PRESS RELEASE
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PERSONALISED TREATMENTS FOR MOOD DISORDERS

Anxiety and depression are psychiatric disorders estimated to affect about 600 million people worldwide, with some people suffering from both conditions, with severe impacts on their quality of life. Now, scientists from the UK have shown for the first time how variations in a gene linked to the conditions can affect response to treatment.

As the numbers affected by anxiety and depression continue to rise, and much research has been dedicated to finding effective treatments, we still have a poor understanding of how mental disorders develop and the mechanisms underlying the symptoms.

Dr Andrea Santangelo from the University of Cambridge has thus been researching why some people are prone to develop psychiatric disorders whilst others are more resilient, why some patients respond better to treatment whilst others struggle to benefit, and how we can use this knowledge to tailor treatments to individual need.

"I am exploring the complex pathway which links individual variation in the genome – the code which tells our cells how to behave – to how we regulate our emotions. My studies involve a variety of techniques to investigate these individual differences at molecular, neurobiological, pharmacological, developmental, and behavioural levels," she told delegates at the FENS Forum of Neuroscience in Berlin today (10 July).

Dr Santangelo works with the marmoset monkey, an experimental model that has gained popularity as it is possible to alter their genome sequence to breed animals with symptoms mimicking those of depressed or anxious patients. This allows both the causal mechanisms and possible treatments for such conditions to be assessed.

Dr Santangelo has been exploring one of the key regulators of emotion, the serotoninergic system, which is the target of action for drugs already used to treat mood disorders. "I have studied the serotonin transporter gene, a molecule that modulates serotonin levels and is the target for antidepressants. My work is the first to show, in a controlled experimental setting, how variations in this gene can affect response to treatment. For example, we know that some people with anxiety actually feel worse when they start treatment and may give up taking it. It thus seems to be that a particular genetic variant can affect therapeutic outcome," she said.
This work has been followed by two other lines of enquiry. A neuroimaging study in marmosets carrying different genetic variants of the serotonin transporter has revealed structural and neurochemical differences in brain areas involved in emotional

and social cognitive processing (under preparation for publication). Ongoing experiments using marmoset stem cells will fully characterise the nature of serotonin transporter variants with the aim of revealing new molecular targets for future therapies.

Her research illustrates the value of an integral approach to research into these complex and distressing conditions, whereby genetic screening at the whole animal and cellular levels and brain imaging may be the way forward for the development of personalised medicine for psychiatric disorders.

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Symposium: S46 - Serotonin and antidepressants: Molecular mechanisms, neuropharmacology and psychological processing
Abstract: Novel primate model to study the neurobiological mechanisms underlying genetic variation associated with affective behaviour

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The 11th FENS Forum of Neuroscience, the largest basic neuroscience meeting in Europe, organised by FENS and hosted by the German Neuroscience Society will attract more than 7,000 international delegates. The Federation of European Neuroscience Societies (FENS) was founded in 1998. With 43 neuroscience member societies across 33 European countries, FENS as an organisation represents 24,000 European neuroscientists with a mission to advance European neuroscience education and research. https://forum2018.fens.org/

Further reading
Novel Primate Model of Serotonin Transporter Genetic Polymorphisms Associated with Gene Expression, Anxiety and Sensitivity to Antidepressants. AM Santangelo, I Shiba, H Clarke, E Schut, G Cockcroft, A Ferguson-Smith, A Roberts N*europsychopharmacology*. 2016 Aug;41(9):2366-76. doi: 10.1038/npp.2016.41. Epub 2016 Mar 21. **https://www.ncbi.nlm.nih.gov/m/pubmed/26997299/#fft**