# Translating cognition from animals to humans.

Posted At : July 23, 2011 3:59 PM | Posted By : Tim Brunson, PhD
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Many clinical disorders, whether neurological (e.g. Alzheimer's disease) or neuropsychiatric (e.g. schizophrenia and depression), exhibit cognitive symptoms that require pharmacological treatment. Cognition is multi-faceted and includes processes of perception, attention, working memory, long-term memory, executive function, language and social cognition. This article reviews how it is feasible to model many aspects of human cognition with the use of appropriate animal models and associated techniques, including the use of computer controlled tests (e.g. touch-screens), for optimising translation of experimental research to the clinic. When investigating clinical disorders, test batteries should aim to profile cognitive function in order to determine which aspects are impaired and which are preserved. In this review we have paid particular attention to the validation of translational methods; this may be done through the application of common theoretical principles, by comparing the effects of psychological manipulations and, wherever feasible, with the demonstration of homologous neural circuitry or equivalent pharmacological actions in the animal and human paradigms. Of particular importance is the use of 'back-translation' to ensure that the animal model has validity, for example, in predicting the effects of therapeutic drugs already found in human studies. It is made clear that the choice of appropriate behavioral tests is an important element of animal models of neuropsychiatric or neurological disorder; however, of course it is also important to select appropriate manipulations, whether genetic, neurodevelopmental, neurotoxic, or pharmacological, for simulating the neural substrates relevant to the disorders that lead to predictable behavioral and cognitive impairments, for optimising the testing of candidate compounds.

Biochem Pharmacol. 2011 Jun 15;81(12):1356-66. Epub 2011 Jan 8. Keeler JF, Robbins TW. Dept. of Expt. Psychology, University of Cambridge, Downing Street, Cambridge CB2 3EB, UK; Dept. of Behavioural and Clinical Neuroscience, University of Cambridge, Downing Street, Cambridge CB2 3EB, UK.