

SS-03-02

Severity of nicotine dependence modulates cue-induced brain activity in regions involved in motor preparation and imagery

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Objective: In nicotine dependent subjects cues related to smoking elicit brain activity in regions linked to attention, memory, emotion and motivation. Besides craving further determinants of cue reactivity and their impact on underlying neural systems are still unknown. Neither for nicotine nor for other drugs of abuse the influence of severity of dependence has been studied. We therefore investigated whether nicotine dependence gradually influences brain activation by visual smoking cues and how this is related to craving intensity.

Methods: Ten healthy male smokers with different degrees of nicotine dependence were investigated. To prevent nicotine withdrawal subjects were not nicotine deprived. Smoking cues and neutral visual stimuli were presented in a block design during functional magnetic resonance imaging (fMRI). The blood oxygen level dependent (BOLD) response to smoking cues was correlated with severity of nicotine dependence assessed with the Fagerström Test of Nicotine Dependence (FTND) and with self-reported cue-induced craving.

Results: Significant positive correlations between the BOLD activity and FTND scores were found in brain areas related to visuospatial attention (anterior cingulate cortex, parietal cortex, parahippocampal gyrus and cuneus) and in regions involved in motor preparation and imagery (premotor cortex, supplementary motor area). Intensity of cue-induced craving was significantly associated with greater neural activation in mesocorticolimbic areas engaged in incentive motivation and in areas related to episodic memory.

Conclusion: Our study suggests that severity of nicotine dependence and intensity of craving are independently associated with cue-induced brain activation in separate neuronal networks. The observed association of severity of nicotine dependence with neuronal cue-reactivity in regions involved in allocation of attention, automated motor preparation and imagery could be clinically relevant in terms of facilitating cue-induced relapse.

SS-03-03

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SS-03-04

Neuroimaging and addiction

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The psychological framework of drug dependence consists of a complex array of behaviours. DSM IV and ICD 10 diagnosis criteria capture those that are core to the identification of addiction per se, but offer no account of their source. Recently, interest has moved towards decision making impairments as a possible core factor in addiction behaviour – with numerous theories offering explanation. These theories have been mostly behavioural economic theories based on observations of behaviours within Skinnerian experiments. However, evidence is gathering which suggests a positive link between these models and neurobiological findings. A summary of recent work which includes the following

will be discussed: - Damasio (1994) lesion studies are used to identify regions of the brain (more specifically limbic system regions involved with emotion and the ventromedial prefrontal cortex involved with planning - VMpFC) which are related to decision making. - Impaired decision making (poor future orientation and sensitivity to immediate rewards) has been shown in patients with VMpFC damage with the absence of any other detectable functional impairment. - Bechara designed a task which identified a particular behavioural pattern amongst patients with VMpFC – The Iowa Gambling Task. - Bechara and Damasio discovered that substance abusers presented with the same behavioural pattern as VMpFC patients, with no other functional impairment. - They suggest that the range of performance, within this task, is an indicator of degree of impairment and specific effect on decision making ability. A new avenue of research has opened ie the ability to identify level of neurological impairment through a behavioural task – when degree of impairment could indicate a potential risk factor for addiction, prognosis, treatment pathway and relapse risk – would prove an invaluable tool. The results from original research is still being validated, and refinements to the gambling task are needed before a true link can be made between its findings and behavioural economic theories – and this is what we are now undertaking at Keele University.

SS-03-05

Cue-induced craving in alcohol dependent patients: Modality specific fMRI of therapeutic intervention

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Objectives: Craving as a central construct in addiction theory has become a major interest in imaging research. Cue-reactivity paradigms are used in imaging studies to elicit craving and provide important information about possible predictors of relapse.

Methods: A well-established olfactory cue-reactivity paradigm was enhanced by adding a comparable visual design. The study was performed on alcohol-addicted subjects shortly after they finished detoxification and repeated after four weeks. During these four weeks the subjects received placebo-controlled pharmacotherapy in combination with psychotherapy. A group of matched healthy controls was examined two times with a four week interval.

Results: Preliminary results of this ongoing study demonstrate the chosen paradigm as capable of illustrating therapeutic effects during this four week interval. Furthermore, first hints to evidence of modality-specific activations of these cue-reactivity paradigms were demonstrated.

Conclusions: Cue-reactivity paradigms are of great importance for addiction research. They are capable of providing information on risk factors for relapse. Increased awareness of possible modality specific effects in cue-induced craving seems necessary. More attention to these effects could lead to a promising way of integrating some still inconsistent imaging results in addiction research.

Tuesday, April 5, 2005

W-17. Workshop: Addictive behaviours across the lifespan of a doctor

Chairperson(s): Miquel Casas (Barcelona, Spain),
Antoni Gual (Barcelona, Spain)
14.15 - 15.45, Holiday Inn - Room 8

M. Dahlin, P. Vaglum, J. O. Røvik, I. Bjelland, N. T. Grønvold, Ø. Ekeberg. *Norra Stockholms psykiatri/Kar Psykiatri, Stockholm, Sweden*

M. Casas. *Unitat de Psiquiatria Hospital, Barcelona, Spain*

P. Lusilla. *Impaired Physicians Program (P), Barcelona, Spain*

R. Tyssen. *Department of Behavioural Science, Oslo, Norway*

Addictions have been described as a major cause of impairment in physicians. The high prevalence of addictive behaviours in doctors has been attributed to different reasons: stress, burn-out, self-medication, etc. This symposium aims at reviewing the characteristics of addictive behaviours across the lifespan of physicians, including the initial years at the medical school. Few studies have addressed the question of previous drug use among medical students and young doctors. That's why the first presentation (Alcohol use and illicit drug exposure among Swedish medical students and first-year interns) addresses the topic of drug use among medical students in Sweden. The transition from medical school to clinical work and its relevance concerning the use of drugs will be described in the second presentation, that focuses in alcohol consumption during the first ten postgraduate years of clinical work in Norwegian doctors (Use of alcohol and depression among Norwegian doctors: a 10-year longitudinal study). The third presentation describes epidemiological data on substance misuse among a large sample of anaesthesiologists, one of the medical specialties where higher rates of substance abuse have been reported (Substance misuse in a sample of 3700 French anaesthesiologists). Finally, the influence of addictive behaviours in the severity of impairment is analyzed in a sample of inpatient sick physicians from Spain (Sick physicians: How relevant are addictive behaviours for impairment). Those four studies offer a wide perspective on the use of drugs in different European countries and in different life stages of physicians.

Sunday, April 3, 2005

C-01. Educational course: Early recognition and early diagnostics of addiction

Course director(s): Michael Musalek (Wien, Austria)
08.30 - 12.00, Hilton - Salon Bialas

Concluding the literature on early recognition and early diagnostics in addictions we may take as an ascertained fact that early recognition of addiction is an utmost important condition of successful treatment: the earlier the valid diagnosis, the better the prognosis. But in early recognition as well as in early diagnostics we are confronted with various problems that are difficult to solve. Examples of this are the almost entire lack of widely accepted early diagnostic criteria, the diagnostic uncertainty in the transient area between health and illness resulting in the risk of false positive and false negative valuations, the instability of diagnostic criteria – and all that in connection with the stigmatization caused by the diagnosis of addiction. To make matters worse, early recognition usually is the task of people not

trained in the field of addiction (e.g. non-psychiatric-medical professionals, nurses, social workers, probation-officers and judicial officers, teachers, priests, relatives, employees, friends, etc.). To cut the Gordian knot of early recognition, first, we need the development of valid and reliable criteria for early diagnosis of addiction; second, a close multi-professional cooperation and the development of liaison institutions with intensive and extensive educational activities; and last not least, the establishment of a “pentologue” between all groups closely involved in prevention activities as psychiatrists, patients, relatives, industry representatives, and politicians. In the first three parts of the course after a short general introduction the various definitory and diagnostic approaches including modern dimensional diagnostics and their value in clinical practice will be discussed. Research on the pathogenesis of addictions showed that addictive disorders are caused by complex interactions of various mental, physical and social factors. But addictions cannot be longer reduced to psychopathological manifestations once established and therefore persisting. The addictive behaviour is a dynamic process which only persists if disorder maintaining factors become active. These disorder maintaining factors are not necessarily corresponding with the addiction's predisposing and triggering factors. As addictions represent nosological non-specific syndromes with a multi-factorial pathogenesis modern integrative treatment approaches (including psycho-pharmacological, psychotherapeutic and socio-therapeutic methods) have to be based on an early multidimensional differential-diagnosis of all the predisposing, triggering, and disorder maintaining factors. In this context the disorder maintaining factors provide the basis for effective, pathogenesis-oriented treatment of the actual symptomatology, whereas the predisposing and triggering factors provide informations for planning prophylactic long-term treatment. The main focus of fourth part of the course is dedicated to the manifold problems concerning multi-professional approaches in the management of patients with addiction disorders in general and in the field of early recognition of addiction in particular. The final part of the course will focus on various involuntary (and sometimes even unexpected) side-effects of early recognition of addictions (e.g. effects of stigmatization) and the possible solutions of the manifold problems we are confronted with in early diagnostics.

Tuesday, April 5, 2005

C-15. Educational course: Alcohol dependence

Course director(s): Karl Mann (Mannheim, Germany)
14.15 - 17.45, Hilton - Salon Bialas

Objective: The participants of this course will learn about new findings on the development, maintenance and treatment of alcohol dependence. A brief review on prevalence rates and diagnostic criteria distinguishing between dependence, harmful use and at risk consumption will be followed by a review of the neurobiology of alcoholism. Neurobiology research indicates dispositional factors including neuroadaptation and sensitisation in the development and maintenance of addiction. The treatment part includes a discussion of the pharmacotherapy of alcohol withdrawal as well as the rationale for treating alcoholics with anti-