

**PRESS RELEASE**

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**A GOOD NIGHT'S SLEEP STRENGTHENS YOUR MEMORY**

When we have to make a difficult decision, or work through an idea, it's often best to 'sleep on it' and come back to it fresh the next day. Swiss scientists have discovered that sleep can have lasting consequences on brain function by stimulating new brain connections that strengthen the learning processes and directly influence our actions.

"Sleep on it'. Well, we all know about this advice, but what does it mean? Does sleep help us change or clarify our mind? Is a period of sleep beneficial for the processing of recent memory?" said Dr Sophie Schwartz from the University of Geneva.

Speaking at the Forum of European Neuroscience today (Monday 14 July), she explained that any new experience is encoded in memory, but memory traces can later be forgotten or become more stable and permanent. Among the numerous factors that can affect the fate of memory traces, sleep seems to play a critical role. Dr Schwartz used brain scans to identify regional changes in brain activation in healthy humans who were given new visual stimuli - for example, seeing an unknown face - or tasks, such as maintaining the position of a joystick as close as possible to a moving dot on a computer screen. These people were then allowed to sleep normally or not. (A whole night of normal sleep was compared to whole night of sleep deprivation, naps vs no nap, eight hours night sleep compared to eight hour day wakefulness.)

It has long been thought that that a night's sleep clarifies our thinking, but Dr Schwartz' research has shown a re-organisation within brain cell connections that will subsequently affect behaviour and decisions. "Our results revealed that a period of sleep following a new experience can consolidate and improve subsequent effects of learning from the experience. This improvement comes from changes in brain activity in

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specific regions that code for relevant features of the learned material." Learning and memory consolidation transforms a weak into a more permanent memory; for example, a better memory for a recently learned lists of words, or better performance on a motor task, such as riding a bike or juggling.

Therefore, a role of sleep in strengthening learning-related changes in the adult human brain helps fine-tune the pathways in the nervous system that govern our actions when we are awake. However, the specific period of sleep and how long sleep should last to benefit cognition is still unknown.

"Everybody sleeps! But some people sleep less than the average population, others have an abnormal sleep structure, and some drugs may change the duration of specific sleep stages. We also need to better study the impact of sleep on brain development in children," she said. Using a brain imaging approach, it will now be possible to assess the neuronal impact of sleep disturbances in patients with insomnia, apnea syndrome, depression or narcolepsy.

Looking ahead, she said, "We now want to know which brain circuits are involved in these learning effects during the night and if we can experimentally enhance such effects. We want to assess how sleep disorders affect emotional and cognitive functioning; and what are the biological factors responsible for these effects."

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**Notes to Editors**

FENS 2008 is hosted by the Swiss Society for Neuroscience and will attract over 5,000 international delegates. The Federation of European Neuroscience Societies, founded in 1998, aims to advance research and education in neuroscience, representing neuroscience research in the European Commission and other granting bodies. FENS is the European partner of the American Society for Neuroscience. FENS represents a large number of national European neuroscience societies and has around 16000 members. <http://fens2008.neurosciences.asso.fr/>