



Cluster of Excellence „Challenges for Adaptive SuperSystems CASUS“

Abstract of the Draft Proposal for the Excellence Initiative 2006

"Destructive and creative energy are directly connected."

On the Trail of Viruses and Bacteria

The nervous system and immune system are two complex supersystems of the human organism with the capability to react and adjust to widely varying environmental challenges. Adaptation, learning and memory are therefore important characteristics of both systems. The disturbance of the dynamic equilibrium between these different reactive levels, for example through internal errors (i.e. mutations), viral or bacterial agents, can lead to illnesses with important socio-economic consequences. At Humboldt-Universität, many of these issues are already being studied in eight special research programmes, three clinical research groups, and three graduate colleges.

The Cluster of Excellence "Challenges for Adaptive SuperSystems" uniquely combines scientific expertise in the neurological sciences, immunology, theoretical biology and infection biology. By bringing together theoretical and empirical approaches, and through interdisciplinary cooperation between previously isolated fields of research, the adaptive capabilities of these two supersystems can be better understood. In addition to studying the similarities and differences between the two systems and their structural and functional interfaces, it is hoped that new treatment methods can be developed which can be applied to system failure and invasive infections.

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Fields of Study

- Immunology
- Infection Biology
- Neuroscience
- Theoretical Biology

Existing Research Associations

- Collaborative Research Center 421 "Protective and pathological results of antigen processing"
- Collaborative Research Center 507 "Non-neuronal cells in neurological diseases"
- Collaborative Research Center 618 "Theoretical Biology: Robustness, Modularity and Evolutionary Design of Living Systems"
- Collaborative Research Center 633 "Immune responses in the gastrointestinal tract"
- Collaborative Research Center 650 "Cellular suppression of unwanted immune reactions"
- Collaborative Research Center 665 "Developmental disturbances in the nervous system"
- Transregional Collaborative Research Center 19 "Inflammatory cardiomyopathy"
- Transregional Collaborative Research Center 3 "Mesial temporal lobe epilepsies"
- Research Unit 100 "Opioid analgesia in inflammatory pain"
- Research Unit 104 "Mucosal infections"
- Research Unit 105 "Neoplastic B-cells"
- Research Training Group 1121 "Genetic and Immunologic Determinants of Pathogen-Host-Interaction"
- Research Training Group 429 "Neuropsychiatry und psychology of aging"
- Research Training Group 1123 "Mechanisms of learning and memory consolidation"
- Interdisciplinary Centre for Infection Biology and Immunity (ZIBI)
- Bernstein Center for Computational Neuroscience Berlin
- Berlin Neuroimaging Center
- Competence Network Systemic Inflammatory Rheumatic Diseases
- Competence Network Chronic-Inflammatory Gut
- Competence Network CAPneumonia
- Competence Network Stroke
- FP6 Integrating Project "TBVAC"
- FP6 Integrating Project "MUVAPRED"
- FP6 Integrating. Project "siRNA technology"
- FP6 Integrating Project "RISET"
- FP5 Integrating Project "HO-1"

Further Information on this Project

<http://www.exzellenz.hu-berlin.de/>