Gina Poe, PhD, see attached speaker's summary).
- The common logic behind seemingly contradictory theories of how sleep remodels synapses, aiding cognition and memory consolidation (Giulio Tononi, MD, PhD, see attached speaker's summary).

"As these research findings show, we cannot underestimate the importance of a good night's sleep," said press conference moderator Clifford Saper, PhD, MD, from the Harvard Medical School, an expert on sleep and its deprivation. "Brain imaging and behavioral studies are illuminating the brain pathways that are blocked or contorted by sleep deprivation, and the risks this poses to learning, memory, and mental health."

Provided by Society for Neuroscience