

Research Project

The effects of diacetylmorphine (heroin) on human brain function and stress response

Third-party funded project

Project title The effects of diacetylmorphine (heroin) on human brain function and stress response

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Heroin dependence (HD) is a chronic relapsing brain disorder that is defined by a compulsion to seek and use heroin, and a loss of control in limiting intake. Stress is a key factor for relapse in heroin-dependent patients. The prescription of diacetylmorphine (heroin) itself for maintenance has become an established treatment in several European countries. However, the neurobiological effects of diacetylmorphine (DAM) on brain function and stress response have not been studied so far. Imaging the acute effects of DAM administration during stress stimuli would elucidate the neurocircuitry and neurobiology of substance use in patients with HD. To investigate the effect of DAM on brain using functional magnetic resonance imaging (fMRI), coupled with measurements of cortisol concentrations and neurophysiological stress parameters during the presentation of emotional and cognitive stimuli in patients with HD. Thirty heroin-dependent patients on stable heroin maintenance will be examined in a randomized placebo-controlled crossover design. They will be compared with 30 heroin-dependent age- and gender-matched but otherwise healthy volunteers receiving saline. The heroin-dependent patients will administer either their individual dose of prescribed DAM dose or saline through an indwelling intravenous line. Afterwards they will complete four experimental paradigms testing response inhibition, emotional processing and working memory while brain responses are measured with fMRI. Before and after the fMRI investigation cortisol samples, DAM blood levels, neurophysiological and psychological stress parameters, such as skin conductance, heart rate, anxiety, anger, and heroin craving will be measured.

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