"ImpactG" - Improvement of the research competitiveness in neuroscience at the Ernst-Moritz-Arndt-University of Greifswald

Neuroscience Group at the Medical Faculty of the University of Greifswald

Brain stimulation and brain repair
Mechanisms, behavioural and clinical effects

International symposium
September 2—4, 2010

Sponsored by the European Union
and the Alfried Krupp von Bohlen und Halbach-Stiftung, Essen
Preface

Neuroscience is one of the fastest growing areas in research. Knowledge, treatments, and cures are the possibilities that continue to be discovered through neuroscientific research. The Neuroscience Group at the Medical Faculty of the University of Greifswald promotes interdisciplinary investigations from the level of gene expression in single neurons to imaging of localized regions of the human brain and neurorehabilitation.

The Medical Faculty at the Ernst-Moritz-Arndt University (EMAU) is the beneficiary of the EU Programme “Unlocking and developing the research potential of research entities in the EU’s convergence regions and outermost regions” whose implementation in the project ImpactG (FP7-REGPOT-2008-1, Grant agreement no.: 229750) allowed us to acquire cutting-edge technology and equipment and to advance our research capacity in neuroscience by creating a network across Europe aiming for the improvement of science and technology (S&T) experience and knowledge of researchers by exchange of know-how and experience with our Strategic Partners from:

(1) the Institute of Brain Research in Zurich, Switzerland;
(2) the Institute of Neuropathology, Zurich, Switzerland;
(3) the Institute of Human Genetics, Newcastle University, UK;
(4) the Physiology and Pathophysiology of Human Motor Control Research Group at the Sobell Department of Motor Neuroscience and Movement Disorders, Institute of Neurology, Queen Square, London, UK,
(5) the Department of Cognitive Neuroscience, Faculty of Psychology, Maastricht University, the Netherlands, and
(6) the Laboratory of Neural Stem Cell Biology, University of Lund, Sweden.
Improvement of the research capacity in neuroscience at the Ernst Moritz Arndt University Greifswald is an ongoing process with several steps starting with collaboration with strategic partners in Europe, followed by support workshops, equipment purchase, collaborative applications and dissemination of gained knowledge and experience.

The objectives of ImpactG (project co-ordinator: Prof. A. Popa-Wagner) will be reached through the implementation of several work packages (WP):

(1) Improvement of the S&T experience and knowledge of researchers in cellular and molecular neuroscience (WP Leader: Prof. A. Popa-Wagner),
(2) in the treatment of neurodegenerative diseases (WP Leader: Dr. M. Sabolek, Prof. Dr. Dr. C. Kessler),
(3) in molecular neuropathology (WP Leader: PD Dr. S. Vogelgesang),
(4) molecular neurophysiology (WP Leader: Prof. H. Brinkmeier), and
(5) neurorehabilitation at the EMAU Greifswald (WP Leader: Prof. T. Platz).

Project dissemination includes the organization of three workshops with international participation to facilitate knowledge transfer at an international level.

The second workshop is scheduled for September 2nd to 4th 2010 and covers the topic of brain stimulation and brain recovery.
State-of-the-art knowledge about repetitive transcranial magnetic stimulation (rTMS) effects from animal experiments to clinical trials in conditions such as stroke, Parkinson disease and depression is presented by senior researchers in the field from all around the world coming from various neuroscience and medical fields. The results of
the workshop are timely made available with a special issue of the journal Restorative Neurology and Neuroscience.

The workshop is funded by the European Union (ImpactG Project, FP7-REGPOT-2008-1, Grant agreement no.: 229750) and the Alfred Krupp von Bohlen und Halbach-Stiftung, Essen.

The contribution of all members of the workshop’s international faculty to its success as well as the support and organisational help of members of the Alfred Krupp Wissenschaftskolleg Greifswald, especially of its scientific CEO Dr. Suhm and Ms. Sülberg, the organisational help of the neurorehabilitation department’s secretary Mrs. Mertin and of the administration of the EMAU is gratefully acknowledged.
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International symposium
September 2—4, 2010

Scientific Chair:
Prof. Dr. Thomas Platz (Greifswald)
BDH-Klinik Greifswald, neurorehabilitation research group, department neuroscience, Ernst-Moritz-Arndt-Universität Greifswald, Germany

Conference Venue:
Alfried Krupp Wissenschaftskolleg Greifswald
Martin-Luther-Straße 14
D-17489 Greifswald

Conference Office:

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The conference language is English.
Objective of the symposium

The multi-professional targeted approach of neurorehabilitation can enhance recovery of functional deficits beyond spontaneous recovery and consequently improve quality of life: Specifically tailored therapeutic interventions address very specific information processes in the brain, re-train skills and thereby improve performance and abilities step by step. As a consequence of training, centres within the brain responsible for these functions become effectively re-activated, functional re-organisation of the brain occurs and ensures long-term benefits of training therapy.

The non-invasive brain stimulation techniques of repetitive or patterned transcranial magnetic stimulation (rTMS) can focally influence the excitability of specific brain areas and might promote these functional adaptations in concert with and potentially beyond training therapy. rTMS holds much promise as a potential therapeutic intervention in a wide range of neurological conditions. However, many questions need to be addressed before a more widespread use in clinical practise can be recommended. The symposium on brain stimulation and brain recovery will shed light on these issues.

State-of-the-art knowledge about rTMS effects from animal experiments to clinical trials in conditions such as stroke, Parkinson disease and depression will be presented by senior researchers in the field from all around the world coming from various neuroscience and medical fields. This concentrated multi-disciplinary in depth approach on brain stimulation with rTMS and recovery will facilitate our understanding of mechanisms, effects, and therapeutic potentials of rTMS, and will promote future research from bench to bed side. The results of the symposium have timely been made available with a special issue of the journal Restorative Neurology and Neuroscience.
Programme

Thursday, September 2, 2010

17:00  Welcome Addresses

Bärbel Friedrich (Greifswald, Germany)
Academic Director of the Alfried Krupp
Wissenschaftskolleg Greifswald

Rainer Westermann (Greifswald, Germany)
Rector, Ernst-Moritz-Arndt-Universität Greifswald

Christof Kessler (Greifswald, Germany)
Neuroscience Group at the Medical Faculty of the
University of Greifswald

Ulf Dembski (Greifswald, Germany)
Deputy Major, City of Greifswald

Conference Chair’s Address
Thomas Platz (Greifswald, Germany)

Opening Lecture
Curing the brain by rTMS therapy?
Michael C. Ridding, University of Adelaide

18:30  Reception and Buffet
09:00-11:00  Metabolic and haemodynamic effects of rTMS

Session I, chairs: Klaus Funke, Charlotte Stagg

09:00  Theta burst and conventional low-frequency rTMS differentially affect GABAergic neurotransmission in the rat cortex (GAD and Ca-binding proteins expression)
Alia Benali
Institut für Neurophysiologie, Universität Bochum

09:20  Immediate and prolonged effects of theta burst stimulation (TBS) and conventional low frequency rTMS on the rat cortex — concepts and overview
Klaus Funke
Institut für Neurophysiologie, Universität Bochum

09:55  Neurochemical effects of theta burst stimulation
Charlotte Stagg
FMRIB Centre, University of Oxford

10:20  Neural substrates of low-frequency rTMS during movement in healthy subjects and acute stroke patients. A PET study
Angelique Gerdelas-Mas
INSERM U 825, Universités de Toulouse
Friday, September 3, 2010

10:45  Assessing the effects of TMS on brain activity in a quantifiable fashion by interleaved TMS/CASL (continuous arterial spin-labeling): Comparison of different rTMS protocols
Axel Thielscher
MPI for Biological Cybernetics, Tübingen

11:05-11:35  Coffee break

11:35-18:30  Specificity and Modification of rTMS effects
Session II, chairs: Walter Paulus, Ying-Zu Huang

11:35  Optimizing functional accuracy of TMS in cognitive studies: a comparison of methods
Alexander Sack
Faculty of Psychology and Neuroscience, Maastricht University

12:00  Optimizing stimulation parameters for theta burst stimulation applications
Walter Paulus
Clinical Neurophysiology, Georg-August-University Göttingen

12:30-14:00  Lunch break
Friday, September 3, 2010

Session II, continued, chairs: Walter Paulus, Ying-Zu Huang

14:00
The complex relationship between voluntary movement and rTMS-induced plasticity in motor cortex
Gabrielle Todd
School of Molecular and Biomedical Science, University of Adelaide

14:25
The effect of continuous theta burst stimulation on circuits in the motor cortex and spinal cord and its modulation by physiological activity and a NMDA receptor antagonist
Ying-Zu Huang
Department of Neurology, Chang Gung Memorial Hospital and Chang Gung University, College of Medicine, Taipei

14:50
Suppression of ipsilateral motor cortex facilitates motor skill learning
Masahito Kobayashi
Department of Neurosurgery, Saitama Medical University
Friday, September 3, 2010

15:15  Motor skill learning – a combined behavioural training and theta burst TMS study
       Thomas Platz
       BDH-Klinik Greifswald, Ernst-Moritz-Arndt-Universität

15:35-16:05  Coffee break

Session III, chairs: Martin Lotze, Orlando B.C. Swayne

16:05  Electrophysiological correlates of reduced pain perception after theta burst stimulation
       Andrea Antal
       Clinical Neurophysiology, Georg-August-Universität Göttingen

16:25  Effects of priming stimulation (metaplasticity) in human rTMS studies — concepts and overview
       Michael C. Ridding
       Neuromotor Plasticity & Development (NeuroPAD)
       The Robinson Institute School of Paediatrics and Reproductive Health, University of Adelaide
Friday, September 3, 2010

16:50 Modulation of effects of iTBS applied over M1 by conditioning stimulation of the opposite M1
Patrick Ragert
Max-Planck-Institut für Kognitions- und Neurowissenschaften, Abteilung Kognitive Neurologie, Leipzig

17:10 TMS-jamming during complex movement performance — evidence for functional involvement in healthy subjects and stroke patients
Martin Lotze
Baltic Imaging Center, Diagnostische Radiologie und Neuroradiologie, Ernst-Moritz-Arndt-Universität Greifswald

17:30 Effects of TBS on motor performance and motor learning and its pharmacological modification
Orlando B.C. Swayne
Sobell Department of Motor Neuroscience and Movement Disorders, Institute of Neurology, University College London

19:30 Social programme
Saturday, September 4, 2010

09:00-14:15  Clinical effects of rTMS

Session IV, chairs: John Rothwell, Margaret A. Naeser

09:00  Curing the brain by applied neurophysiology — fact or fiction?
John Rothwell
Sobell Department of Motor Neuroscience and Movement Disorders, Institute of Neurology, University College London

09:30  Short- and long-term effect of rTMS on motor function recovery after acute ischemic stroke
Eman M. Khedr
Department of Neurology, Assiut University Hospital

09:55  Effects of ipsilesional and contralesional rTMS on motor recovery in cortical and subcortical stroke
Mitra Ameli
Klinik für Neurologie, Uniklinik Köln
Saturday, September 4, 2010

10:15  Effects of parietal theta burst stimulation trains on visual attention and visual neglect
      Thomas Nyffeler
      Abteilung für kognitive und restorative Neurologie, Inselspital Bern

10:40  Research with rTMS in the treatment of aphasia
      Paula I. Martin, Margaret A. Naeser
      Harold Goodglass Boston University, Aphasia Research Center, Department of Neurology, Boston University School of Medicine and the Veterans Affairs

11:10-11:40  Coffee break

           Session V, chairs: Masashi Hamada, Giacomo Koch

11:40  Effects of coupled rTMS and speech therapy on language and brain activation in subacute stroke patients
      Ilona Rubi-Fessen
      RehaNova Köln
Saturday, September 4, 2010

12:00 High-frequency rTMS over the supplementary motor area improves bradykinesia in Parkinson’s disease
Masashi Hamada
Department of Neurology, Division of Neuroscience Graduate School of Medicine, University of Tokyo

12:25 Cerebellar magnetic stimulation decreases levodopa-induced dyskinesias in Parkinson disease
Giacomo Koch
Laboratorio di Neurologia Clinica e Comportamentale Fondazione Santa Lucia, IRCCS, Rome

12:50 Efficacy and safety of bilateral continuous theta burst stimulation (cTBS) for the treatment of chronic tinnitus: a three-armed randomized controlled trial
Christian Plewnia
Neurophysiology & Interventional Psychiatry, Universitätsklinikum Tübingen

13:10 Influence of rTMS on depression and its symptoms
Jacqueline Höppner
Universitätsklinik für Psychiatrie und Psychotherapie, Rostock
Saturday, September 4, 2010

13:30 Antidepressant effects of augmentative transcranial magnetic stimulation. Randomised multicentre trial
Carlos Schönfeldt-Lecuona
Universitätsklinik für Psychiatrie und Psychotherapie III, Ulm

14:00 Closing
Thomas Platz
BDH-Klinik Greifswald
Ernst-Moritz-Arndt-Universität Greifswald

14:15 Farewell lunch