**A Single Stressful Event May Cause Long-Term Effects in the Brain**

[**Neuroscience News**](http://neurosciencenews.com/author/neurosciencenew/)**November 23, 2016**

***Summary: A new study reports that a single stressful event may cause long term consequences in the brain.***

***Source: University of Milan.***

**One day a person experiences deep stress caused by a sudden happening, for example a traffic accident or a natural catastrophe. Later on this person could develop a serious neuropsychiatric disorder that may last for years, posttraumatic stress disorder (PTSD).**

**Stress is considered a primary risk factor for neuropsychiatric disorders. However, traditional animal models for these disorders are based on repeated or chronic stress, although it is known that in some cases (e.g., PTSD) even a single trauma may be enough to induce the disorder.**

**A recent study found that a** [**single stressful event**](http://neurosciencenews.com/brain-changes-stress-event-5589/) **may cause long-term consequences in the brain. The authors had found earlier that a short protocol of stress (40 min) enhances the release of glutamate (the major excitatory transmitter) in the prefrontal cortex (PFC), an effect due mainly to an increase in the number of glutamate-containing vesicles available for release at synapses. They found now that the enhancement of glutamate release in PFC is sustained for at least 24 hours after stress. They also found that after 24 hours significant atrophy of apical dendrites (the receiving part of neurons containing receptors for glutamate) is observed in PFC. Dendrite atrophy is usually measured after weeks of chronic stress in stress-based animal models.**

**A recent study found that a single stressful event may cause long-term consequences in the brain. NeuroscienceNews.com image is adapted from the University of Milan press release.**

**These results completely change our traditional distinction between the effects of acute vs chronic stress. It appears that a single exposure to stress may have long-term functional (glutamate release) and structural (dendrite atrophy) consequences. The dendrite atrophy was found to be sustained for 2 weeks after stress. These stress-related changes may be relevant for pathophysiology of PTSD and other stress-related disorders. Moreover, the assessment of glutamate release and related parameters after stress represents an experimental model to test new compounds for therapy of PTSD, a disorder in which an efficient therapy is still missing.**