

Individuals with rage disorder have smaller volumes in brain areas linked to emotion

Posted on January 12, 2016 by [Kevin Jiang](#) in [At the Bench](#), [Don't Miss](#)



(https://sciencelife.uchospitals.edu/2016/01/12/individuals-with-rage-disorder-have-smaller-volumes-in-brain-areas-linked-to-emotion/1024px-kennedy_expressway_and_metra/)

The Kennedy Expressway is the most congested highway in the US.

On any given afternoon on the [Kennedy Expressway](http://www.chicagotribune.com/news/ct-kennedy-congestion-met-20151123-story.html) (<http://www.chicagotribune.com/news/ct-kennedy-congestion-met-20151123-story.html>), there are bound to be incidents of road rage – explosive, sometimes violent outbursts of anger. But terrible Chicago traffic isn't the only reason why these events are so frequent. An estimated 16 million Americans are affected by a mental disorder known as [intermittent explosive disorder](http://www.nlm.nih.gov/news/science-news/2006/intermittent-explosive-disorder-affects-up-to-16-million-americans.shtml) (<http://www.nlm.nih.gov/news/science-news/2006/intermittent-explosive-disorder-affects-up-to-16-million-americans.shtml>) (IED), which is characterized by impulsive, extreme anger disproportionate to the situation that triggered it.

A new study by University of Chicago scientists provides striking evidence that the the brains of these impulsively aggressive individuals are altered. Publishing in the January issue of *[Biological Psychiatry: Cognitive Neuroscience and Neuroimaging](#)*

<http://www.sciencedirect.com/science/article/pii/S2451902215000075>), <https://psychiatry.uchicago.edu/directory/emil-f-coccaro-md>), MD, Ellen.C. Manning Professor and Chair of Psychiatry and Behavioral Neuroscience, and colleagues show that individuals with IED have significantly lower gray matter volume in the brain regions that regulate emotion.



<https://sciencelife.uchospitals.edu/2016/01/12/individuals-with-rage-disorder-have-smaller-volumes-in-brain-areas-linked-to-emotion/coccaro/>
Emil Coccaro, MD, Ellen.C. Manning Professor and Chair of Psychiatry and Behavioral Neuroscience

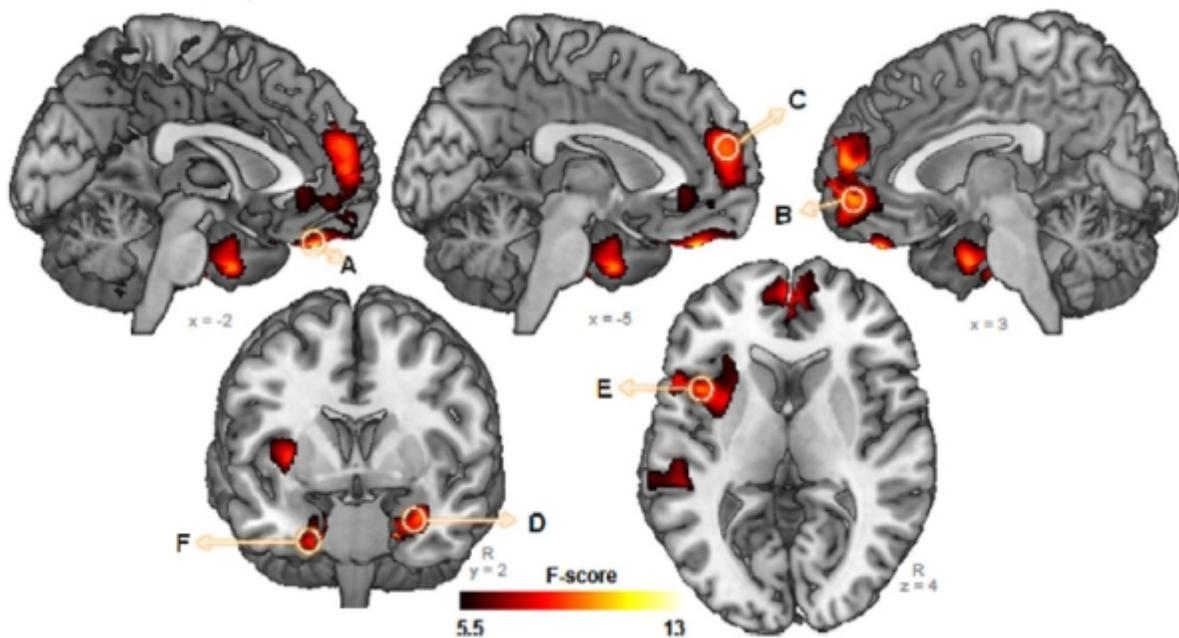
Our data confirm that IED is a brain disorder and not a disorder of ‘personality,’” said Coccaro. “The behaviors displayed by IED patients represent the expected consequence of altered brain structure and function underlying impulsive aggression in humans.”

IED is defined by the DSM-5 as recurrent, impulsive, problematic outbursts of aggression, disproportionate to the situation—extreme road rage, for example. It is thought to be more common than bipolar disorder and schizophrenia combined.

To study brain changes involved in IED, Coccaro and his colleagues performed high-resolution magnetic resonance imaging (MRI) scans in 168 people, including 57 who were diagnosed with IED, 53 healthy control subjects and another 58 control patients with psychiatric diagnoses.

The team discovered a direct correlation between history of impulsive aggressive behavior and gray matter volume in the frontolimbic region of the brain—an area known to play a central role in the regulation of emotions. Across all subjects, reduced gray matter volume directly correlated with increases in aggressive behavior. The inverse relationship was also observed.

“There is clear evidence of brain alterations in impulsively aggressive individuals, which are not due to other factors,” Coccaro said. “IED is not simply ‘bad behavior’ that requires an attitude adjustment.”



[\(https://sciencelife.uchospitals.edu/2016/01/12/individuals-with-rage-disorder-have-smaller-volumes-in-brain-areas-linked-to-emotion/coccaroetal2/\)](https://sciencelife.uchospitals.edu/2016/01/12/individuals-with-rage-disorder-have-smaller-volumes-in-brain-areas-linked-to-emotion/coccaroetal2/)

IED patients have reduced frontolimbic grey matter (regions highlighted)

The causes of the differences in gray matter volume are unknown, but IED runs in families and is thought to have a significant genetic component. Developmental processes and environmental influences may also play a role, and further studies are needed to investigate.

“More work needs to be done before we can use these brain scans to make diagnoses,” Coccaro said. “However, this work does inform us on what brain targets might be available for the development of novel treatments of impulsive aggression and IED.”

##

The study, “Frontolimbic Morphometric Abnormalities in Intermittent Explosive Disorder and Aggression,” was supported by the National Institute of Mental Health. Additional authors include Daniel A. Fitzgerald, Royce Lee, Michael McCloskey and K. Luan Phan.

- Biological Sciences
- Emil Coccaro
- intermittent explosive disorder
- Neuroscience
- Psychiatry
- road rage

About Kevin Jiang ([147 Articles](#))

Kevin Jiang is a Science Writer and Media Relations Specialist at the University of Chicago Medicine. He

focuses on neuroscience and neurosurgery, orthopedics, psychology, genetics, biology, evolution, biomedical and basic science research.

Connect With Us

Follow Science Life via Email

For Patients

UChicago Links

Copyright © 2016 | [Blog at WordPress.com.](#) | [The MH Magazine Theme.](#)