

FENS Satellite Symposium: Neuron-astrocyte signaling in the epileptic brain

Public meeting organized by the FP7 European consortium 'Neuroglia'

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The EU-funded *NeuroGLIA* project represents a concerted European effort to increase our knowledge of glial function. Using a complex multidisciplinary approach, *NeuroGLIA* has the overall aim to better understand the role of neuron-astroglia signaling in the normal and epileptic brain.

Current anticonvulsant drugs and complementary therapies are not sufficient to control seizures in about a third of epileptic patients. Thus, there is an urgent need for treatments that prevent the development of epilepsy and control it better in patients already inflicted with the disease. A prerequisite to reach this goal is a deeper understanding of the cellular basis of hyperexcitability and synchronization in the affected tissue. Epilepsy is often accompanied by massive reactive gliosis, but the role of glial cells in seizures and epilepsy is still elusive. Several recent studies clearly indicate that astrocytes take an active part in the formation, function and plasticity of synapses. Actually, the contribution of glial cells to CNS signalling can be considered one of the most exciting new fields in the neurosciences. The proposed Satellite Symposium will present new developments and findings of the *NeuroGLIA* consortium on the neuron-glia crosstalk in the epileptic brain. The focus will be on astroglial glutamate- and ATP-related mechanisms as well as the role of proinflammatory cytokines in seizure generation. The Symposium will bring together scientists with different backgrounds to discuss various aspects of this new, topical field.

The contribution of Giorgio Carmignoto will provide insights into the role of neuron-to-astrocyte signalling in both focal seizure initiation and cerebral blood vessel responses. Rheinallt Parri will discuss findings on glial glutamate release plasticity and glial GABA release in the thalamus and their potential roles in epilepsy. Vincenzo Crunelli will describe how abnormalities in the astrocytic GABA transporter GAT-1 lead to the generation of typical absence seizures. The differentiation potential of glial cells in CNS pathologies as revealed by a novel transgenic mouse model will be presented by Frank Kirchhoff. Martin Theis will talk about transgenic mouse studies on the role of CPEB translational regulators and astrocytic connexins in development and progression of temporal lobe epilepsy. Annamaria Vezzani will report on the role of cytokines and related inflammatory molecules in the etiopathogenesis of seizures. Eleonora Aronica will provide evidence of activation of inflammatory pathways in human intractable epilepsy, discussing the potential of anti-inflammatory drugs for the treatment of pharmacoresistance. Alfonso Araque and Christian Steinhäuser will discuss recent findings on dysregulated astrocytic function in the context of seizure generation in human brain.

We are convinced that an improved understanding of glial biology and of the involvement of glial cells in epileptogenesis offers the potential for developing novel strategies to treat epilepsy.

Schedule Satellite Neuroglia

Date: 7. July 2010

Venue: Amsterdam RAI Convention Center, Room G102

20' talk + 5' discussion

(14:15 end of FENS closing lecture)

15:00-15:10: Welcome and Introduction

15:10-15:35: G. Carmignoto Astrocyte control of seizure initiation and neurovascular coupling in focal seizure models

15:35-16:00: H.R. Parri Glutamate and GABA glia-neuron signaling in the thalamus, implications for function and absence epilepsy

16:00-16:25: V. Crunelli Astrocytic GABA transporters and typical absence seizures

16:25-16:50: F. Kirchhoff Novel transgenic mouse models to study glial cell-fate in the diseased brain

16:50-17:15: M. Theis CPEB translational regulators and astrocytic connexins in temporal lobe epilepsy

17:15-17:45: Coffee Break

17:45-18:15: A. Vezzani Neuron-astrocyte interactions in the normal and epileptic brain

18:15-18:35: E. Aronica Inflammation in human focal epilepsy: common therapeutic targets to treat drug-resistant epilepsy.

18:35-18:50: A. Araque Neuron-glia communication in human brain tissue

18:50-19:15: C. Steinhäuser A key role for astrocyte dysfunction in epileptogenesis

19:15-19:25 Closing remarks

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Website address of the symposium: not yet available

No registration fee