Scientists Pinpoint Brain's Fear Control Area

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By Patricia Reaney

LONDON (Reuters) - Scientists have pinpointed an area of the brain involved in overcoming fear which may help to improve treatments for people suffering from post-traumatic stress disorder and anxiety attacks.

When they stimulated the region of the brain in laboratory rats who had been conditioned to associate a sound with a small electrical shock, their fear diminished.

"We've found an area of the brain that is activated, or turned on, when fear is reduced. Consistent with that, if we stimulate that area electrically we can reduce fear," said Gregory Quirk of the Ponce School of Medicine in Puerto Rico.

Fear is a reaction to danger and a survival instinct in animals and humans. Scientists had suspected there was a system in the brain that reduced fear without completely erasing the memory of it, but until now they did not know where it was.

"We think we found it because in this part of the prefrontal cortex (of the brain) it is the first time an area has been activated, or turned on, when fear is reduced," he added in an interview.

LEARNING NOT TO BE AFRAID

Quirk and his colleague Mohammed Milad think the job of the prefrontal cortex, which they found by studying recordings of nerve cells in the brains of rats, is to inhibit the fear response.

They suspect the prefrontal cortex reduces fear by inhibiting the amygdala, a hub of fear memory deep in the brain.

The rats in the study were taught to associate a sound with an electrical shock and froze when they heard it. All animals and humans learn fear associations.

When the rats heard the tone without the shock several times they learned not to be afraid -- a process called extinction. But the original fear association was not erased because it is important for survival but overtaken by the new memory.

"Our data suggest that the rats that were shown the tone-fear stimulus again and again with stimulation of this area had very low fear," said Quirk, whose research is reported in the science journal Nature.

People with post-traumatic stress disorder appear to have weak activity in the prefrontal cortex of the brain, according to the scientists. They believe a painless experimental technique called transcranial magnetic stimulation might help them control fear.

"Now that we have identified the area it should be straightforward to strengthen the connections in this area so they have stronger safety memory," Quirk said.

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