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GLOBUS PALLIDUS ABNORMALITIES IN OPIATE DEPENDENT PATIENTS RECEIVING METHADONE MAINTENANCE THERAPY

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Introduction: Preclinical studies have suggested that continuous, long-term opiate exposure may be neurotoxic. There is accumulating evidence for neural and neuropsychological abnormalities in diverse human drug addiction populations. However, the structural and behavioural correlates of human opiate dependency have been less studied than other drugs.

Aims: We investigated brain structure and neuropsychological functioning in opiate dependent, treatment-seeking patients receiving Methadone Maintenance Treatment, to test hypotheses of regional grey matter reductions correlating with methadone exposure and neuropsychological measures.

Methods: Cambridge Gambling Task (CGT) data were acquired from 47 patients receiving MMT and 51 controls. T_1 weighted Magnetic Resonance Images were acquired from a representative subset of these volunteers.

Results: MMT patients exhibited grey matter reductions in the orbito-medial prefrontal cortex and basal ganglia. Additionally, patients exhibited significant abnormalities on CGT behavioural measures; risk adjustment, risk taking and impulsivity. Both the initial titration dose of methadone at the commencement of MMT following protocolised tolerance testing, and methadone dose at the time of scanning, correlated with grey matter reductions in the globus pallidus. Abnormal risk adjustment behaviour correlated with reductions in globus pallidus grey matter, increased risk taking with orbitofrontal grey matter reductions, and increased impulsivity with cingulate cortex reductions.

Conclusions: These findings support an interpretation of heightened risk taking and impulsivity in patients receiving MMT. However, the anatomically restricted correlates with indices of methadone exposure suggest that most structural brain abnormalities are not opiate linked, with the possible exception of the globus pallidus.

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