BBC

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**Cardiff University on brain chemistry and aggression**

Aggressive and impulsive behaviour in men could be linked to a deficiency of a particular type of neurotransmitter in the brain, a new study by Cardiff University scientists claims.

Neurological scientists have long suspected that impulsive and irrational behaviour may be caused, in part, by a lack of GABA (a chemical which sends messages between brain cells), in the dorsolateral prefrontal cortex.

This is the part of the brain responsible for analytical thinking and decision-making.

However, the university's Brain Research Imaging Centre, (Cubric), has used the latest in MRI brain scanning to capture images of this process at work.

The scientists studied male undergraduate students, with no history of psychiatric disorders or substance dependence, measuring their brain activity whilst asking them to make a series of hypothetical decisions.

They found that those with reduced activity in the dorsolateral prefrontal cortex were more likely to make poorly-reasoned or snap decisions, consistent with aggressive and impulsive behaviour.

"Now we're aware of this link, there are several directions in which we can take the research," said Dr Boy, who headed the research.

"The next stage needs to be understanding why GABA affects the dorsolateral prefrontal cortex in this way."

"After that we can start evaluating whether there's any way in which we could treat a GABA deficit in this area.

I suspect this could be difficult, as GABA is present throughout the brain, and raising the level indiscriminately may have all sorts of unforeseen consequences."

"The other area which needs further research is whether GABA levels in the dorsolateral prefrontal cortex fluctuate over time, as this study is simply a snapshot of levels on one given day."

Impulsive and irrational behaviour is the second most prevalent aspect in diagnosing any psychiatric illness.

It is a contributing factor in not only aggression, but also alcoholism, drug-addiction and problem gambling.

However the team specifically sought out subjects with no history of any of these conditions, in order to rule out the possibility that substance-abuse could reduce levels of GABA, rather than vice versa.

'Drunken fight'

Dr Boy is sharing his findings with NHS Wales, to discover whether they can be used to predict and prevent potential instances of violence against medical staff.

However he emphasises that whilst GABA deficiency appears to be a contributory factor in these behaviours, it is a much more complicated issue, and that environmental causes could play as big a part.

"I hope that our research will further scientists' understanding of how brain chemistry affects behaviour, but it's important not to over-emphasise the link."

"For instance 80% of violent crime is committed under the influence of alcohol.

"Whilst there is some evidence to suggest that reduced GABA levels may predispose someone to alcoholism, not everyone who gets in a drunken fight is an alcoholic."

"What we've discovered is a possible reason why some people may find it harder to control their impulses than others.

However what sets humans apart from animals is the ability to regulate our behaviour in response to a constantly changing physical and social world."

He added that the same findings may well be true of the female brain.

Whilst scientists believe that women's brains are neurologically very similar to men's, female subjects weren't used for this study, as some steroids naturally secreted during the menstrual cycle mimic the action of GABA, and could therefore have invalidated the results.

By [Daily Mail Reporter](http://www.dailymail.co.uk/home/search.html?s=&authornamef=Daily+Mail+Reporter)  
Created 4:11 PM on 9th August 2011

**Rioters may have 'lower levels' of brain chemical that keeps impulsive behaviour under control**

* **Scientists uncover a link between impulsiveness and levels of the neurotransmitter GABA in the brain**

Some men may be more likely to riot because of their 'impulsive' brains.

Certain individuals have lower levels of a brain chemical that helps keep behaviour under control, scientists believe.

Researchers from the University of Cardiff uncovered a link between impulsiveness and levels of the neurotransmitter GABA in a key brain region.

Those with low levels tended to be more aggressive and to respond rashly to 'urges'.

GABA is one of a family of brain chemicals that allow signals to flow between neurons.

Around 30 male university students had their levels of GABA measured using a specialised type of brain scan.

They were also asked to complete questionnaires that assessed different aspects of impulsiveness, a trait known to influence self-control.

Participants with more GABA in the pre-frontal brain region had lower scores for 'urgency' - the tendency to behave rashly in response to distress or strong emotions and urges.

Men with lower GABA levels had higher urgency ratings, making them more likely to act aggressively, drink and take drugs.

The link with GABA was specific to the dorsolateral pre-frontal cortex, a region critical to higher thinking functions.

The research, funded by the Wellcome Trust, is published in the journal Biological Society.

Lead scientist Dr Frederic Boy said: 'What is clear is that the way people behave results from a complex interaction between a number of genetic, social and environmental factors.

'What we've found is that one of the reasons why some men act impulsively may be related to lower concentration of GABA in a specific part of men's brains.'

None of the undergraduates taking part in the study had any history of psychiatric disorders or substance dependence.

The research helps to illustrate the role of basic brain physiology in controlling behaviour, said the scientists.

'The ability to regulate our behaviour in response to a constantly changing physical and social world is key to adapted life,' said Dr Boy.

'Failure in this finely-tuned mechanism is particularly important in most psychiatric disorders, where impulsiveness is the second most common symptom.

'We hope this research will lead to further studies and help bridge the gap between recent genetic studies and imaging studies of psychiatric disorders.'

* *Further to publication of this article, researchers at the University of Cardiff have asked us to make clear that their findings – which related to how some people have lower levels of the brain chemical that keeps behaviour under control – made no mention of rioting.*
* *We are happy to make this clear.*

**INDEPENDENT**

**Some men more likely to riot because of "impulsive" brains**

By John von Radowitz

Tuesday August 09 2011

Some men may be more likely to riot because of their "impulsive" brains, a study suggests.

Certain individuals have lower levels of a brain chemical that helps keep behaviour under control, say scientists.

The University of Cardiff researchers uncovered a link between impulsiveness and levels of the neurotransmitter [GABA](http://searchtopics.independent.ie/topic/Gay_Auckland_Business_Association) in a key brain region.

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Metro (UK)

August 11, 2011 Thursday   
Edition 1;   
National Edition

**IMPULSE BYE: Men can't help [...];**MINICOSM SCIENCE & DISCOVERY IN BRIEF  
  
**SECTION:** NEWS; Pg. 14  
  
**LENGTH:** 64 words

?IMPULSE BYE: Men can't help acting on impulse because they have something missing in their brains, say scientists.

Impulsive males - including those who lose their temper - are lacking a chemical called GABA, which sends messages between brain cells, Cardiff University scientists found.

'It is a problem in society, that some people will lose their temper easily,' said Dr Frederic Boy.

The Express

August 11, 2011 Thursday   
Edition 1;   
National Edition

**Why some men see red**  
  
**SECTION:** NEWS; Pg. 15  
  
**LENGTH:** 136 words

SOME men quickly lose their temper because they have something missing in their brain, scientists have found.

Research also discovered why some men can't help acting on impulse and make snap decisions.

Impulsive men lack a chemical called GABA which sends messages between brain cells.

Dr Frederic Boy, who carried out the study, said: "We've discovered why some people may find it harder to control their impulses than others.

It is a tremendous problem in society that some people will lose their temper easily and that can lead to aggression and other problems."

Scientists at Cardiff University monitored a number of students in decision-making situations and measured their brain activity at the same time.

Those with reduced brain activity were more likely to make snap decisions.

Their study did not include women.

The Sun (England)

August 10, 2011 Wednesday   
Edition 1;   
National Edition

**SCOTCH 'N' SNIFF;   
Nose spray to stop drunks and brawls**  
**BYLINE:** EMMA LITTLE  
  
**SECTION:** NEWS; Pg. 28  
  
**LENGTH:** 245 words

A NASAL spray to stop men boozing too much or fighting could be developed after a scientific breakthrough.

It would deter fellas from acting aggressively and impulsively - including acts such as cheating and gambling.

The hope comes after scientists at two top British universities discovered the mechanism behind a chemical that can prevent men from behaving badly.

Treatment - as a nasal spray or tablet - would regulate levels of it to ensure they stayed moderate to high.

The revelation follows a decade of research on the neurotransmitter gamma-Aminobutyric acid (GABA).

For the latest study, researchers at Cardiff University's Brain Imaging Research Imaging Centre and University College London performed brain imaging scans on males under 30 to monitor GABA levels.

The subjects then completed questionnaires on different aspects of impulsiveness and self-control.

Those with lower GABA levels in the prefrontal cortex were more likely to act rashly.

The findings contradicts theories that self-control is all that is needed to beat impulsive thoughts.

The research did not investigate women as no link has been shown between GABA and the female brain.

Study leader Dr Frederic Boy said: "The ability to regulate our behaviour in response to a physical and social world is key to adapted life."

Researchers stressed that studies were in the early stages and further similar trials were needed.

But the "cure" could be developed in the next ten years.