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Hormone serotonin, impulsivity linked in British study

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Serotonin plays a key role in regulating emotions such as aggression and impulsivity during decision making, according to British research appearing Thursday in the United States.

Neurologists and psychiatrists have long linked serotonin, a hormone that transmits chemical messages between nerve cells, and social behavior, but its precise role is controversial.

The British study in the June 6 edition of the journal *Science* is among the first to show a causal link between low levels of serotonin in the brain and impulsivity.

It also demonstrates why people can become combative on an empty stomach.

Serotonin levels naturally drop when a person hasn't eaten, because tryptophan, an essential amino acid necessary for the body to create serotonin, can only be obtained through diet.

Scientists from the University of Cambridge took advantage of that fact, and lowered the levels of brain serotonin in study participants by manipulating their diet.

Participants were asked to participate in an activity called the "Ultimatum Game," so researchers could observe how they reacted to situations perceived as unfair.

In the game, a player proposes dividing a sum of money with a partner. If the second person accepts, the sum is divided as proposed. If the offer is rejected, neither player receives any money. Normally, people reject about half the offers under which they would receive only 20 to 30 percent of the total, even knowing they would thus receive nothing.

But the rate of rejection soared to 80 percent when participants' serotonin levels were low.

"Our results suggest that serotonin plays a critical role in social decision making by normally keeping aggressive social responses in check," said Molly Crockett, a PhD student at the University of Cambridge Behavioural and Clinical Neuroscience Institute.

"Changes in diet and stress cause our serotonin levels to fluctuate naturally, so it's important to understand how this might affect our everyday decision making."

The findings cast new light on clinical disorders such as depression, obsessive compulsive disorder and severe anxiety, all characterized by low levels of serotonin.

They also suggests that people with depression and anxiety could benefit from therapy that trains them to control their emotions when making decisions, especially in a social context.

The study was funded by the Wellcome Trust and the Medical Research Council, Britain's largest charity.



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