

Neurobiology Commission

Members

Chair

Aristea Galanopoulou (USA)

Members

Aristea Galanopoulou (USA)

Marco de Curtis (Italy)

Terence O'Brien (Australia)

Márcio Moraes (Brazil)

Kathryn Davis (USA)



Aristea Galanopoulou

Management Committee Liaison

Ed Bertram (USA)

The purpose of the Neurobiology Commission is to promote neurobiology research in epilepsy through advocacy, education, training, proposals of optimal methodologies and infrastructure improvements.

Activities

We have had zoom conferences with the members of the NBC and the chairs of its Task Forces (TF) regularly to discuss matters pertaining the NBC areas of interest. Due to the COVID-19 pandemic and ensuing travel restrictions, there were no face-to-face meetings or scientific meetings in 2020. Similarly, due to COVID-19-related budgetary restrictions, the usual activities of sponsoring workshops or providing bursaries to young investigators to attend meetings or training opportunities were cancelled for this year.

A recurrent theme in the zoom discussions was the importance of highlighting neurobiology research in epilepsy within the ILAE priorities and activities. A particular area of concern is the need to improve the content, quality and participation of neurobiologists across diverse areas of expertise and career stages globally in the ILAE-associated meetings. The NBC members proposed suggestions to the ILAE leadership and congress council that were thought as important to improve the quality and content of the scientific meetings in basic and translational epilepsy research, and increase the participation of neurobiologists in the ILAE-associated meetings. There were also suggestions provided to the leadership for consideration on the organizational bodies restructuring of the ILAE that were thought as important in addressing these concerns.

Continuity Plans

Efforts to elevate neurobiology research within ILAE activities (congresses, advocacy, etc) and organizational structure are strongly needed to address the interests and needs of neurobiology researchers globally and at all career levels.

Neurobiology Commission Task Forces

WONOE Task Force

Members

Terry O'Brien (Australia), **co-chair**
Aristea Galanopoulou (USA), **co-chair**
Marco de Curtis (Italy), **past chair**
Ozlem Akman (Turkey)

Márcio Moraes (Brazil)
Tomonori Ono (Japan)
Raman Sankar (USA), **liaison to NBC Advocacy TF**

Aim: Organize the WONOE meetings prior to the IECs.

The WONOE TF originally discussed the theme for a WONOE meeting prior to the Paris IEC 2021 and had invited Drs Stephanie Baulac and Stephane Auvin as local co-organizers for this meeting with a main topic of “**Early onset epilepsies: neurobiology and novel therapeutic strategies**”. While efforts to identify a site for the meeting and plans for the meeting agenda and call for abstracts were ongoing, it became evident that the IEC 2021 in Paris would not be materialized due to the ongoing COVID-19 pandemic. The NBC is currently discussing the possibility of postponing the planned meeting to a later day, in coordination with the ILAE congress council and leadership.

In addition, there are 3 manuscripts in preparation for the proceedings of the WONOE 2019.

Continuity plans: Due to the COVID-19 pandemic meeting cancellations that extend through 2021, the WONOE 2021 could not be held physically, which is the optimal forum for the spirit of this meeting. The TF is considering postponing the WONOE 2021 meeting for 2022, prior to the Geneva meeting, utilizing the same organizers, topic and agenda items.

ILAE/AES Joint Translational Task Force

Members

AES co-chairs: Aristea Galanopoulou and Greg Worrell
AES nominees: Richard Staba, Anne Anderson, Manisha Patel, Kevin Kelly
ILAE co-chairs: Terence O'Brien (Australia) and Matthew Walker (UK)
ILAE nominees: Gunther Sperk (Austria), Rudiger Koehling (Germany), Heidrun Potschka (Germany), Steven Petrou (Australia)
Liaison to MC: Ed Bertram (USA)
Project manager: Seonaid Anderson (Belgium)

Activities: Multiple zoom conferences of the main TF as well as of the working groups (WGs) have been conducted. The main TF has offered the position of a project manager to Dr Seonaid Anderson in the fall of 2020. Since then, Seonaid has been coordinating the zoom meetings, communications, and activities of the various WGs. These activities include the following.

The TASK1-WGs continue their work towards the creation of an online atlas of rodent EEGs, a system for the interpretation of the rodent EEGs and classification of seizures and epilepsy models in rodents. There is a first version of the Rodent EEG Atlas which is created by Peter Shen with the guidance of Drs Timofeev, Akman, and Galanopoulou. There is a plan to finalize a report on proposing a nomenclature for the electrodes used in rodent EEG studies for submission within 2021. Other TASK1-WGs are discussing and drafting reports on rodent EEG interpretation, models of seizures and epilepsies, drug resistance in preclinical epilepsy studies with plan to submit within 2021.

TASK2 is continuing the systematic review of outcome measures in epilepsy models.

TASK3-WGs are working towards the creation of additional preclinical common data elements (CDEs) and case report forms (CRFs) for general pharmacology studies, pediatric and genetic models, rigor in preclinical epilepsy research, phenotyping seizure models, omics, imaging, pathology.

In addition, in collaboration with Karen Crawford's group at LONI (U Southern California) the first electronic CRFs have been created and will be made available to interested investigators. These address core, physiology and EEG CDEs that had been created by the TASK3 group in the previous cycle. This has been made possible with the support of ILAE, AES and CURE Epilepsy through the LONI data analysts group of Karen Crawford (University of Southern California).

CURE (Citizens United for Research in Epilepsy) has co-sponsored these efforts to create electronic modules of the CRFs.

There is a special issue planned for *Epilepsia Open* to include the new versions of preclinical TASK3-CDEs, as well as a plan to submit separate TASK1 reports within 2021.

Discussions are also ongoing to collaborate with team science research projects, e.g. CURE Epilepsy funded research, and One Mind for best ways of utilizing our efforts to enhance collaboration and data sharing.

Continuity plans: Largely due to the disruptions posed by COVID-19 upon the WG members, there have been significant delays in the activities of this TF. Some of the activities may need to continue till end of 2021 by the members of the WGs, such as completing the reports that have been initiated by TASK1-3, the conversion of additional CRFs to electronic CRFs, maintenance and enrichment of the rodent EEG Atlas. These can be covered by the existing budget of the TF and with the support of the existing members.

There is however an ongoing need to continue with an organizational body within ILAE that will evaluate, prioritize and promote the ongoing needs and priorities of translational epilepsy researchers which are vital for the successful discovery and validation of treatments for epilepsies, comorbidities and drug-resistant seizures across the lifespan, biomarkers and other tools and infrastructure that will promote translational epilepsy research.

Genetics/Epigenetics Task Force

Membership:

David Henshall (Ireland), chair	Iscia Lopes-Cendes (Brazil)
Katsuhiro Yamakawa (Japan)	Annapurna Poduri (USA)
Albert Becker (Germany)	Michael Johnson (UK)
Chris Reid (Australia)	Hela Mrabet (Tunisia)
Alica Goldman (USA)	Katja Kobow (Germany, liaison to Big Data TF)
Erwin van Vliet (Netherlands)	Steven Petrou (Australia, liaison to ILAE/AES Joint Translational TF).

Aims: Discuss scientific and clinical research priorities of the TF and commission review(s) that would focus on promoting the TF, promote priority Genetics-Epigenetics topics at key epilepsy meetings, organize training, create infrastructure and promote industry-academia research interactions and developments, and collaborate with the ILAE/AES Joint Translational TF on CDEs in genetics-epigenetics.

Activities: During 2020, the Epigenetics-Genetics Task Force continued to meet and progress its original tasks. Meetings occurred during the year by Zoom call. These were generally well attended with a majority of the TF members being present. However, the impact of COVID on everyone impacted on our ability to achieve some of the plans for the year.

In April, we saw the publication of a review under our Task I (Publications) activities appear, on the topic of Epigenetics, in *Epileptic Disorders*.

https://www.jle.com/fr/revues/epd/e-docs/epigenetics_explained_a_topic_primer_for_the_epilepsy_community_by_the_ilae_genetics_epigenetics_task_force_316722/article.phtml

The article provides a broad but nevertheless substantial overview of the topic and includes explanations and definitions, the main epigenetic mechanisms, evidence for these as contributors to mechanisms of epilepsy and future directions of the field.

During 2020, the TF focused on a second publication, on how mutations in genes with known epigenetic functions cause epilepsy. We have agreed the list of genes and individual TF members have begun writing their draft contributions. We anticipate a submission in mid-2021.

Under Task II, promoting the topic, TF members contributed to symposia and provided speaker suggestions for various meetings. Some were cancelled however due to COVID while others were delayed (e.g. Gordon conference and 14th European Congress on Epileptology). Our Epigenetics-focused workshop application to the IEC in Paris was declined.

The TF has identified potential contributors to ILAE and related websites (eg. podcast-type review of recent advances or publications).

Under Task III, training activities, the TF revised its original plan of holding an in-person training workshop on epigenetic methods at ICL in the UK. Instead, we are planning a more didactic-style teaching workshop on Epigenetics. The structure of the workshop would be to begin with broad overview of the subject area for the non-specialist, followed by specific topics in depth. There would then be an opportunity for

attendees to join breakout groups focusing on topics of their interest including technical aspects, new methods, collaborations etc. The intention would be to host this workshop in mid-late 2021.

The Chair continued to liaise with Epilepsy Climate Change initiative led by UCL. However, the planned conference in 2020 did not proceed. However, funding for this meeting is now in place and will proceed in 2021.

Under Task IV, activities on resources and infrastructure, two members of the Task Force are finalizing common data elements for preclinical research. This will now include a specific module for collecting “omics” data. For specifics see the activities of the TASK3 group of the ILAE/AES Joint translational TF, which is leading this effort.

*Publications

Katja Kobow, Christopher A. Reid, Erwin A. van Vliet, Albert J. Becker, Alica M. Goldman, Shinichi Hirose, Iscia Lopes-Cendes, Hela Mrabet Khiari, Annapurna Poduri, Michael R. Johnson and David C. Henshall. Epigenetics explained: A topic “primer” for the epilepsy community. A report of the Genetics/Epigenetics Task Force. *Epileptic Disorders* 22(2):127-141 (2020)

Young Neurobiologists Task Force

Membership:

Premysl Jiruska (Czech Republic), chair	Shilpa Kadam (USA)
Nihan Çarçak (Turkey)	Christos-Panagiotis Lisgaras (Greece)
Kathryn Davis (USA)	Joseph Raimondo (South Africa)
Vadym Gnatkovsky (Italy)	Liankun Ren (China)
Nigel Jones (Australia)	Erwin van Vliet (Netherlands)

Aims: To evaluate the current environment for attracting, sustaining, and advancing talented young neurobiologists in epilepsy research across regions, cultures, and genders, as well as identify areas in need of improvement, challenges and possible solutions. To promote opportunities that will cultivate leadership qualities and identify future young leaders among young epilepsy neurobiologists. To collaborate with the other members of the NBC and its TFs so as best to integrate the expertise of this TF in the initiatives and goals of the NBC and its TFs.

Activities: In 2020, the TF continued activities focused on attracting, sustaining, and advancing young neurobiologists. TF members focused on promoting education and training in epilepsy research by creating undergraduate and postgraduate programs to train epilepsy research specialists of the 21st century.

The members of the TF were awarded a pilot grant from the 4EU+ consortium to elaborate the foundations for the Master’s program on Epilepsy. The Master’s program is a part of the European Universities Initiative, which aims to establish high-quality curricula on specific topics across Europe. The primary goal of the project is to set up the foundations for a permanent undergraduate educational EU program focused on epilepsy. The Master’s program will fill the existing gaps in academic education to promote broad multidisciplinary knowledge in epilepsy research areas that include clinical,

neurobiological, social, and legal aspects. The graduates should be versatile scientists able to catalyse the integration of science and technology; they will acquire the ability to work in academia and industry, to bridge between basic and clinical research to develop a global vision about epilepsy-related issues. The Master's program aims to enhance personal development in translational science and promote project development creativity. The project activities and program development are supported by ILAE and synergized with the Commission on Neurobiology and Education Council so that the Master's program covers current topics in epilepsy research and requirements for epilepsy researchers.

The initial part of the project involves the preparation of an Elective course on the Pathogenesis of Epilepsy which will be opened in the autumn of 2021. The faculty involves scientists and clinicians who are members of the Young Neurobiologists Task Force, Next Generation Task Force and Young Epilepsy Section. The course aims to be international to attract undergraduate and postgraduate students and early career researchers from academia and industry. The 4EU+ Alliance promotes innovative student-centered teaching methods and faculty members will be provided with training and support to implement innovative pedagogies and transversal competencies into the course and Master's program. The elaborated curriculum will be used for the purpose of ILAE Academy and it should cover the knowledge and competencies required for epilepsy neurobiologists.

The TF continues to explore the possibilities for Ph.D. training programs in epilepsy. The consortium composed of multiple European epilepsy research laboratories, led by Dr. de Curtis from the NBC, will re-apply to the Innovative Training Network funding scheme to secure the financial support for the international Ph.D. training program in epilepsy. Also, opportunities to fund Ph.D. programs from other European schemes are being evaluated by the TF.

The YNTF has strengthened its collaboration between the Next Generation Task Force and Young Epilepsy Section. The primary aim is to harmonize and synergize the joint activities to support neurobiology at international congresses and to prepare joint educative activities like online webinars or round table discussions.

Advocacy Task Force

Membership:

Raman Sankar (USA), co-chair Solomon Moshe (USA), co-chair Ed Bertram (USA), liaison to MC Kathryn Davis (USA)	Akio Ikeda (Japan) Janet Mifsud (Malta) Terence O'Brien (Australia) Vicky Whittemore (USA, NINDS)
--	--

Aims: To evaluate the current funding environment for neurobiology research in epilepsy. To advocate for the value of neurobiology research in improving knowledge on epilepsy and translating basic science discoveries to better therapies. To advocate for initiatives that will improve research infrastructure and the initiatives of the NBC and its TFs, including research, educational and training initiatives. To advise the NBC and the Research Advocacy TF on matters related to advocating for neurobiology research.

Activities: Initial work has focused on giving the epilepsy patient and caregiver community access to translational neurobiology research. The TF initially decided to work with *Living Well with Epilepsy*, a blog run by Jessica Kennan Smith. Kate Davis has been leading this effort. The TF has now been in discussions on how to consistently develop content in lay language to bring new scientific findings to patients and the caregiver community. In 2019, the TF had submitted two blogs on the *Living Well with Epilepsy* website. The COVID-19 pandemic and lack of budgetary support halted these efforts as well as the plans to engage a medical writer to assist with the writing of scientific highlights for the general public. Opportunities to liaise with *Epilepsia Open* editorial board to advance these plans are ongoing.

Submitted by Aristeia Galanopoulou