

Mice overcome fear, depression with natural Prozac

Wed Oct 8, 2008 9:02pm BST

By Maggie Fox, Health and Science Editor

WASHINGTON (Reuters) - The brain can produce antidepressants with the right signal, a finding that suggests that meditating, or going to your "happy place," truly works, scientists reported on Wednesday.

Mice forced to swim endlessly until they surrendered and just floated, waiting to drown, could be conditioned to regain their will to live when a tone they associated with safety was played.

The experiment suggests that there are good ways to teach people this skill, and points to new routes for developing better antidepressants, said Dr. Eric Kandel of the Howard Hughes Medical Institute and Columbia University in New York, who led the research.

"The happy place works. This is like going to the country," Kandel said in a telephone interview.

Writing in the journal *Neuron*, Kandel's team said they used classical conditioning to train mice. They had already conditioned some mice to fear a neutral tone by playing the sound when they shocked the animals' paws. After a while, the tone itself creates fear.

"It scares the hell out of the animal," Kandel said.

They decided to reverse the study -- they played the tone when they were not shocking the mice. "It learned that the only time it was really safe is when the tone comes on," Kandel said.

To make a mouse depressed, they used a method favored by drug companies called learned helplessness.

"You put an animal into a pool of water and it can't get out. It gives up and it stops swimming and it just floats," Kandel said.

"When you give the animal an antidepressant, it starts swimming again. When we played the tone, it started to swim again just as it did with the antidepressant."

NEW PATHWAYS

Further experiments showed the tone and an antidepressant drug worked synergistically, he said.

When they looked at the brains of their mice, they saw using the conditioned "safety" tone activated a different pathway than the drugs did.

It affected dopamine, while antidepressants work on serotonin. Both are message-carrying molecules called neurotransmitters.

The conditioning also affected a compound called brain-derived neurotrophic factor or BDNF - which helps nourish and encourages the growth of brain cells.

The learned safety did not affect serotonin.

Mice conditioned by the "safety" tone also had more newborn brain cells in the dentate gyrus, a part of the brain linked with learning and depression.

When Kandel's team used radiation to slow the birth of new cells in the dentate gyrus, the effects of learned safety and of antidepressants were blunted.

Kandel noted that antidepressant drugs appear to work, in part, by encouraging the growth of new brain cells -- as does psychotherapy.

"Learning involves alterations in the brain and gene expression," Kandel said. "Psychotherapy is only a form of learning."

This shows how effective psychotherapy, meditation and other stress-reduction tools may be, and it could help in the design of new drugs, Kandel said.

"This opens up new pathways that may be profitable," he said.

(Editing by Will Dunham and Xavier Briand)

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