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Imaging people with psychopathy

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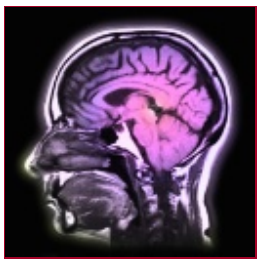

Professor Declan Murphy and colleagues Dr Michael Craig and Dr Marco Catani from the Institute of Psychiatry at King's College London have found differences in the brain which may provide a biological explanation for psychopathy. The results of their study are outlined in the paper *Altered connections on the road to psychopathy,* published in *Molecular Psychiatry*.

The research investigated the brain biology of people with psychopathic personality disorder who have convictions that included attempted murder, manslaughter, multiple rape with strangulation and false imprisonment. Using a powerful imaging technique (DT-MRI) the researchers have highlighted biological differences in the brain which may underpin these types of behaviour and provide a more comprehensive understanding of criminal psychopathy.

Dr Michael Craig said: *'If replicated by larger studies the significance of these findings cannot be overestimated. The suggestion of a clear structural deficit in the brains of people with psychopathic personality disorder has profound implications for clinicians, research scientists and the criminal justice system.'*

While psychopathy is strongly associated with serious criminal behaviour (eg rape and murder) and repeat offending, the biological basis of psychopathy remains poorly understood. Also some investigators stress mainly social reasons to explain antisocial behaviours. To date, nobody has investigated the 'connectivity' between the specific brain regions implicated in psychopathy.

Earlier studies had suggested that dysfunction of specific brain regions might underpin psychopathy. Such areas of the brain were identified as the amygdale, ie the area associated with emotions, fear and aggression, and the orbitofrontal cortex (OFC), the region which deals with decision making. There is a white matter tract that

connects the amygdala and OFC, which is called the uncinate fasciculus (UF). However, nobody had ever studied the UF in psychopaths. The team from King's used an imaging method called in vivo diffusion tensor magnetic resonance imaging (DT-MRI) tractography to analyse the UF in people with psychopathic personality disorder.

They found a significant reduction in the integrity of the small particles that make up the structure of the UF of people with psychopathic personality disorder, compared to control groups of people with the same age and IQ. Also, the degree of abnormality was significantly related to the degree of psychopathy. These results suggest that psychopaths have biological differences in the brain which may help to explain their offending behaviours.

Dr Craig added: *'This study is part of an ongoing programme of research into the biological basis of criminal psychopathy. It highlights that exciting developments in brain imaging such as DT-MRI now offer neuroscientists the potential to move towards a more coherent understanding of the possible brain networks that underlie psychopathy, and potentially towards treatments for this mental disorder.'*

Notes to editors

King's College London
King's College London is one of the top 25 universities in the world (*Times Higher Education* 2008) and the fourth oldest in England. A research-led university based in the heart of London, King's has more than 21,000 students from nearly 140 countries, and more than 5,700 employees. King's is in the second phase of a £1 billion redevelopment programme which is transforming its estate.

King's has an outstanding reputation for providing world-class teaching and cutting-edge research. In the 2008 Research Assessment Exercise for British universities, 23 departments were ranked in the top quartile of British universities; over half of our academic staff work in departments that are in the top 10 per cent in the UK in their field and can thus be classed as world leading. The College is in the top seven UK universities for research earnings and has an overall annual income of nearly £450 million.

King's has a particularly distinguished reputation in the humanities, law, the sciences (including a wide range of health areas such as psychiatry, medicine and dentistry) and social sciences including international affairs. It has played a major role in many of the advances that have shaped modern life, such as the discovery of the structure of DNA and research that led to the development of radio, television, mobile phones and radar. It is the largest centre for the education of healthcare professionals in Europe; no university has more Medical Research Council Centres.

King's College London and Guy's and St Thomas', King's College Hospital and South London and Maudsley NHS Foundation Trusts are part of King's Health Partners. King's Health Partners Academic Health Sciences Centre (AHSC) is a pioneering global collaboration between one of the world's leading research-led universities and three of London's most successful NHS Foundation Trusts, including leading teaching hospitals and comprehensive mental health services. For more information, visit: www.kingshealthpartners.org.

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