



H. M. Emrich



U. Schneider

Hinderk M. Emrich

- 1962 – 1968** Medical Studies at the Universities of Berlin and Bern (Switzerland)
- 1975 – 1978** Postgraduate training in Psychiatry, Neurology and Clinical Psychopharmacology
- 1979 – 1987** Group and later on Department leader of Clinical Psychopharmacology at the Max-Planck-Institute for Psychiatry
- 1991** Chair of the Department of the Adult Psychiatry at the Max-Planck-Institute of Psychiatry
- 1991 – 1992** Fellow at the Institute for Advanced Study at Berlin
- since 1992** Chair of the Department of Psychiatry at the Medical School in Hannover
- 26.07.1999** Ph.D. (University of Munich)
Guest Professorships:
- March 1995** Ben-Gurion-University of the Negev: Philosophical Psychology
- 1995 – 1997** Kunsthochschule für Neue Medien, Köln
- 1996/97** Ben-Gurion-University of the Negev: Philosophical Psychology
- since 1997** Universität Witten-Herdecke
- since 1999** Deutsche Film- und Fernseh-Akademie Berlin: Tiefenpsychologie der Medien

Udo Schneider

- 1983 – 1990** Medical Studies at the Justus-Liebig-University (JLU) of Giessen, Germany
- 1990 – 1991** Experimental studies in Adult Respiratory Distress Syndrome (ARDS) at the Department of Experimental Pathophysiology JLU, (Prof. Dr. W. Seeger)
- 1991 – 1996** Postgraduate training in Neurology (Prof. Dr. R. Hagenah) and Psychiatry/Psychotherapy (Prof. Dr. H.M. Emrich)
- since 1996** Senior Registrar/Consultant in the Dept. of Clin. Psychiatry and Psychotherapy, Medical School Hannover
- since 2001** Professor of Neurocognition, Medical School Hannover
- since 2003** Vice-chair of the Department of Clinical Psychiatry and Psychotherapy at the Medical School Hannover

Current Research

The main research foci in our group are: addiction (especially alcohol, cannabinoids, and opioids), schizophrenia, cognitive functions in psychiatric diseases, synesthesia, anticonvulsants, psychiatric anthropology and bipolar disorders. Most studies are clinically orientated and as additional tools we are able to use fMRI, evoked potentials, and repetitive transcranial magnetic stimulation.

1. Schizophrenia research

Within the past twenty years biological psychiatry has tried to define and elucidate the pathomechanisms of schizophrenia by addressing questions as to a possible neurotransmitter- and neuromodulator deficiency hypothesis. According to the current view, schizophrenia can not be attributed pathogenetically to one single causative factor, but to a complex pattern of pathogenetic conditions. The recently discovered cannabinoid receptor system with its endogenous ligand anandamide has tight links to the glutamatergic and dopaminergic systems. In our concept a subgroup of schizophrenic patients may pathogenetically be related to a functional disturbance of the endogenous anandamide/cannabinoid system. We try to investigate these associations and on the practical side, to assess whether different cannabinoids can be used as an antipsychotic drug. Another goal in schizophrenia research is the characterization of cognitive deficits and to identify drug effects on different cognitive functions.

2. Addiction research (e.g. Cannabinoids)

The endogenous cannabinoid system was first described in 1988. There are two specific receptors, the CB₂-receptor, located in the lymphatic system

(spleen, lymphocytes), and the CB1-receptor, that occurs predominantly in the central nervous system. The CB1-receptor shows a distinct distribution in the CNS with a very high density in the cerebellum, the basal ganglia and in the hippocampus. In 1992 endogenous ligands of the cannabinoid-system were discovered for the first time. The physiological role of these arachidonic acid derivatives is still unclear. Implications of these newer discoveries for the Gilles de la Tourette syndrome, ischemic brain lesions, schizophrenic psychoses and opiate drug dependence are evident.

A dysregulation in the endogenous cannabinoid/anandamide system could possibly play an important role in the etiology of Gilles de la Tourette syndrome and schizophrenic psychoses; administration of cannabinoids affects the symptoms of the Gilles de la Tourette syndrome positively, whereas cannabinoids probably have rather negative effects in schizophrenic psychoses. In ischemic brain lesions cannabinoids seem to have a neuroprotective effect; they appear to minimize the extent of a lesion by reduction of glutamate release. Additionally the meaning of the endogenous cannabinoid-system for the development of opioid drug dependency is investigated as well as the interactions between the endogenous opioid-system and the endogenous cannabinoid-system. This is of interest since it could be shown in animal experiments that the absence of CB1-receptors reduces the positive reinforcement of opiate administration.

3. Neuropsychology

One focus of neuropsychological investigations in our group is the so called binocular depth inversion. Binocular depth inversion represents an illusion of visual perception, serving to invert the perception of implausible hollow objects e.g. a hollow face into a normal face. Such inversion occurs frequently, especially when objects with a high degree of familiarity (e.g. photographs of faces) are displayed. Under normal conditions cognitive factors apparently override the binocular disparity cues of stereopsis. This internal mechanism of a kind of "censorship" of perception – balancing "top down" and "bottom up" processes of perception – appears to be disturbed in acute schizophrenia, after sleep deprivation, alcohol withdrawal and cannabis intoxication. These findings suggest that testing of binocular depth inversion can detect specific dysfunctions in visual perception and might be useful as a state-marker for psychotic states. One major goal is now the characterization of the neurobiological mechanisms underlying the binocular depth perception by means of fMRI and evoked potentials.

4. Synaesthesia

The word "synesthesia" comes from the Greek "syn", meaning unification and "aisthesis" meaning sensation. Synesthesia is a perceptual condition in which the stimulation in one sensory modality elicits a concurrent sensation in another, a perception which is perceived as real. These sensory experiences from different modalities occur in otherwise neurologically and psychologically completely healthy individuals. Any of such combinations of the senses are theoretically possible, however, the most common type of synesthesia is "coloured hearing". Synesthesia is defined by five criteria separating it from imagery and fancy: synesthesia is involuntary and can not be suppressed, the sensations do not appear in the mind, but are usually perceived externally as

real the synesthetic sensations are discrete, they are highly memorable and this is accompanied by strong emotions and a sense of conviction. However, although there are numerous studies addressing the phenomenological aspects of synesthesia, experiments trying to investigate the neurobiological basis of synesthesia with functional imaging techniques have been scarce. For that reason the Synesthesia-Research Group of the Dept. of Clinical Psychiatry and Psychiatry in collaboration with the Max-Planck-Institute of Brain Research, Frankfurt and the Institute of Neurobiology, Magdeburg performed fMRI and MEG studies in persons with synesthetic experience.

Selected Publications

- [1] M. Karst, K. Salim, I. Conrad, L. Hoy, S. Burstein, U. Schneider: Analgesic effects of synthetic cannabinoid CT-3 on chronic neuropathic pain in man. **JAMA** (2003) 290 (13): 1757-1762.
- [2] K.R. Müller-Vahl, H. Kolbe, A. Pravidel, H.M. Emrich, U. Schneider: Tetrahydrocannabinol (THC) is effective in the treatment of Tics in Tourette Syndrome: A 6-week randomized trial. **Neuropsychopharmacology** (2003) 2: 384-388.
- [3] U. Schneider, M. Borsutzky, J. Seifert, F.M. Leweke, T.J. Huber, J.D. Rollnik, H.M. Emrich: Reduced binocular depth inversion in schizophrenic patients. **Schizophr Res** (2002) 53:101-8.
- [4] K. Schiltz, K. Trocha, B.M. Wieringa, H.M. Emrich, S. Johannes, T. Münte: Neurophysiological Aspects of Synesthetic Experience. **Journal of Neuropsychiatry and Clinical Neuroscience** (1999) Vol II(I): 58-65
- [5] H.M.Emrich: Ich-Erleben, Synästhesie und Gefühl: zur Bedeutung von Gefühlszuständen für die Einheit des Bewusstseins. **Analytische Psychologie**, 2003; 34 (4): 243-250

Contact

H.M. Emrich, MD, PhD
Professor of Psychiatry
Dept. Clin. Psychiatry and Psychotherapy
Medical School Hannover
Carl-Neuberg-Str. 1
30625 Hannover, Germany
Tel. +49-511-5326571
Fax. +49-511-5322415
Email: emrich.hinderk@mh-hannover.de

U. Schneider, MD
Professor of Neurocognition
Dept. Clin. Psychiatry and Psychotherapy
Medical School Hannover
Carl-Neuberg-Str. 1
30625 Hannover, Germany
Phone: +49-511-5326559
Fax: +49-511-5322415
Email: schneider.udo@mh-hannover.de