

Using Computational Neuroscience to Guide the Development of Novel Treatments for Depression

Depression is a common and debilitating illness. While a range of treatments are available, remission rates are low and relapse common. It is therefore essential that new, more effective treatments are developed. In order to do this we must first understand the full range of interconnected mechanisms, from abnormal brain function to maladaptive cognitive habits, which cause people to become, or to remain, depressed.

Recently, computational modelling techniques have been successfully used to link cognitive and neurobiological function with symptoms of psychiatric illness (e.g. Browning et al. 2015). In the current project computational modelling will be used to investigate the underlying cognitive characteristics of depressed patients including the neural systems which support these characteristics and how they can be altered using novel cognitive and pharmacological interventions.

The project may include the development and fitting of computational models of behaviour in depressed patients, the collection and analysis of physiological data (pupilometry and fMRI) and the use of both cognitive training and pharmacological manipulations in experimental studies of patients and healthy volunteers.

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Browning, M. et al. (2015). Anxious individuals have difficulty learning the causal statistics of aversive environments. *Nature Neuroscience*, 18(4), 590–596.