

# Nature or nurture - why do some of us see red?

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University of Manchester researchers are investigating why some people remain calm in the face of life's niggles, while others 'flip' with little provocation.

Recent studies using new brain-imaging technology have discovered that a change in the brain's neurochemical activity may be related to increased impulsive aggression (when someone unexpectedly reacts violently with little provocation, as opposed to someone deliberately 'looking for trouble'). Now psychologist Angela Rylands wants to deploy the University's world-leading HRRT PET brain scanner, based at its Wolfson Molecular Imaging Centre (WMIC), as part of a project to find out more.

Angela said: "Positron emission tomography (PET) scanning has revealed that a deficit in brain serotonin neurotransmission may leave some people more prone to aggression and impulse control disorders. I want to establish to what extent such behaviours are rooted at a molecular level and how much does learning from the environment around us also play a part."

One of her case studies, 39-year-old former professional bodyguard turned retail manager Carl Hayes, is available for interview. Carl is taking part in order to find out why he loses his temper so easily (he once set light to £800 in a row with his ex-wife).

Angela is looking for other males aged 18 or over, who do not use illegal

drugs, and who feel they may be impulsively aggressive to have their brains scanned, to develop the team's understanding of the processes at work. Genetic samples will also be taken to enable them to investigate any interesting polymorphisms (genetic markers which occur in different forms from person to person), as previous research has implicated specific polymorphisms in aggressive behaviour.

Angela will then carry out psychological assessments of participants' previous exposure to aggression and neuropsychological tests to assess their aggressive capacity.

"It's well known that the prefrontal brain regions are associated with normal social and emotional behaviour, and that people with damage to these areas are more impulsive and aggressive," Angela continued. "We now want to see whether subtle deficits in the brain's serotonin system can explain differing levels of aggression in people who don't have brain damage. Our first theory is that higher capacity for impulsive aggression will be found in those with the lowest levels of brain serotonin. The second is that a combination of our genetic makeup and a harsh or abusive childhood may lead to the brain serotonin system not developing normally.

"The areas of serotonin neurotransmission that we are interested in are in the brain regions associated with inhibitory control. Of course people need to take responsibility for their own behaviour, but it could be that some people have difficulties controlling aggression because of impaired regulation of negative emotions or social behaviour by the serotonin system in their brains.

"The genetic samples we take and our assessments of people's exposure to aggression in their childhoods may uncover the factors that adversely influence the developing serotonin system and lead to a dysfunctional system in the mature adult.

"If we can get to the root of impulsive aggressive behaviour - be it nature, nurture or a combination of the two - it could help us to identify how we can break the cycle of impulsive and aggressive behaviour and intervene with future generations at risk from losing control."

She added: "This work may prevent future generations suffering the consequences of impulsive aggression."

"Aggression that occurs as a consequence of poor impulse control presents a burden for society. Each year over half a million people worldwide die from interpersonal violence. The financial burden of violent crime adds to this, incurring expenditures for the criminal justice system, for the incarceration of offenders and to local victims. Socioeconomic costs and public health issues persist, as a consequence of aggressive behaviour."

"The underpinnings of aggression should be identified to enable advancement towards preventative measures."

Participants will visit the WMIC for a screening session, followed by a scan if appropriate. They will then undergo psychological assessments of their previous exposure to aggression, and neuropsychological tests to assess their aggressive capacity. Volunteers will be reimbursed for their time and travel expenses.

Source: University of Manchester

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