Brain difference in psychopaths identified

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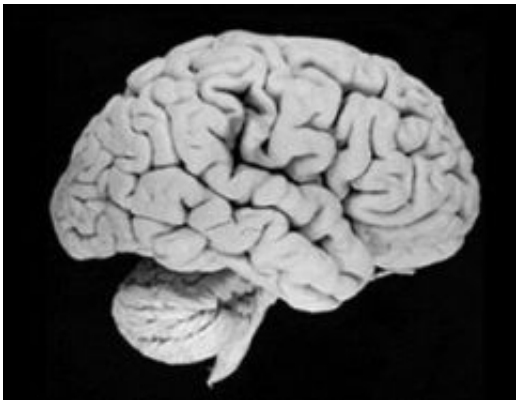

Modern human brain. Credit: Univ. of Wisconsin-Madison Brain Collection.

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 psychopaths with 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 underestimated. The suggestion of a clear structural deficit in the brains of psychopaths 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 psychopaths.

They found a significant reduction in the integrity of the small particles that make up the structure of the UF of psychopaths, 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.'

Source: King's College London (news : web)

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