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News

Brain chemical helps us tolerate foul play

Serotonin allows us to keep our cool when faced with life's unfairness.

[Daniel Cressey \(/news/author/Daniel+Cressey/index.html\)](/news/author/Daniel+Cressey/index.html)

Controlling your anger and reacting sensibly when someone treats you badly can be a problem. And if you have low levels of serotonin, it can be even more of a problem, a new study has found.

Molly Crockett at the University of Cambridge, UK, and her colleagues gave volunteers a drink that temporarily lowered their levels of serotonin, a brain 'neurotransmitter' linked to happy mood. They then had them play 'the Ultimatum Game', which involves accepting or rejecting offers of money.

Those with lower serotonin levels showed increased retaliation to offers that they perceived to be unfair.

"We've suspected for years that there's a link between serotonin and impulsive aggression and emotional regulation," says Crockett. "Until this study it wasn't clear whether serotonin was playing a causal role."

It has long been known that low serotonin levels are associated with groups of people prone to impulsiveness and problems with emotional control, such as alcoholics, violent criminals and suicide attempters. Low serotonin is also found in clinical conditions such as depression and anxiety.

"We've known for 30 years that low serotonin is associated with impulsivity, inwardly directed aggression and outwardly directed aggression," says David Nutt, head of the Psychopharmacology Unit at the University of Bristol's Faculty of Medicine and Dentistry, who was not involved in the new study.

"What we are doing now is externally manipulating it. We need to study it in a more controlled environment."

The Ultimatum Game

So how does the Ultimatum Game work? Well, imagine what you would do if someone offered you £6. But what if they offered you £6 out of a total of £13 that they'd been given to split with you?

Most people would take the money, especially if rejecting the money meant getting nothing.

But what if they offered you £6 out of £30 they'd been given to split with you? That is a clearly unfair split, but logically it is still better than nothing.

In the Ultimatum Game, you can punish the other player by rejecting the offer, meaning they get nothing. Of course, you also get nothing.

In Crockett's study, detailed this week in *Science* ¹(#B1), 20 participants were given a number of attempts at the game, with fair offers, defined as 45% of the stake, unfair offers, defined as 30% of the stake, and very unfair offers, defined as 20%. Participants were randomized to get the serotonin-lowering treatment or a placebo.



Foul! Without serotonin, we'd find it harder to deal with others who treat us harshly.

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While placebo participants rejected about 65% of very unfair offers, those with low serotonin rejected more than 80%.

Researchers also measured the mood, fairness judgement and reward processing of participants. They found these to be unaffected by lower serotonin, clearly implicating the neurotransmitter in the more aggressive response to injustice.

Our desire for fairness also seems to be a universal trait.

Crockett says even when the Ultimatum Game has been tested in poor countries with amounts of money equivalent to a week's or a month's wage, people still reject unfair offers. "The motivation for fairness is a strong one," she says.

References

1. Crockett, M. *et al.*, *Science*, early online publication doi: 10.1126/science.1155577 (2008).

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On the bright side, perhaps union employees will enjoy gifts of cheese and chocolate before each contract vote.

Posted by: **Mike Serfas** | 05 Jun, 2008

Talking about serotonin and its link with the level of anger or mood changes, one needs to look at how can this study can be useful to psychologists. The work needs more experimentation and validation of the same. I liked the article since I got to know why I retaliate when someone behaves harshly to me. It is a good piece of work and must be continued to validate the needs of psychologists, counselors, and scientists related in this field. The line 'Our desire for fairness also seems to be a universal trait.' is true, no doubt.

Posted by: **Payal Joshi** | 06 Jun, 2008

a good report... can u pls tell me how u record d serotonin levels? does it have anything to do with the reward and punishment centers?

Posted by: **ruta shah** | 08 Jun, 2008

the question begs how can we stimulate serotonon production in the brain at critical times ?

Posted by: **David Julian** | 08 Jun, 2008

Serotonin has a structure like other bioactive chemicals and chemists often try to set its structure - activity relation with that of body system in a manner best known to them. Biologists try to lament certain relationship based on the surrounding behavior and attainments of final structure after action based performance. However scientists in general forget that brain function is also associated with light and magnetism. If content of serotonin alone would have been a problem in hatching out a solution then by now all problems related to human behavior would have been solved. Light is well known for its wave and particle nature and magnetism is well defined even outside the magnetic field. Under such a situation commission or omission of light and magnetism along with serotonin or any other brain chemical has its inbuilt significance. Researchers may like to consider it.Regards Dr. R. Dayal Yadav

Posted by: **Dr. R. Dayal Yadav** | 08 Jun, 2008

The real cause of aggressive response to injustice may at times be for the purpose of self assertion only thus aimed at getting a payoff higher than the material loss caused by the injustice. Thus the aggressor as well s the responder both get what they wanted and are happy in that sense. Lack of serotonin may be prompting people to play these unhealthy games. Serotonin replenishment has been used for quite some time for the purpose of managing behavior problems. As such the observations made by the subject study is not surprising.

Posted by: **Nalsuresh Pai** | 09 Jun, 2008

But wait - no mention is made of the study participants' gender. One cannot begin to make sense of aggression without taking testosterone into account. This oversight renders the article useless.

Posted by: **Teresa Goodell** | 09 Jun, 2008

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