New Research Finds Sadness Circuit

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SEO: brain, amygdala, limbic system, memory, hippocampus,

Category: News/longevity

None of us are strangers to sadness. It’s something every one of us has experiences at some time in our lives. Now, after the results of research at the University of California San Francisco, scientists think they know what sadness looks like, too. They’ve caught a glimpse of in the brain. Their study was published in the journal, *Cell*, last Thursday.

Scientist had established that most moods, including sadness, involve the limbic system, specifically the amygdala, an almond-shaped mass found in each side of the brain. In addition, there’s evidence that the hippocampus, that is associated with memory, can play a role in emotion as well. But they wanted to know how to track sadness and how it expresses itself in the physical brain.

Much of what is was previously known about emotion networks in the human brain comes from fMRI and positron emission tomography (PET) studies, in which specific emotions are provoked using controlled stimuli.

Because fluctuations within the brain happens rapidly, those simple brain scans weren’t quick enough to capture what was happening second by second. So, they outfitted 40-70 tiny electrodes into the brains of 21 epilepsy patients who were waiting for brain surgery, and monitored their brains’ electrical activity. This made it much easier for the UC team to look for patterns between their brain activity and mood. The subjects were also asked to keep a journal of their emotions/moods for one week which was used as a source for comparison to brain activity.

The researchers observed that there was one circuit of communication between the amygdala and the hippocampus that consistently showed interconnection in the subjects and provided detailed map of what was going on in the brain. According to Dr. Joshua Gordon, Director of The National Institutes of Health, the study confirms research already performed on animals.

So, what’s really going on? Apparently, there’s a link between remembering unpleasant things and feelings of sadness. It makes sense. But it’s still not clear whether the circuit between emotion and memory causes the feeling of sadness or the other way around. Like most research, results only lead to more questions and clarifying research.

Still, researcher Vikaas Sohal, said he hopes the finding will bring comfort to patients in the form of a new explanation for what’s going on during times of sorrow: “As a psychiatrist, it’s incredibly powerful to just be able to say to patients, ‘Hey, I know there’s something happening in your brain when you’re feeling down.'”

Depression affects more than 3.3 million adults in the United States and impacts every area of an individual’s life. This research will help in the development of more effective treatment to increase the quality of their lives

The study is an outgrowth of and shows the value of the [BRAIN Initiative](https://www.braininitiative.nih.gov/), which was launched by then-President Obama in 2013. The research team's funding came in part from the Defense Advanced Research Projects Agency, a major supporter of the BRAIN Initiative.

RESEARCH

1. An Amygdala-Hippocampus Subnetwork that Encodes Variation in Human Mood. Cell.

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DOI:<https://doi.org/10.1016/j.cell.2018.10.005>.

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