

COMMISSION ON NEUROBIOLOGY



Marco de Curtis

Chair

Marco de Curtis (Italy)

Members

Norberto Garcia-Cairasco (Brazil)
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Damir Janigro (USA)
Hoon-Chul Kang (Korea)
Katja Kobow (Germany)
Merab Kokaia (Sweden)
Richard Idro (Uganda)
Wei Ping Liao (China)
Astrid Nehlig (France)
Jeff Noebels (USA)
Terry O'Brien (Australia)
Vicky Whittermore (USA)

MC Liaison

Solomon Moshé

Mission and Aims

ILAE Neurobiology Commission (NBC) advocates an integrated view of neurobiology and clinical experimental research in the field of epilepsy and promotes this perspective by organizing workshops, events and educational initiatives that involve both neuroscience and epilepsy communities at different levels. NBC has developed a plan according to the following objectives:

- improve translation of basic research into clinical care
- define best methodologies for neurobiology research
- promote and enhance international and regional training/education on neurobiology of epilepsy
- stimulate discussion on new findings related to the understanding of the neurobiological mechanisms of epilepsy
- endorse the involvement of young emergent scientists around the world in epilepsy research

Objectives and Task Forces

The main objectives will be defined during the 4-year NBC term through activities of specific topic-oriented Task Forces. A broad and close interaction with other ILAE Commissions is planned to realize the following initiatives.

Initiative 1: Promote and optimize preclinical antiepilepsy strategies. By the Joint ILAE-AES

Translational Research Task Force chaired by Terence O'Brien and Michele Simonato and by Aristea Galanopoulou and Jacqueline French from the American Epilepsy Society. Members: M. de Curtis, A. Ikeda, A. Pitkanen, A. Brooks-Kayal, F. Jensen, H. Scharfman.

Initiative 2: Establish a catalog/list of laboratories and tools of valuable resources. Organized by the Resource Mapping Task Force chaired by Astrid Nehlig, Vicky Whittermore. Members: D. Janigro, R. Idro, G. Kostopoulos, M. Kokaia, N. Garcia-Cairasco.

Initiative 3: Endorse educational activities supported by NBC. By the Education and Beyond Task Force chaired by Marco de Curtis. Members: G. Avanzini, M. Bentivoglio, E. Bertram, R. Idro, K. Kobow, WP. Liao, M. Scorza, HC. Kang.

Initiative 4: Advance professional training in neurobiology aimed at solving regional epilepsy issues and seed new research developments in less advantaged geographical areas. By the Education and Beyond Task Force (see above).

Initiative 5: Organize 2015 and 2017 editions of the Workshops on Neurobiology of Epilepsy (WONOE). By the WONOE Task Force chaired by Katja Kobow and Raman Sankar. Members: K. Kobow, A. Galanopoulou, Y. Murashima, J. Noebels, HC. Kang.

Initiative 6: Disseminate neurobiology of epilepsy contents at neuroscience and epilepsy venues and communities. By the Neurobiology Dissemination Task Force chaired by Merab Kokaia and Asla Pitkanen. Members: G. Avanzini, A. Galanopoulou, A. Ikeda, U. Heinemann, D. Janigro, A. Nehlig, J. Noebels, H. Scharfman, N. Garcia-Cairasco, V. Whittermore

Activities July 2013 through June 2014

The NBC organized two meetings, the first in Washington (December 5, 2013) and the second in Stockholm (June 28, 2014). The Translational TF gathered in Washington (December 6, 2013) and in Stockholm (June 30). The WONOE TF meeting was held in Stockholm on June 29 2014.

During and between these encounters, all initiatives were discussed and progressed as detailed below.

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Initiative 1

A plan of activities was discussed during TF meetings. The following tasks were defined and preliminary working teams were identified:

Task 1, co-led by Aristeia Galanopoulou, Marco de Curtis, Akio Ikeda aims at harmonizing methods for video-EEG interpretation and analysis across experimental studies using in vivo and in vitro models of seizures. This task will be accomplished by 6 different work groups.

Working Group 1 will identify standards for adult rodent EEG interpretation including: methods of EEG recording; types of electrodes, montages, systems of recordings; terminology and classification system of normal EEG patterns; definition and classification of abnormal EEG patterns, including epileptic activities or background abnormalities and status epilepticus.

Working Group 2 will develop standards for EEG interpretation in immature rodents, in particular for methods of EEG recording, terminology and classification system of normal EEG patterns from surface or epidural recordings, definition and classification of abnormal EEG patterns, including epileptic or background abnormalities and status epilepticus.

Working Group 3 aims at the development of standards for depth electrophysiological recordings, for in vivo brain recordings (electrodes, recording systems and methods, terminology and interpretation of recorded patterns and associated behaviors).

Working Group 4 will develop standards for utilization and interpretation of in vitro seizure models to predict validity and relevance to in vivo models and human seizures, to develop methodological standards for in vitro electrophysiological studies and to develop terminology of normal and abnormal (ictal/interictal epileptic or other) patterns.

Working Group 5 will develop infrastructures to harmonize the analysis of video-EEG data from animal models through existing database-depositories of raw data that will be accessible by all interested investigators. The team will define standards for software-based analysis of rodent EEG and seizure behaviors.

Working Group 6 will consult on matters that relate to the publications, in particular the atlas of rodent EEGs, and will oversee the creation of a secure video-EEG library of epileptic and nonepileptic events from animal models (*Epileptic Disorders*). Furthermore, this group will oversee issues on translatability of rodent video-EEG patterns and seizures to those seen in humans.

Task 2, led by Michele Simonato, Amy Brooks-Kayal and Frances Jensen has the overall goal of undertaking a systematic review of animal model data for particular clinical syndromes, including treatments, biomarkers, and comorbidities through a Cochrane-like collaboration. The working group will organize and coordinate a systematic review of selected topics regarding animal research in epilepsy and establish means to publish/collect them (journals, websites). Creation of focused working groups to address specific issues is planned in the immediate future.

Task 3, led by Jacqueline French, Asla Pitkanen, and Helen Scharfman will develop Preclinical Common Data Elements (CDEs) and standardized procedures and protocols based on minimal requirements defined in experimental practice and will create standardized data acquisition forms for preclinical research to allow consistent data collection across different laboratories. Working groups have been formed to generate preclinical CDEs for Behavior, Pharmacology, Physiology, and EEG studies.

Task 4 (formerly 5), led by Terence O'Brien, Akio Ikeda and Solomon Moshé, will develop the infrastructure to organize multi-center preclinical studies for epilepsy research, through a partnership among government-related funding organizations, industry, philanthropic foundations and academia. A collaboration with the MULTI-PART (Multicenter Preclinical Animal Research Team) group has been initiated, and this is thought to accelerate the progress of this initiative.

Initiative 2

A questionnaire developed by the TF was posted on the website and will be available either for download or for online compilation. The future of this initiative will be reconsidered after evaluating the response to the online survey.

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Initiative 3

Starting in 2015, a formal application will be used to request a NBC contribution to educational events. Two types are identified in the proposed application form (soon available on line): scientific contribution and economic support. Application deadline is 15 July of the year before the planned event. The new procedure and the application request/form will be finalized and disseminated to all ILAE Commissions and to the organizers of previously sponsored events.

Initiative 4

One of ILAE's aims is to promote epilepsy training to improve standard treatments and diagnostic capabilities of countries in less advantaged geographical areas. Initiative 4 seeks to advance forward epilepsy training generated at ILAE-sponsored courses, by promoting and launching new seeding research developments aimed at solving regional epilepsy issues in less advantaged countries. The NBC is evaluating the possibility of developing a competitive call for a Beyond-Training Epilepsy Grant Program, in collaboration with co-funding agencies. Project funding should support seeding research/diagnostic activities in the hosting country with limited resources in collaboration with other nations, to realize develop more extensive international collaborative studies that will support research activities on region-specific epilepsy topics.

Initiative 5

The XIII WONOEP is scheduled for August 31–September 4 2015 on Heybeliada Island, Istanbul, Turkey, as a satellite event of the Istanbul ILAE Congress. The Scientific Organizing Committee is formed by Katja Kobow, Raman Sankar, Filiz Onat, Candan Gurses and Marco de Curtis. The main topic is Biomarkers in Epilepsy. Details on the XIII WONOEP location, application form, etc. are available at <http://www.ilae.org/Commission/neurobio/index.cfm>. The call for abstracts will be published through WONOEP mailing list, on the ILAE website and on *Epilepsia*, *Epilepsy Currents*, and *Epigraphs*. Abstract submission will open November 15, 2014 and will close January 15, 2015. Invitations and fellowships will be announced by April 1, 2015.

Initiative 6

The program of neurobiology activities organized by the NBC for the 2015 ILAE meeting in Istanbul was defined and a flier for dissemination was prepared and will be distributed at neuroscience and epilepsy venues. The following events are included in the 2015 ILAE meeting program: WONOEP Highlights. A special session will provide delegates with highlights of the most significant issues discussed at 2015 WONOEP XIII.

Neurobiology Symposium: Optogenetics to cure epilepsy: facts and feasibility. Speakers: M. Kokaia, R. Wykes, E. Krook-Magnuson, G. Carmignoto.

Neurobiology of Epilepsy/Translational Epileptology

- 1) Personalizing mTOR inhibition for epilepsy treatment: From bench to bedside. Speakers E. Aronica, P. Crino, N. Burnashev, S. Jozwiak
- 2) Exploring new therapies for human monogenic epilepsies using personalized models. Speakers J. Noebels, H. Caglayan, S. Petrou, K. Yamakawa.
- 3) Epilepsy across species and ages: translating video and EEG terminology from animals to humans and back. Speakers A. Galanopoulou, T. O'Brien, N. Garcia-Cairasco, A. Arzimanoglou

Other sessions/titles with neurobiology content:

- The complexities of epilepsy genetics
- Epilepsies related to the immune system
- SUDEP: From understanding mechanisms to clinical prevention
- Pitfalls of preclinical AED studies
- Status epilepticus: Translation from animal models to humans
- Brain development: Common mechanisms between autism and epilepsy spectrum
- Different flavors of interictal discharges
- Genetic causes of epileptic encephalopathies
- Where is the next big breakthrough coming from?
- Mechanisms of developmental toxicity of AEDs
- Modeling epilepsy comorbidities in animals

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Educational events: The best of two worlds:
Translational epileptology

1. Of mice and men: Clinical and neurobiological perspectives in temporal lobe epilepsy
2. When a seizure is a seizure
3. What do and can clinicians expect from neuroscientists?
4. Beyond the neuron(s): Where is epilepsy Young Scientist Awards to the best platform presentation.

The NBC sponsored the following events:

2014 Epilepsy Gordon Research Conference (GRC), entitled Mechanisms of Epilepsy and Neuronal Synchronization held August 17-22, 2014 in the Mount Snow Resort in Vermont, U.S.A., organized by Jack Parent, Scott Baraban and Heiz Beck.

2014 Advanced San Servolo Course Bridging Basic with Clinical Epileptology—focus on focal epilepsy progression: July 20-August 1, 2014. The 12-day course gathered a faculty of 17 tutors and 12 lecturers from 11 countries and involved 40 students from 32 different nations worldwide.

2014 Session at the 17th World Congress of Basic and Clinical Pharmacology (WVP2014), Cape Town, South Africa. The session was on “Optimizing anti-epileptic drug discovery” on July 15, 2014 and was organized by Michele Simonato with the following invited speakers: Terence O’Brien, Asla Pitkanen, Jerome Engel Jr., Aristeia Galanopoulou. This session provided an update on ongoing work to define guidelines that improve and standardize the design, reporting, and validation of data across preclinical and clinical antiepilepsy drug development studies targeting drug-resistant seizures, epileptogenesis and comorbidities. Session on network synchronization in epilepsy at 9th IBRO meeting (July 7-11, 2015), Rio de Janeiro, Brasil. K. Deisseroth, D. Kullmann, J. Huguenard, M. Kokaia.

Commission activities, updated by Katja Kobow, can be viewed at the ILAE NBC website:
<http://www.ilae.org/Commission/neurobio/index.cfm>.