SYNGO
SYNAPSE GENE ONTOLOGY AND ANNOTATION PROJECT
WORKSHOP & SYMPOSIUM

1st SynGO meeting
Singapore
2019

PRE-SYMPOSIUM WORKSHOP
Launching SynGO: Worldwide expert annotation of synaptic genes to understand brain disorders
21 February 2019
Centre for Life Sciences, National University of Singapore

SYMPOSIUM
The Synapse-Neurobiological Underpinnings of Brain Disorders
22 February 2019
Singapore
A very warm welcome to Singapore and to the inaugural SynGO Workshop and Symposium! This event is jointly and proudly organised by the Department of Physiology, Yong Loo Lin School of Medicine, National University of Singapore and the international Synaptic Gene Ontology (SynGO) consortium.

Our brain has been a constant source of fascination. This is exemplified especially when one ponders upon the collective achievements of the human species – it would seem that our capacity to continually surprise and surpass ourselves is boundless. What is truly amazing is that the capacity for such achievements is all stored in an apparently finite and unassuming organ that is our brain. Yet, belying this humble appearance lies a complexity that is simply mind boggling and blowing. The source of our mental capacities is rooted within the intricate networks of densely interconnected neurons that acquire, process and execute information derived from various inputs via cellular communication at specialised subcellular structures known as synapses. That such sophistication in design and function fall almost exquisitely on these tiny structures is both amazing and irresistibly fascinating!

The preceding decades have seen significant and breath-taking breakthroughs in our knowledge and understanding of the synapse both in defining its composition and understanding the molecular mechanisms underlying their function. This explosion of knowledge has revolutionised our lives in so many ways that it is impossible to mention them in any level of detail here. Yet, despite all these advancements, we have merely uncovered the very tip of the iceberg. Even more importantly, recent research not only revealed how complex the synapse is, but also how incredibly delicate it can be. Indeed, all it takes is for a simple perturbation of the synapse to make the beauty of our brain (and of its human owner) fade away. Such synaptic perturbations, little understood and collectively known as synaptopathies, are the current focus of intense research by many laboratories around the world.
This symposium is thus appropriately themed “The Synapse – neurobiological underpinnings of brain disorders”. Together with the accompanying SynGO Workshop that showcases the new SynGO database platform, we hope to bring the Synapse into focus. We are delighted to have with us prominent international and local speakers to share and discuss the latest developments in human neurological disorders with the local scientific and clinical community. We hope that the event will serve as a catalyst to stimulate further interest in understanding the significant contribution of the synapse in causing brain disorders and hope that you will enjoy the sessions and discussions as much as we had to bring the exciting programme together.

We would like to thank all speakers, coordinators, student helpers and attendees for your participation. We are thankful for the support given by the Department of Physiology in planning and organising the event. We are deeply appreciative of the generous support received from our sponsors that made this meeting possible. Particular thanks go to the Broad Institute, Lee Foundation and Medical Sciences Cluster.

Wishing you an exciting and stimulating meeting!

Organizing Chairperson,
John Chua Jia En
Organizing Committee

Symposium Organizing Chairperson: John Chua Jia En

Advisor: Lim Kah Leong

Workshop Organizer: Matthijs Verhage, Guus Smit, Frank Koopmans

Organizing Secretariat: Lee Xin Yi, Angeline, Chong Pey Rou, Koh Kang Sheing, Phoebe, Vaisnavi Chandrasekaran

The booklet graphic design is given credit to Sirisako under Freepik.com.
The bipartite sinapse illustration is given credit to Ms Hang Liting.
SYNGO CONSORTIUM

Coordinators (alphabetical order):
Guopeng Feng, Broad Institute/Stanley Center, MIT, Cambridge
Steve Hyman, Broad Institute/Stanley Center, MIT, Cambridge
August B. Smit, Vrije Universiteit Amsterdam
Matthijs Verhage, Vrije Universiteit (VU) and VU Medical Center Amsterdam

Expert labs (alphabetical order):
Claudia Bagni, University of Lausanne, Switzerland
Alex Bayes, Hospital de la Santa Creu i Sant Pau, Spain
Thomas Biederer, Tufts University, Boston, USA
Nils Brose, Max Planck Institute, Göttingen, Germany
Pietro DeCamilli, Yale University, New Haven, USA
John Chua, National University Singapore, Singapore
Eckart Gundelfinger, LIN Magdeburg, Germany
Casper Hoogenraad, University of Utrecht, The Netherlands
Reinhard Jahn, Max Planck Institute, Göttingen, Germany
Pascal Kaeser, Harvard University, Boston, USA
Eunjoon Kim, IBS-KAIST, Deajeon, Korea
Ben Neal, Broad Institute/Stanley Center, MIT, Cambridge
Vincent O’Conner, University of Southampton, UK
Danielle Posthuma, Vrije Universiteit (VU) and VU Medical Center Amsterdam
Timothy Ryan, Weil Cornell, New York, USA
Carlos Sala, University of Milano, Italy
August B. Smit, Vrije Universiteit Amsterdam
Thomas Sudhof, Stanford, USA
Matthijs Verhage, Vrije Universiteit (VU) and VU Medical Center Amsterdam
12:30 pm - 1:00 pm : Registration
1:00 pm - 1.15 pm    : Welcome by Dr. John Chua (NUS) and Dr. Guus Smit (SynGO)
1:15 pm - 2:00 pm   : The SynGO user’s guide by Frank Koopmans (30 min presenta
tion + 15-min discussion)
2:00 pm - 3:30 pm : Hands-on analyses by participants (please bring own data!)
3:30 pm - 4:00 pm : Tea break
4:00 pm - 5:00 pm : Hands-on analyses, Part 2, conclusions

The hands-on workshop will highlight the SynGO database and the online analysis
and visualization capacities of the SynGO portal. Participants will have unrestricted
access to the database through the portal and may bring their own datasets to
analyze synaptic enrichments etc. The SynGO portal allows users to browse genes
of interest and explore available synaptic annotations. Gene lists can be uploaded
to perform over representation analysis for synaptic genes which are presented in
interactive visualizations.

At the start of the workshop, Frank Koopmans, SynGO's chief bioinformatician, will
present a plenary users guide through the database and portal. After this, all par-
ticipants are invited to work hands-on with the database and portal. SynGO per-
sonnel will be available to assist with data entry, analyses and visualizations.
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location/Institution</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00</td>
<td>Registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08:20</td>
<td>Audience to be seated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>08:25</td>
<td>Opening Speech</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Session 1: Omics approaches to elucidate brain function and disorders**

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker/Institution</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30</td>
<td>Prof Guus Smit, Vrije Universiteit, Amsterdam</td>
<td>SynGO: an evidence-based data resource for synapse function and dysfunction</td>
</tr>
<tr>
<td>08:55</td>
<td>Prof Matthijs Verhage, Vrije Universiteit, Amsterdam</td>
<td>Synapse plasticity and diversity: how synapse compositions drive synaptic properties</td>
</tr>
<tr>
<td>09:20</td>
<td>Prof Jens Hjerling-Leffler, Karolinska Institutet, Sweden</td>
<td>Synaptic heterogeneity between cell types of the brain</td>
</tr>
<tr>
<td>09:45</td>
<td>Prof Shyam Prabhapar, Agency for Science, Technology and Research (A*STAR), Singapore</td>
<td>Histone acetylome-wide association studies: a new paradigm for neurogenomics</td>
</tr>
<tr>
<td>10:10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Session 2: Recent insights into neurodegenerative and neuropsychiatric disorders**

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker/Institution</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30</td>
<td>Dr Jimmy Lee, Institute of Mental Health, Singapore</td>
<td>Genomic medicine in psychiatry – what and how?</td>
</tr>
<tr>
<td>10:55</td>
<td>Dr Adeline Ng, National Neuroscience Institute (NNI), Singapore</td>
<td>Updates on Genetics and Biomarkers in Frontotemporal Dementia (FTD) Spectrum Disorders</td>
</tr>
<tr>
<td>11:20</td>
<td>Prof Edward Koo, National University of Singapore, Singapore</td>
<td>Synaptic injury in Alzheimer disease: is this where abeta toxicity starts?</td>
</tr>
<tr>
<td>11:45</td>
<td>Dr Fu Yu, Agency for Science, Technology and Research (A*STAR), Singapore</td>
<td>PBN circuits in suppressing appetite by competing states</td>
</tr>
<tr>
<td>12:10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:45</td>
<td>Prof Steven E. Hyman, Broad Institute, USA</td>
<td>SynGO in Context: A Critical Bridge From Genetics to Disease Mechanisms and Therapeutics</td>
</tr>
</tbody>
</table>

**Session 3: Synaptic mechanisms in brain function and disorders**

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker/Institution</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:45</td>
<td>Prof Kim Eunjoon, Korea Advanced Institute of Science and Technology (KAIST), Korea</td>
<td>NMDA receptor dysfunction and sexual dimorphism in mouse models of autism</td>
</tr>
<tr>
<td>15:10</td>
<td>Prof Soong Tuck Wah, National University of Singapore, Singapore</td>
<td>The role of RNA editing of Cav1.3 Channels in learning and memory</td>
</tr>
<tr>
<td>15:35</td>
<td>Prof Timothy A. Ryan, Weill Cornell Medical College, USA</td>
<td>The cost of thinking &amp; not thinking: metabolic control of synaptic performance</td>
</tr>
<tr>
<td>16:00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16:20</td>
<td>Dr John Chua, National University of Singapore, Singapore</td>
<td>The role of FEZ1 in neurodegenerative and neurodevelopment disorders</td>
</tr>
<tr>
<td>16:55</td>
<td>Prof Eckart Gundelfinger, Magdeburg University, Germany</td>
<td>Multiple functions of bassoon in the development, performance and maintenance of brain synapses</td>
</tr>
<tr>
<td>17:20</td>
<td>Prof George Augustine, Nanyang Technological University, Singapore</td>
<td>Synapsins and the Synaptic Vesicle Reserve Pool</td>
</tr>
<tr>
<td>17:45</td>
<td>Prof Nils Brose, Max Planck Institute of Experimental Medicine, Germany</td>
<td>Synaptic vesicle priming and the unique features of regulated exocytosis at nerve cell synapses</td>
</tr>
<tr>
<td>18:10</td>
<td>Closing speech</td>
<td></td>
</tr>
<tr>
<td>18:15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18:30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
WITH COMPLIMENTS
Koen Dewaele, CEO
ADx NeuroSciences, Belgium

Extending into diagnostics and therapeutic antibody market

ADx NeuroSciences develop state-of-the-art biomarker-assays to diagnose a wide variety of neurodegenerative diseases. Pharmaceutical companies rely on those assays to accelerate and improve the design of large clinical trials, and their assays therefore require highly validated, specific and sensitive antibodies that are suitable for routine commercial use.

Sourcing reliable antibodies with the correct performance characteristics is a major challenge in commercial assay development. ADx NeuroSciences chose Abcam as a valued partner in their assay development programs due to Abcam’s advanced antibody discovery capabilities and portfolio of existing affinity binders.

“We have been working with Abcam for several years now to help develop antibodies for our assays. Critical to our partnership is the trust we place in Abcam to provide us with high-precision antibodies suitable for the stringent standards required in clinical use.”
What if the path not taken is the path to discovery?

If a journal article could efficiently connect your users to critical contextual knowledge at their point of need, where might their research take them?

“The key advantage [of ScienceDirect Topics] is that a lot of information relevant to one topic is in the one location and easy to understand.”

—Josey Erickson-Pintaudi, Student, Monash University

Guide your users on their path to discover with ScienceDirect Topics.

Visit elsevier.com/sciencedirecttopics
INSTRUCTIONS TO SPEAKERS AND ATTENDEES

GOING PAPERLESS

No QR code reader? please follow these steps:

1. Open your mobile app store (App Store, Google Play, Windows Marketplace, etc.)
2. Search for QR code readers.
3. Simply download the QR code reader to your phone, open it and you are ready to go.
   Note: You will need to open your downloaded QR code reader each time you want to decode a QR code. Otherwise, you will end up just taking a picture of the QR code.
4. If you are reading the flipbook in your QR code reader apps, probably you can open it in your browser apps to eliminate the advertisement of the QR code reader apps.

If you have any questions or concerns on downloading a QR code reader for your mobile phone, please seek for help from the organizing committee, we will try to help you out.
INSTRUCTIONS TO SPEAKERS AND ATTENDEES
GOING PAPERLESS

No QR code reader?
please follow these steps:

1. Open your mobile app store (App Store, Google Play, Windows Marketplace, etc.)
2. Search for QR code readers.
3. Simply download the QR code reader to your phone, open it and you are ready to go.
   Note: You will need to open your downloaded QR code reader each time you want to decode a QR code. Otherwise, you will end up just taking a picture of the QR code.
4. If you are reading the flipbook in your QR code reader apps, probably you can open it in your browser apps to eliminate the advertisement of the QR code reader apps.

If you have any questions or concerns on downloading a QR code reader for your mobile phone, please seek for help from the organizing committee, we will try to help you out.