

Scientists find insights into post-traumatic stress disorder

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MUMBAI: Scientists have found insights into why people suffer from flashbacks, nightmares, anxiety after a terror attack, sexual violence, war and even an accident.

In a path-breaking discovery, a study by a two-member team from Bangalore-based National Centre for Biological Sciences (NCBS), which is a part of the Tata Institute of Fundamental Research, has revealed how a person's brain diagnosed with post-traumatic stress disorder (PTSD) stops differentiating from safe and dangerous stimuli, which results in a state of generalised fear.

According to the researchers, the findings can be used for designing new treatments against PTSD, and in exploring new therapies for trauma patients.

Till now, it was known that the amygdala – brain structure that forms memories of fearful experiences and the emotional hub of the brain – tends to be hyperactive among PTSD patients while the cause was poorly understood.

THE EXPERIMENT

Rats were exposed to two tones. One was paired with a mild electric shock that predicted danger, while the other was safe

Researchers recorded electrical signals from individual neurons in the amygdala

The rats showed a higher fear response only to the dangerous tone

But when the shock associated with the dangerous tone was made stronger, the same animals

showed a greater fear response to the safe tone as well

These animals showed a significant shift in the electrical activity with a much larger proportion of amygdala neurons losing their ability to discriminate between safe and dangerous stimuli causing fear among the rats

The study 'Neuronal encoding of the switch from specific to generalised fear' is published in the current issue of Nature Neuroscience.

The study (see box), spanning four years, did experiments on rats which showed that individual neurons in the amygdala that were initially capable of telling apart safe from dangerous stimuli start firing indiscriminately causing the rat to become fearful of non-threatening stimuli.

The rats showed how abnormal electrical signalling in individual neurons can add up to give rise to amygdala hyperactivity and generalisation of fear in PTSD patients.

“Having a strong fear mem-

ory is important for survival. But being afraid of things that are safe is problematic. Therefore, we felt the need to know what goes wrong,” said professor Sumantra Chattarji, who co-authored the study with Supriya Ghosh.

“There is hardly any research on trauma or mental health. This study is very useful from the point of designing new therapies for PTSD patients,” said Seema Hingorrany, clinical psychologist and trauma researcher.