ANA2017

142nd ANNUAL MEETING OF THE AMERICAN NEUROLOGICAL ASSOCIATION

SAN DIEGO, CA • OCTOBER 15-17, 2017

SHERATON SAN DIEGO HOTEL & MARINA

EXPLORE • EXAMINE • INVESTIGATE

FINAL PROGRAM

OCTOBER 14, 2017 | Pre-Meeting Symposium: Big Science and the BRAIN Initiative

ANA American Neurological Association since 1875

2017.MYANA.org

THE 142ND ANA ANNUAL MEETING

Enjoy outstanding scientific symposia covering the latest research in the fields of neurology and neuroscience while taking the opportunity to network with leaders in the world of academic neurology at the 142nd ANA Annual Meeting in San Diego, CA, October 15-17, 2017.

MEETING LOCATION

Sheraton San Diego
Hotel & Marina
1380 Harbor Island Drive
San Diego, California 92101

ONSITE MEETING CONTACTS

Registration and meeting questions:
meetings@myana.org
OR visit the registration desk
Bay View Foyer
(located in Marina Tower Lobby Level)

Saturday, October 14
3:00 PM–7:00 PM

Sunday, October 15
6:00 AM–5:45 PM

Monday, October 16
6:30 AM–5:45 PM

Tuesday, October 17
6:30 AM–2:15 PM

ANA2017 142nd ANNUAL MEETING OF THE AMERICAN NEUROLOGICAL ASSOCIATION

SAN DIEGO, CA • OCTOBER 15-17, 2017

SHERATON SAN DIEGO HOTEL & MARINA

Please note *some session titles may have changed since this program was printed. Please refer to your* ***Mobile app*** *for the most current session updates.*

#ANAMTG2017

ANA 2017 FROM THE CHAIR

Laura P.W. Ranum, PhD
University of Florida
Chair, Scientific Program Advisory Committee

Dear Colleagues,

It is a pleasure to welcome you to the 142nd Annual Meeting of the American Neurological Association (ANA). First, I would like to thank members of the Board of Directors, the Scientific Program Advisory Committee, Dr. James Brewer and the Local Arrangements Subcommittee here in San Diego, and colleagues throughout academic neurology for their hard work and outreach efforts. These efforts have resulted in more than 450 abstract submissions for the 2017 ANA meeting.

This year, the ANA Annual Meeting which will be held on October 15 - 17, 2017 in San Diego CA, will offer exceptional scientific talks and posters and an unparalleled opportunity to connect with colleagues throughout academic neurology. The scientific symposia presented cover a broad spectrum of research areas including precision medicine, antisense oligonucleotide therapies, global neurology, neuronal circuits and behavior, and molecular imaging. The poster sessions are packed with the latest emerging neuroscience. Additionally, the Career Development Sessions, Interactive Lunch Workshops and Special Interest Groups provide opportunities for focused scientific exchange. This meeting also offers an important opportunity for career development at all levels of academic neurology and networking opportunities with leaders in the field. This year, plenary poster-blitz talks, highlighting the scientific contributions of young investigators, have been selected from submitted abstracts.

Please be sure to also attend the Pre-Meeting Symposium on Big Science and the BRAIN initiative. The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative is the most ambitious neuroscience project to date. It is aimed at revolutionizing our understanding of the human brain and seeks to develop technologies that will enable precise monitoring and modulation of neural activity. Now in its third year, a number of tools have been developed that are transforming our understanding of brain circuits. I hope you will take advantage of this evening session as a panel of experts discuss the BRAIN initiative.

In addition, it is an honor to highlight that our 2017 Annual Meeting will afford each of us the opportunity to welcome and celebrate our colleagues from the Japanese Society of Neurology. We are thrilled to continue the tradition of recognizing colleagues and collaborators from around the world, as was done with the Italian Neurological Society in 2016, Indian Academy of Neurology in 2015, Mexican Academy of Neurology in 2014, French Société Française de Neurologie in 2013 and Association of British Neurologists in 2012. This coincides with new efforts within the ANA to consider potential programs to extend collaborations in neurological teaching and research with academic neurologists globally. My colleagues on the Board of Directors and all of us on the Scientific Program Advisory Committee are confident that this year's ANA Annual Meeting will be exceptional. We look forward to seeing you in San Diego!

With best regards,

ANA 2017 SCHEDULE AT A GLANCE *(schedule is subject to change)*

FRIDAY	OCTOBER 13
4:30 PM – 8:15 PM	**NINDS/ANA Career Development Symposium** | *Harbor Island Ballroom 3* *By Invitation Only*

SATURDAY	OCTOBER 14
7:15 AM – 6:45 PM	**NINDS/ANA Career Development Symposium** | *Harbor Island Ballroom 3* *By Invitation Only*
3:00 PM – 7:00 PM	**Registration** | *Bay View Foyer*
6:00 PM – 7:00 PM	**PRE-MEETING SYMPOSIUM** **Buffet Dinner** | *Grande Ballroom C*
6:45 PM – 7:45 PM	**NINDS/ANA Career Development Reception** | *Harbor Island Ballroom 3* *By Invitation Only*
7:00 PM – 10:00 PM	**PRE-MEETING SYMPOSIUM** **Big Science & the BRAIN Initiative** *Grande Ballroom C*

SUNDAY	OCTOBER 15
6:00 AM – 5:45 PM	**Registration** | *Bay View Foyer*
7:00 AM – 9:00 AM	**Breakfast** *(Open to All Registrants)* *Bay View & Grande Foyers*
7:00 AM – 7:30 AM	**Trainee Breakfast with the ANA Board of Directors*** | *Nautilus 1 & 2* *(Open to Students, Post-docs, Residents, and Fellows)*
7:30 AM – 9:00 AM	**Professional Development Courses**
Course 1	Students, Residents, Post docs and Fellows Career Level: **Early Careers in Academic Neurology** *Nautilus 1 & 2*
Course 1	Early- to Mid-Career Level: **There is no K in Promotion** | *Nautilus 4 & 5*
Course 1	AUPN Chair-Career Level: **Challenges in Faculty Compensation** | *Nautilus 3*
7:30 AM – 3:30 PM	**Exhibits Open*** | *Grande Foyer* *(Open to All Registrants)*
9:00 AM – 9:15 AM	**Coffee Break** | *Bay View & Grande Foyers*
9:15 AM – 11:15 AM	**PLENARY SESSION** **Linking Circuits to Behavior: Promise & Perils** | *Grande Ballroom AB*
11:00 AM – 7:00 PM	**Poster Viewing*** ***Poster presenters and judges will be in attendance from 5:30 PM – 7:00 PM*** | *Pavilion*
11:15 AM – 11:45 AM	**New Member Meet and Greet*** ***with ANA Past Presidents & Current Leadership*** *Spinnaker*
11:45 AM – 1:00 PM	**Lunch** | *Bay View & Grande Foyers*
11:45 AM – 1:00 PM	**Interactive Lunch Workshops**
1.	Management of Severe Pediatric Traumatic Brain Injury: What is the Evidence? *Grande Ballroom C*

SUNDAY	OCTOBER 15 (CONTINUED)
2.	Inflammatory Diseases of the Spinal Cord *Nautilus 1 & 2*
3.	Operative Strategies for Drug-Resistant Focal Epilepsy: Cortical Resection, Responsive Neurostimulation, Deep Brain and Chronic Subthreshold Cortical Stimulation | *Nautilus 3*
4.	Meet the Director and Staff of the National Institute of Neurological Disorders and Stroke (NINDS)* | *Nautilus 4 & 5*
5.	Meet the Editors 1* | *Seabreeze*
1:15 PM – 3:15 PM	**PLENARY SESSION** **Derek Denny-Brown Young Neurological Scholar Symposium** | *Grande Ballroom AB*
3:30 PM – 5:30 PM	**Special Interest Group Sessions**
1.	Neuro-Oncology | *Grande Ballroom C*
2.	Neurocritical Care: ICH/IVH: Translational Convergence for Treatment Discovery *Nautilus 1 & 2*
3.	Behavioral Neurology | *Nautilus 3*
4.	Epilepsy: Advances in Electrical Stimulation for Treatment of Epilepsy & Comorbidities *Nautilus 4*
5.	Cerebrovascular Disease | *Nautilus 5*
AUPN SPONSORED 6.	Education: Diversity, Inclusion, and Equity in Neurology Training | *Seabreeze*
7.	Multiple Sclerosis | *Spinnaker*
8.	Movement Disorders | *Marina 6*
5:30 PM – 7:00 PM	**Poster Presentation & Reception 1*** *Pavilion*
7:15 PM – 9:15 PM	**Past Presidents Dinner*** | *Executive 2* *By Invitation Only*

MONDAY	OCTOBER 16
5:45 AM – 7:30 AM SPONSORED BY MEDSCAPE	**SATELLITE SYMPOSIUM: Updates in Diagnosing and Treating Alzheimer Disease** | *Grande Ballroom C*
6:30 AM – 5:45 PM	**Registration** | *Bay View & Grande Foyers*
7:00 AM – 9:00 AM	**Breakfast** *(Open to All Registrants)* *Bay View & Grande Foyers*
7:30 AM – 9:00 AM	**Professional Development Courses**
Course 2	Students, Residents, Post-docs and Fellows Career Level: **The Many Faces of Academic Global Neurology** | *Nautilus 1 & 2*
Course 2	Early- to Mid-Career Level: **Roads Less Traveled-Creative Careers Off the Beaten Track** *Nautilus 4 & 5*
Course 2	AUPN Chair-Career Level: **Politics for Neurology Chairs** | *Nautilus 3*
7:30 AM – 3:30 PM	**Exhibits Open*** | *Grande Foyer* *(Open to All Registrants)*

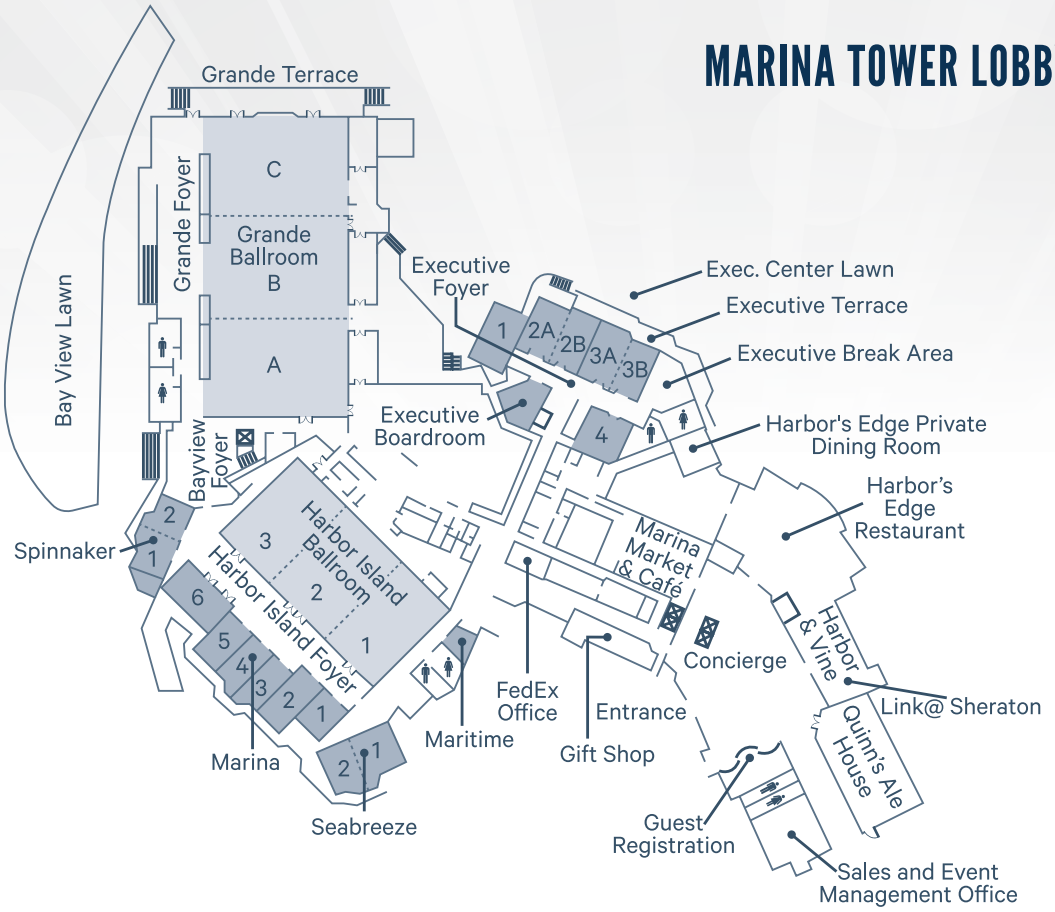
ANA 2017 SCHEDULE AT A GLANCE

MONDAY	OCTOBER 16 (CONTINUED)
9:00 AM – 9:15 AM	**Coffee Break** | *Bay View & Grande Foyers*
9:15 AM – 11:15 AM	**PLENARY SESSION** **PRESIDENTIAL SYMPOSIUM** Translational Neuroscience Research to Improve Outcomes for the 'Bottom Billion' *Grande Ballroom AB*
11:00 AM – 7:00 PM	**Poster Viewing*** ***Poster presenters and judges will be in attendance from 5:30 PM – 7:00 PM*** | *Pavilion*
11:15 AM – 11:45 AM	**Executive Session of Membership*** *All members are encouraged to attend* *Grande Ballroom AB*
11:45 AM – 1:00 PM	**Lunch** | *& Grande Foyers*
11:45 AM – 1:00 PM	**Interactive Lunch Workshops** 1. Meet the Fogarty International Center and Global Neurology at NIH* | *Grande Ballroom C* 2. The Microbiome and the Nervous System *Nautilus 1* 3. Concussion and Youth Sports | *Nautilus 2* 4. Role of Positron Emission Tomography (PET) in Neurodegenerative Disorders | *Nautilus 3*
11:45 AM – 1:00 PM	**Additional Lunch Workshops** 1. American Board of Psychiatry and Neurology (ABPN) Maintenance of Certification (MOC) Program: Life-long Learning for Neurologists* *Nautilus 4* 2. 17th Annual Women of the ANA Lunch Program: Empowering Women to Close the Salary Gap* *Nautilus 5*
1:15 PM – 3:15 PM	**PLENARY SESSION** Precision Medicine in Neurologic Disease | *Grande Ballroom AB*
3:15 PM – 3:30 PM	**Coffee Break** | *Bay View & Grande Foyers*
3:30 PM – 5:30 PM	**Special Interest Group Sessions** 1. Traumatic Brain Injury: **Imaging, Molecules, and Endophenotypes** | *Grande Ballroom C* 2. Sleep Disorders and Circadian Rhythm: **Clinical and Basic Biology of Human Sleep** *Nautilus 1* 3. Update on Interventional Neurology | *Nautilus 2* 4. Case Studies in Neurology | *Nautilus 3* 5. Autoimmune Neurology | *Nautilus 4* 6. Dementia and Aging | *Nautilus 5* 7. Health Services Research in Neurology *Spinnaker* 8. Headache and Pain: **Mechanisms of Migraine Headache, Cancer Pain and Opioid Analgesia** *Seabreeze* 9. Neuromuscular Disease: **Advances** | *Marina 6*

MONDAY	OCTOBER 16 (CONTINUED)
5:30 PM – 7:00 PM	**Poster Presentation & Reception II*** *Pavilion*
7:30 PM – 9:00 PM	**President's Reception*** | *Bay View Lawn*
TUESDAY	**OCTOBER 17**
6:30 AM – 2:15 PM	**Registration** | *Bay View Foyer*
7:00 AM – 8:30 AM	**Professional Development Courses** *Please note early start time for Tuesday sessions*
Course 3	Students, Residents, Post-docs and Fellows Career Level: **Preparing for Your First Faculty Position—A Workshop for New Academic Neurologists** *Nautilus 1 & 2*
Course 3	Early- to Mid-Career Level: **The View from the NIH and Successful Grant Writing** *Nautilus 4 & 5*
Course 3	AUPN Chair Level: **Winter is Coming, but MACRA is Here - Reimbursement for Quality and the Shift to Population-Based Care** *Nautilus 3*
7:00 AM – 8:45 AM	**Breakfast** | *Bay View & Grande Foyers*
8:30 AM – 8:45 AM	**Break** | *Bay View & Grande Foyers*
8:45 AM – 10:45 AM	**PLENARY SESSION** *Please note early start time for Tuesday sessions* Antisense Oligonucleotide Treatment of Genetic Neurological Diseases *Grande Ballroom AB*
10:45 AM – 11:00 AM	**Break** | *Bay View & Grande Foyers*
11:00 AM – 12:00 PM	**Lunch** | *Bay View & Grande Foyers*
11:00 AM – 12:00 PM	**Interactive Lunch Workshops** 1. An Overview of Global Neurology Contributions of International Outreach Committee of ANA* | *Grande Ballroom C* 2. Meet the Neurology Department Chairs* *Nautilus 1* 3. Extranigral Parkinson Disease and Parkinsonism *Nautilus 2* 4. The Evolving Field of Clinical Neurogenetics in the Next-Generation Sequencing Era | *Nautilus 4* 5. Meet the Editors II* | *Nautilus 3*
11:00 AM – 12:00 PM	**Additional Lunch Workshop** AUPN'S Networking Lunch for Small Academic Departments of Neurology* | *Nautilus 5*
12:00 PM – 12:15 PM	**Break** | *Bay View & Grande Foyers*
12:15 PM – 2:15 PM	**PLENARY SESSION** Molecular Imaging in Neurologic Disease *Grande Ballroom AB*
2:15 PM	**Meeting Adjourns**

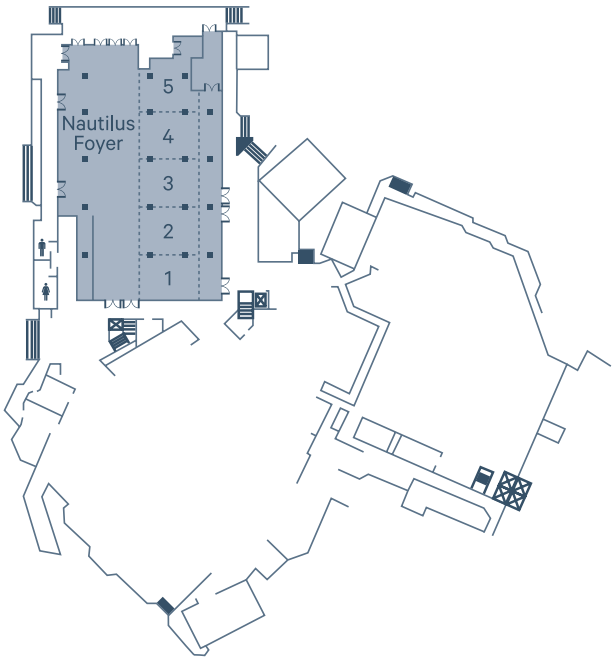
ANA 2017 HOTEL FLOOR PLAN

MARINA TOWER LOBBY LEVEL



Pavilion

MARINA TOWER LOWER LEVEL



ANA 2017 GENERAL INFORMATION

HOTEL

Sheraton San Diego Hotel & Marina
1380 Harbor Island Drive
San Diego, CA 92101

Main Phone: (619) 291-2900
Guest Fax: (619) 692-2337

Check-in Time: 3:00 PM
Check-out Time: 12:00 PM

ON-SITE REGISTRATION HOURS

Bay View Foyer (Located in Marina Tower LOBBY Level)

Saturday, October 14	3:00 PM – 7:00 PM
Sunday, October 15	6:00 AM – 5:45 PM
Monday, October 16	6:30 AM – 5:45 PM
Tuesday, October 17	6:30 AM – 2:15 PM

POSTER HOURS

Pavilion (The Pavilion is located directly outside Grande Foyer, please follow signage)

Sunday, October 15	11:00 AM – 7:00 PM

Poster presenters and poster judges will be in attendance from 5:30 PM – 7:00 PM

Monday, October 16	11:00 AM – 7:00 PM

Poster presenters and poster judges will be in attendance from 5:30 PM – 7:00 PM

SPEAKER READY ROOM HOURS

Marina 4 (Located in Marina Tower LOBBY Level)

Saturday, October 14	3:00 PM – 7:00 PM
Sunday, October 15	6:00 AM – 5:45 PM
Monday, October 16	6:30 AM – 5:45 PM
Tuesday, October 17	6:30 AM – 2:15 PM

BREAKFAST

Bay View & Grand Foyers (Located in Marina Tower LOBBY Level, additional seating on the Bay View Lawn)

Sunday, October 15	7:00 AM – 9:00 AM
Monday, October 16	7:00 AM – 9:00 AM
Tuesday, October 17	7:00 AM – 8:45 AM

LUNCH

Bay View & Grand Foyer (Located in Marina Tower LOBBY Level)

Boxed Lunches will be distributed in these foyers each day and attendees are encouraged to attend the Interactive Workshop Lunches. There will be additional seating on the Bay View Lawn if you are not attending an Interactive Workshop Luncheon.

Sunday, October 15	11:30 AM – 1:00 PM
Monday, October 16	11:30 AM – 1:00 PM
Tuesday, October 17	11:00 AM – 12:00 PM

Boxed lunches are available to be taken into Interactive Lunch Workshops

PRESS ROOM HOURS

Marina 2 (Located in Marina Tower LOBBY Level)

Sunday, October 15	8:30 AM – 3:30 PM
Monday, October 16	8:30 AM – 3:30 PM

WIRELESS CONNECTION

All Sheraton San Diego Hotel & Marina guest rooms booked under the ANA block will be equipped with complimentary high-speed wireless Internet access during the official conference dates (Saturday to Tuesday). To connect, enable Wi-Fi on the device.

While in the designated ANA meeting rooms at the Sheraton San Diego Hotel & Marina, look for the network SSID: **ANAmtg2017**. When prompted, enter the Passcode: **MYANA2017** *(Please note that the password is case sensitive).* Proceed to the internet as normal.

DISCLAIMER

Please note some session titles may have changed since this program was printed. Please refer to your Mobile app for the most current information.

CONTINUING MEDICAL EDUCATION: ACCREDITATION & DESIGNATION STATEMENT(S)

American Neurological Association 142nd Annual Meeting

The American Neurological Association is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The Annual Meeting and Pre-Conference Symposium: Big Science & the BRAIN Initiative offer CME to eligible participants. Detailed information pertaining to CME can be found in your conference bag and at the following website:

2017.myana.org/continuing-medical-education

EVALUATIONS ONLINE

Within a week following the event, you will receive an email containing a link to the evaluation. Please complete the online evaluation within a week of receipt in order to obtain any CME credit. You will be provided with a certificate within three weeks following completion of the evaluation. If you have any questions, please contact the ANA Meeting Coordinator at:

meetings@myana.org.

CONSENT TO USE OF PHOTOGRAPHIC IMAGES

Registration and attendance at, or participation in, ANA meetings and other related activities constitutes attendee's authorization to ANA's use and distribution (both now and in the future) of the attendee's image or voice in photographs, video recordings, electronic reproductions, audio recordings, and other media throughout the world and royalty free.

PHOTOGRAPHY

Photography in the Annual Meeting Poster Area is restricted to the official conference photographer.

Disclaimer: The ANA does not endorse or affiliate with third-party companies, products or services including those that may have elected to support the 2017 Annual Meeting Program.

LANGUAGE

The official language of the Annual Meeting is English. No simultaneous translation is available.

ADA

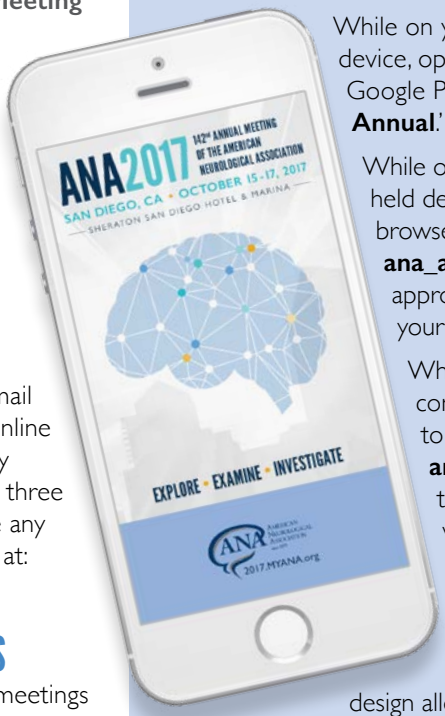
ANA fully complies with the legal requirements of the Americans with Disabilities Act rules and regulations. If any participant is in need of special accommodations, they should notify the hotel and indicate the type of assistance needed. ANA cannot ensure the availability of appropriate assistance without advance notice.

Stay in-the-know and Join in on Social Media

#ANAMTG2017

ANA ANNUAL MEETING MOBILE APP

DOWNLOADING THE APP IS EASY!**



While on your smartphone or hand-held device, open your app store (Play Store, Google Play), and SEARCH for "**ANA Annual**."

While on your smartphone or hand-held device, point your mobile browser to **m.core-apps.com/ana_annual17** to be directed to the appropriate download version for your phone.

While on your desktop or laptop computer, open your browser to this URL **core-apps.com/dl/ana_annual2017** to be directed to the appropriate download version for your phone.

The ANA Annual Meeting mobile application is a native app on both Apple and Android platforms. This design allows a majority of the app features to function without Wi-Fi or connectivity including interactive scheduling, maps, exhibitors, sessions, and speaker information.

The ANA Annual Meeting application is available on all Apple and Android devices and is optimized for the iPhone 7, the iPad and iPad mini, and all other Android devices and tablets. A tablet specific app is supported for iPad along with a universal Android tablet app. The technology also supports an HTML5 app for BlackBerry, Windows, and all other web-based devices for access on personal computers.

**Available Friday October, 13.

ANA 2017 PROGRAM BY DAY *(schedule is subject to change)*

SATURDAY, OCTOBER 14

3:00 PM – 7:00 PM **REGISTRATION** | *Bay View Foyer*

PRE-MEETING SYMPOSIUM
BIG SCIENCE & THE BRAIN INITIATIVE

6:00 PM – 7:00 PM **BUFFET DINNER** | *Grande Ballroom C*

7:00 PM – 10:00 PM **SYMPOSIUM** | *Grande Ballroom C*

Chair: Walter Koroshetz, MD, *National Institute of Neurological Disorders and Stroke*
Co-Chairs: Frances Jensen, MD, *University of Pennsylvania*
Alica M. Goldman, MD, PhD, MS, *Baylor College of Medicine and 2014 Derek Denny-Brown Young Neurological Scholar Award Recipient*

The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative is aimed at revolutionizing our understanding of the human brain. By accelerating the development and application of innovative technologies, researchers will be able to produce a revolutionary new dynamic picture of the brain that, for the first time, shows how individual cells and complex neural circuits interact in both time and space. Long desired by researchers seeking new ways to treat, cure, and even prevent brain disorders, this picture will fill major gaps in our current knowledge and provide unprecedented opportunities for exploring exactly how the brain enables the human body to record, process, utilize, store, and retrieve vast quantities of information, all at the speed of thought.

Learning Objectives

1. At the conclusion of this symposium, participants are expected to increase their understanding of how the BRAIN Initiative will lead to a golden age in neuroscience, a sophisticated means of charting brain circuit activity and interventions that modulate neural activity for health
2. The participants are expected to become familiar with the structural framework, collaborative opportunities, and to date discoveries achieved in the NINDS funded Centers Without Walls
3. The participants are expected to learn about the research framework and expected deliverables of the Human Brain Connectome project
4. The participants are expected to learn about ethical challenges that accompany human genetic research and genetic testing in clinical practice

7:00 PM – 7:10 PM
Structure of the NIH BRAIN Initiative
Walter Koroshetz, MD, *National Institute of Neurological Disorders and Stroke*

7:10 PM – 7:40 PM
New Tools to Develop a Human Brain Cell Census
Arnold Kriegstein, MD, PhD, *University of California, San Francisco*

7:40 PM – 8:10 PM
Optogenetic, Tissue Clearing, and Viral Vector Approaches to Understand and Influence Whole-Animal Physiology and Behavior
Viviana Gradinaru, PhD, *California Institute of Technology*

8:10 PM – 8:25 PM **Coffee and Dessert Break**

8:25 PM – 8:55 PM
New Tools for Monitoring and Analyzing Human Brain Activity/Neurology
Sydney Cash, MD, PhD, *Massachusetts General Hospital and Harvard Medical School | 2012 Recipient of the Grass Foundation–ANA Award in Neuroscience*

8:55 PM – 9:25 PM
Microscopic Foundation of Multimodal Human Imaging
Anna Devor, PhD, *University of California, San Diego*

9:25 PM – 10:00 PM
Panel Discussion: Impact of the BRAIN Initiative on Translational Neuroscience and Opportunities to Join the BRAIN Initiative

SUNDAY, OCTOBER 15

6:00 AM – 5:45 PM **REGISTRATION** | *Bay View Foyer*

7:00 AM – 9:00 AM **BREAKFAST** | *Bay View & Grande Foyers*
(Open to All Registrants)

7:00 AM – 9:00 AM **TRAINEE BREAKFAST WITH THE ANA BOARD OF DIRECTORS*** | *Nautilus 1 & 2*
(Open to Students, Residents, Post-docs, and Fellows)

The ANA Board of Directors is composed of academic neurologists at every level, representing all subspecialties from every region of the country. Join the Board for breakfast and an informal discussion on preparing for, entering, and succeeding in a career in academic neurology. This is a wonderful opportunity to interact with leading academics and discuss the selection of an academic path, areas of research focus, or how to navigate the faculty position seeking process.

7:30 AM – 9:00 AM **PROFESSIONAL DEVELOPMENT COURSES**

COURSE 1
EARLY CAREERS IN ACADEMIC NEUROLOGY | *Nautilus 1 & 2*
Students, Residents, Post-docs and Fellows-Career Level

Chair: Allison Willis, MD, MS, *University of Pennsylvania*
Co-Chair: Lesli E. Skolarus, MD, MS, *University of Michigan and 2017 Derek Denny-Brown Young Neurological Scholar Award Recipient in Clinical Science*

Emerging Leaders in Neurology will discuss academic career paths in Neurology, beginning with a discussion on the transition from neurology resident to fellow, followed by three exemplar discussions of the basic science pathway, clinical scientists/researcher pathway and clinician-administrator pathway. In addition, 2016 Derek Denny-Brown Young Neurological Scholar Award Recipients will provide insights on successful early careers in academic neurology. This course is designed to benefit students, residents, and fellows.

Learning Objectives

1. Increase understanding of what to consider when selecting a fellowship
2. Increase understanding of clinician-clinical scientist pathway
3. Increase understanding of clinician-basic scientist pathway
4. Increase understanding of the clinician-administrator pathway
5. Gain an accurate and deep understanding of what to expect, setting priorities, how to handle challenging situations, and other academic career insights from neurology scientists with successful early careers

7:30 AM – 7:45 AM
Resident/Fellow Transition
Diego Torres-Russotto, MD, *University of Nebraska*

7:45 AM – 8:00 AM
Clinician/Researcher Pathway
Rebecca Gottesman, MD, PhD, *Johns Hopkins University*

8:00 AM – 8:15 AM
Basic Scientist Pathway
Robert Baloh, MD, PhD, *Cedars-Sinai | 2016 Derek Denny-Brown Young Neurological Scholar Award in Basic Science Recipient*

8:15 AM – 8:30 AM
Clinician/Administrator Pathway
Mollie McDermott, MD, MS, *University of Michigan*

8:30 AM – 8:45 AM
Early Careers in Academic Neurology—Insights
Glen Jickling, MD, MSc, FRCPC, *University of California, Davis*
2016 Derek Denny-Brown Young Neurological Scholar Award in Clinical Science Recipient

8:45 AM – 9:00 AM **Q&A and Discussion**

COURSE 1
THERE IS NO K IN PROMOTION | *Nautilus 4 & 5*
EARLY- TO MID-CAREER LEVEL

Chair: Amy Pruitt, MD, *University of Pennsylvania*
Faculty: Joshua Klein, MD, PhD, *Harvard Medical School*
Raymond Price, MD, *University of Pennsylvania*
Dianna Quan, MD, *University of Colorado*

This will be an interactive panel, during which each speaker will speak for 20 minutes tracing his/her career trajectory, followed by a 30-minute group discussion moderated by Dr. Amy Pruitt. This course is designed to benefit those in early- and mid-levels of their career.

Learning Objectives
1. Attendees will learn how successful academic clinicians have found a niche and plotted a successful career trajectory without NIH grants support.
2. Attendees will learn about alternate sources of funding for clinical research and educational enterprises.
3. Attendees will become aware of negotiating skills with their chairs to help support teaching missions and curricular development.

COURSE 1
CHALLENGES IN FACULTY COMPENSATION | *Nautilus 3*
AUPN CHAIR LEVEL

Faculty: Robert G. Holloway, MD, MPH, *University of Rochester Medical Center*
Sara Uschold, *University of Rochester Medical Center*
José Biller, MD, FACP, FAAN, FANA, FAHA, *Loyola University Chicago Stritch School of Medicine*
Michael Budzynski, *Loyola University Chicago Stritch School of Medicine*

Salary disparities are increasing between procedural and cognitive subspecialties and between research or education-oriented faculty and predominantly clinical faculty, while traditional salary differences between junior and senior faculty are shrinking. At the same time, funding for faculty salaries is challenged by declining reimbursement for clinical activity, the NIH cap on research salary support, which prevents adequate reimbursement for research effort, the need to compete with salaries offered by the private sector, and the lack of support for educational activity. In this environment, how can chairs effectively cross-subsidize the salaries of research or education-focused faculty? Are salary disparities disruptive to morale, or simply the new normal? How can chairs argue effectively for institutional subsidies and support when other departments face the same challenges? Are there novel revenue sources (philanthropy, concierge medicine, legal consulting, device and pharma industry relationships) that can fill the gaps?

Learning Objectives
1. Understand the various funding resources available to a faculty member within a university setting and identify the internal/external pressures associated with each resource
2. Examine alternative funding for clinical compensation that may not be directly related to RVU (Relative Value Unit) production, but is necessary for the university neurologist to remain competitive with private practices (directorships, committees, call pay, etc.)
3. Develop systems to understand what each neurology patient is worth to the institution in terms of direct patient care and downstream revenue. Understand the total financial picture of a patient presenting to the institution with a neurological condition and track the total financial contribution
4. Related to morale/burn-out, offer non-monetary means for compensation to the university neurologist – protected research/educational days, funding for educational activities/conferences, provide an environment conducive to fostering research activities (bench and clinical trials), etc.

7:30 AM – 3:30 PM **EXHIBITS OPEN*** | *Grande Foyer*
Open to All Registrants.

9:00 AM – 9:15 AM **COFFEE BREAK**
Bay View & Grande Foyers

9:15 AM – 11:15 AM **PLENARY SESSION**
LINKING CIRCUITS TO BEHAVIOR: PROMISE & PERILS
Grande Ballroom AB

Chair: William Dauer, MD, *University of Michigan*
Co-Chair: John Krakauer, MD, *Johns Hopkins University*

The advent of dramatically powerful technologies such as optogenetics enable manipulation of discrete neural populations as never before, leading to a wave of studies associating circuits and behavior. As exciting as these studies are, there is a nascent appreciation for the pitfalls of interpreting such work. The speakers will highlight the newest advances in optogenetic technology, but also the critical importance of considering rapid compensatory events, and of developing a theoretical framework of the computation being performed by the brain prior to circuit manipulation. A review of the consequence of these considerations on interpretation of human brain functional imaging will illustrate how this new understanding impacts strategies for novel therapeutic development.

Learning Objectives
1. Become aware of new tools available for neural circuit manipulation
2. Understand the importance of behavioral theory in guiding neural circuit research
3. Appreciate the pitfalls and difficulties in linking circuit function and behavior
4. Learn how novel views of circuits are pointing to new therapeutic approaches

9:15 AM – 9:40 AM
Towards Comprehensive Analysis of Neural Circuit Functions
Ed Boyden, PhD, *Massachusetts Institute of Technology*

DATA BLITZ PRESENTATION

9:40 PM – 9:45 PM

Optogenetic Activation of the Dorsomedial Medulla Reveals a Role in Precise Timing of Gait

Alana Kirby, MD, PhD, *Beth Israel Deaconess Medical Center*

9:45 AM – 10:10 AM

Promise and Perils of Neural Circuit Manipulations

Bence Ölveczky, PhD, *Harvard University*

DATA BLITZ PRESENTATION

10:10 AM – 10:15 AM

Optogenetic Dissection of Striatal Dopaminergic Contributions to Dexterous Limb Movements

Daniel Leventhal, MD, PhD, *University of Michigan*

10:15 AM – 10:40 AM

Iterative Strategies to Refine and Optimize DBS for Depression

Helen Mayberg, MD, *Emory University*

DATA BLITZ PRESENTATION

10:40 AM – 10:45 AM

Evidence for Brainstem Network Disruption in a Focal Epilepsy and Sudden Unexplained Death in Epilepsy: Validation Study

Alica Goldman, MD, PhD, MS, *Baylor College of Medicine*

10:45 AM – 11:10 AM

The Brain-Behavior Relationship: Understanding Versus Causality

John Krakauer, MD, *Johns Hopkins University*

11:10 AM – 11:15 AM **Q&A and Discussion**

11:00 AM – 7:00 PM **POSTER VIEWING*** | *Pavilion*

Poster presenters and judges will be in attendance from 5:30 PM – 7:00 PM.
(The Pavilion is located directly outside Grande Foyer, please follow signage)

11:15 AM – 11:45 AM **NEW MEMBER MEET AND GREET WITH ANA PAST PRESIDENTS AND CURRENT LEADERSHIP*** | *Spinnaker*

11:45 AM – 1:00 PM **LUNCH** | *Bay View & Grande Foyers*

Boxed lunches available to be taken into Interactive Lunch Workshops.

11:45 AM – 1:00 PM **INTERACTIVE LUNCH WORKSHOPS**

(These workshops are "lunch and learns")

WORKSHOP 1
MANAGEMENT OF SEVERE PEDIATRIC TRAUMATIC BRAIN INJURY: WHAT IS THE EVIDENCE | *Grande Ballroom C*

Chair: Robert Tasker, MBBS, MD, FRCP, *Boston Children's Hospital –Neurocritical Care*

Co-Chair: Mark Wainwright, MD, PhD, *Northwestern University –Neurocritical Care*

This session will focus on the data supporting the management of severe TBI in children by (i) discussing data from the ongoing ADAPT study; (ii) the impact of adherence to current guidelines with results of the PEGASUS study; (iii) discussing current investigations using pharmacologic neuroprotective agents; and (iv) reviewing the recent data on cellular mechanisms of injury and the potential for development of targeted neuroprotective therapies for clinical use.

Learning Objectives

1. To understand the limitations of the data supporting current recommendation for management of severe pediatric TBI
2. To understand the rationale for comparative effectiveness research in pediatric TBI
3. To review recent research in the cellular mechanisms of injury in the developing brain following neuro trauma
4. To understand the challenges to following current guidelines for management of pediatric TBI and the impact of adherence on outcome
5. To discuss the potential of pharmacologic neuroprotection as future therapy for severe pediatric TBI

11:45 AM – 12:00 PM

What are We Learning from the ADAPT Study?

Michael Bell, MD, *Children's National Medical Center*

12:00 PM – 12:15 PM

Pharmacologic Neuroprotection in Severe Pediatric TBI

Robert Clark, MD, *University of Pittsburgh*

12:15 PM – 12:30 PM

Management of Severe Pediatric Traumatic Brain Injury: Lessons from Implementation Science

Monica Vavilala, MD, *University of Washington*

12:30 PM – 12:45 PM

Bridging the Gap Between Bench and Bedside in Pediatric Neuro Trauma

Robert Tasker, MBBS, MD, *Boston Children's Hospital –Neurocritical Care*

12:45 PM – 1:00 PM **Q&A and Discussion**

WORKSHOP 2
INFLAMMATORY DISEASES OF THE SPINAL CORD | *Nautilus 1 & 2*

Chair: Michael Levy, MD, PhD, *Johns Hopkins University*

Co-Chair: Bruce Cree, MD, PhD, MAS, *University of California, San Francisco*

Updates on the diagnosis and treatment of inflammatory diseases of the spinal cord including including Multiple Sclerosis (MS), Neuromyelitis optica (NMO), anti-Myelin oligodendrocyte glycoprotein (anti-MOG) disease, idiopathic transverse myelitis, infections, and sarcoidosis.

Learning Objectives

1. To learn the differential diagnosis of inflammation in the spinal cord
2. To understand how new serological and imaging diagnostics distinguish among the many etiologies
3. To discuss studies and trial data relating to treatments of inflammatory diseases of the spinal cord

11:45 AM – 12:00 PM

Sarcoidosis in the Spinal Cord

Brian Weinshenker, MD, FRCP(c), FAAN, *Mayo Clinic*

12:00 PM – 12:15 PM

Infectious Myelopathies

Carlos Pardo-Villamizar, MD, *Johns Hopkins University*

12:15 PM – 12:30 PM

Neuromyelitis optica (NMO) vs. anti-Myelin oligodendrocyte glycoprotein (anti-MOG)

Michael Levy, MD, PhD, *Johns Hopkins University*

12:30 PM – 12:45 PM

Differential Diagnosis of Transverse Myelitis

Bruce Cree, MD, PhD, MAS, *University of California, San Francisco*

12:45 PM – 1:00 PM **Q&A and Discussion**

WORKSHOP 3
OPERATIVE STRATEGIES FOR DRUG-RESISTANT FOCAL EPILEPSY: CORTICAL RESECTION, RESPONSIVE NEUROSTIMULATION, DEEP BRAIN AND CHRONIC SUBTHRESHOLD CORTICAL STIMULATIONS | *Nautilus 3*

Chair: Gregory Cascino, MD, FAAN, FANA, FACNS, FAES, *Mayo Clinic*
Co-Chair: Nathalie Jette, MSc, MD, *Icahn School of Medicine at Mount Sinai*

The rationale for the present interactive lunch workshop is to identify the surgical techniques available in the management of drug-resistant focal epilepsy. The diagnostic evaluation and identification of candidates for focal cortical resection, responsive neurostimulation, and deep brain and chronic subthreshold cortical stimulation will be presented. The speakers will emphasize the relative efficacy and safety of the unique operative strategies.

Learning Objectives

1. To identify the presurgical evaluation of patients with pharmacoresistant focal seizures including use of neuroimaging and EEG studies
2. Become familiar with the surgically remediable epileptic syndromes
3. Be able to identify the potential use of responsive neurostimulation, and deep brain and chronic subthreshold cortical stimulation in drug-resistant focal epilepsy

11:45 AM – 12:00 PM
Focal Cortical Resection: Diagnostic Evaluation and Operative Outcome
Nathalie Jette, MSc, MD, *Icahn School of Medicine at Mount Sinai*

12:00 PM – 12:15 PM
Responsive Neurostimulation System (RNS) for Focal Epilepsy
Barbara C. Jobst, MD, Dr. med, FAAN, *Dartmouth-Hitchcock Epilepsy Center*

12:15 PM – 12:30 PM
Deep Brain and Chronic Subthreshold Cortical Stimulation for Focal Epilepsy
Gregory Cascino, MD, FAAN, FANA, FACNS, FAES, *Neuroscience and Enterprise, Mayo Clinic*

12:30 PM – 12:45 PM
Chronic Subthreshold Cortical Stimulation
Brian N. Lundstrom, MD, PhD, MSc, *EEG/Epilepsy Fellow, Mayo Clinic*

12:45 PM – 1:00 PM **Q&A and Discussion**

WORKSHOP 4
MEET THE DIRECTOR AND STAFF OF THE NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE (NINDS)* | *Nautilus 4 & 5*

Moderator: Allison Willis, MD, MS, *Associate Professor, University of Pennsylvania*

This is your opportunity to get your questions answered by the Director and senior staff members from the National Institute of Neurological Disorders and Stroke (NINDS).

Panelists: Walter Koroshetz, *MD, Director, NINDS*
Clinton Wright, MD, Director, *NINDS Division of Clinical Research*
Amir Tamiz, PhD, Director, *NINDS Division of Translational Research*
Shantadurg Rajaram, PhD, *Scientific Review Officer, NINDS Scientific Review Branch*
Craig Blackstone, MD, PhD, *Senior Investigator and Section Chief, NINDS Neurogenetics Branch*

WORKSHOP 5
MEET THE EDITORS I* | *Seabreeze*

Editors from the named journals will be available to discuss the submission process, publishing, tips, and other key topics of interest.

Panelists: Seemant Chaturvedi, MD, *Assistant Editor,* Stroke*; and Professor of Clinical Neurology, University of Miami*
Rebecca F. Gottesman, MD, PhD, *Associate Editor Epidemiology,* Neurology®*, Professor of Neurology, Johns Hopkins University*
Masud Husain, MA, DPhil, BM BCh, FRCP, FMedSci, *Associate Editor,* BRAIN*; Professor of Neurology, University of Oxford*
Clifford B. Saper, MD, PhD, *Editor-in-Chief,* Annals of Neurology®*; Professor of Neurology and Neuroscience, Harvard Medical School; Chairman, Department of Neurology, Beth Israel Deaconess Medical Center*
Bradford B. Worrall, MD, MSc, FAAN, *Deputy Editor,* Neurology®*; Professor of Neurology and Public Health Sciences, University of Virginia*

1:15 PM – 3:15 PM **PLENARY SESSION**
DEREK DENNY-BROWN YOUNG NEUROLOGICAL SCHOLAR SYMPOSIUM | *Grande Ballroom AB*

Chair: Andrew J. Cole, MD, FRCP(C), *Massachusetts General Hospital and Harvard Medical School*
Co-Chair: Tracey A. Cho, MD, *Massachusetts General Hospital and Harvard Medical School*

The Derek Denny-Brown Young Neurological Scholar Symposium is an opportunity for young researchers to share groundbreaking research in the field of Neurology. This symposium will feature sessions from the three 2017 Derek Denny-Brown awardees, the Wolfe Neuropathy Research Prize awardee and the Grass Award recipient. It will begin with the 2017 Distinguished Neurology Teacher Award which recognizes and rewards contributions by gifted and talented teachers of neurology.
The Derek Denny-Brown Young Neurological Scholar Award recognizes early- to mid-career neurologists and neuroscientists. This award honors those neurologists and neuroscientists in the first 10 years of their career at the assistant/associate faculty (equivalent) level who have made outstanding basic and clinical scientific advances toward the prevention, diagnosis, treatment and cure of neurological diseases. As of 2017, the Membership, Honorary and Awards Committee can designate up to a total of three (3) awards in any of the following three areas: Physician Scientist – Basic, Physician Scientist – Clinical, Neuroscientist – relevant to disease. This year the committee has awarded one (1) Physician Scientist – Basic and two (2) Physician Scientist – Clinical recipients.

The 2017 Grass Foundation – ANA Award in Neuroscience was established in 2007 to recognize outstanding young physician scientists conducting research in basic or clinical neuroscience. The Grass Foundation was established in 1955 by Albert and Ellen Grass to advance research and education in neuroscience, with a special focus on investigators early in their careers.

The Wolfe Neuropathy Research Prize for Investigators Identifying New Causes or Novel Treatments of Axonal Peripheral Neuropathy was established to honor outstanding investigators who identify a new cause or treatment of axonal peripheral neuropathy. Eligible candidates include faculty members at any stage in their career (MD, MD/PhD, or

PhD) who identify either a new cause or treatment of axonal peripheral neuropathy. The same researcher can qualify for this award annually if he/she can demonstrate evidence of repeated success in identifying new causes or treatments for axonal peripheral neuropathy.

1:15 PM – 1:20 PM

Presentation of the 2017 Distinguished Neurology Teacher Award

Zachary Nathaniel London, MD, FAAN, *University of Michigan*
2017 Distinguished Neurology Teacher Award Recipient

1:20 PM – 1:45 PM

Presentation of the 2017 Derek Denny-Brown Young Neurological Scholar Award in Clinical Science | *Instructive, Pragmatic, and Successful Trials in Acute Brain Injury: Making Intracerebral Hemorrhage the LEAST Devastating Form of Stroke*

Kevin N. Sheth, MD, FAHA, FCCM, FNCS, FAAN, FANA, *Yale University School of Medicine | 2017 Derek Denny-Brown Young Neurological Scholar Award in Clinical Science Recipient*

1:45 PM – 2:10 PM

Presentation of the 2017 Derek Denny-Brown Young Neurological Scholar Award in Clinical Science | *Reducing the Burden of Stroke in a Disadvantaged Community*

Lesli E. Skolarus, MD, MS, *University of Michigan | 2017 Derek Denny Brown Young Neurological Scholar Award Recipient in Clinical Science*

2:10 PM – 2:35 PM

Presentation of The Grass Foundation – 2017 ANA Award in Neuroscience | *Modeling C9ORF72 Disease: A Crucial Step for Therapeutic Development in ALS and Frontotemporal Dementia*

Clotilde Lagier-Tourenne, MD, PhD, *Massachusetts General Hospital*
2017 The Grass Foundation - ANA Award in Neuroscience Recipient

2:35 PM – 3:00 PM

Presentation of 2017 Derek Denny-Brown Young Neurological Scholar Award in Basic Science | *Connecting Protein Quality Control Pathways in Skeletal Muscle and Muscle Disease*

Conrad Chris Weihl, MD, PhD, *Washington University in St. Louis*
2017 Derek Denny-Brown Young Neurological Scholar Award in Basic Science Recipient

3:00 PM – 3:15 PM

Presentation of the 2017 Wolfe Neuropathy Research Prize | *Targeting a Core Axonal Degeneration Program to Treat Vincristine and Bortezomib-Induced Axonal Degeneration*

Stefanie Geisler, MD, *Washington University in St. Louis | 2017 Wolfe Neuropathy Research Prize Recipient*

3:15 PM – 3:30 PM **COFFEE BREAK**
Bay View & Grande Foyers

3:30 PM – 5:30 PM SPECIAL INTEREST GROUP SESSIONS

SESSION 1
NEURO-ONCOLOGY | *Grande Ballroom C*

Chair: Scott Pomeroy, MD, PhD, *Harvard Medical School Children's Hospital Boston*
Co-Chair: Tim Gershon, MD, PhD, *University of North Carolina at Chapel Hill*

Recent advances in genomics and stem cell biology have revolutionized the fields of brain tumor biology and therapeutics. As defined in the WHO Classification of Tumours of the Central Nervous System published in 2016, brain tumors are now defined by molecular features in addition to histological characteristics. Research has defined the subclonal structure of tumors, and has revealed the presence of cancer initiating cells as a subpopulation within the tumors. This SIG will focus on projects that define the molecular heterogeneity within brain tumors, the biological mechanisms of tumor origin and progression, and how research discoveries are shaping new therapies.

Learning Objectives

1. The participant will understand the degree of heterogeneity that underlies brain tumors as revealed by detailed analysis of the transcriptome, both between and within tumors
2. The participant will understand the biological origins and molecular mechanisms that regulate cancer "stem cells" that are present within glioblastomas
3. The participant will learn about and consider whether a program modeled on the STAIR criteria for neuroprotection would be a helpful framework to guide future ICH trial development.

LEADER IN THE FIELD PRESENTATION

3:30 PM – 3:50 PM

High-Throughput Single Cell Transcriptomics Reveals New Complexity in Medulloblastoma

Tim Gershon, MD, PhD, *University of North Carolina at Chapel Hill*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION

4:00 PM – 4:10 PM

Aryl Hydrocarbon Receptor Regulates Self-Renewal Capacity and Tumor Evolution from Glioma Stem-Like Cells in Patient-Derived Tumor Organoids

Jaime Imitola, MD, *The Ohio State University Wexner Medical Center*

LEADER IN THE FIELD PRESENTATION

4:10 PM – 4:30 PM

Precision Medicine and Immunotherapy in Neuro-Oncology: Opportunities and Challenges

Santosh Kesari, MD, *John Wayne Cancer Institute*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION

4:40 PM – 4:50 PM

Conditional Probability of Survival as a Proposed Endpoint for Future Single-Arm Clinical Trials in Glioblastoma

Chirag Patel, MD, PhD, *Stanford University School of Medicine*

LEADER IN THE FIELD PRESENTATION

4:50 PM – 5:10 PM

Nicotinamide Metabolism Regulates Glioblastoma Stem Cell Maintenance

Leo J.Y. Kim, *Case Western Reserve University School of Medicine*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION

5:20 PM – 5:30 PM

Semi-Automated MRI Segmentation Workflow for Glioblastoma Treated by Tumor Treating Fields

Joshua Timmons, BS, *Beth Israel Deaconess Medical Center*

SESSION 2
ICH/IVH: TRANSLATIONAL CONVERGENCE FOR TREATMENT DISCOVERY | *Nautilus 1 & 2*

Chairs: Christiana Hall, MD, MS, FNCS, *The University of Texas Southwestern Medical Center; and*
Kevin N. Sheth, MD, FAHA, FCCM, FNCS, FAAN, FANA, *Yale University School of Medicine | 2017 Derek Denny-Brown Young Neurological Scholar Award in Clinical Science Recipient*
Co-Chair: Wendy Ziai, MD, MPH, FAHA, *Johns Hopkins University*

ICH/IVH form a cornerstone for day-to-day Neurocritical Care practice; yet in 30 years of dedicated search, a defined efficacious intervention proven to modify outcomes has remained elusive. This session will review one high potential clinical trials program, which is ongoing, visit the bench to view a promising strategy in the pipeline, and then consider whether pathway criteria to clinical trials that have been helpful to other disciplines may also hold promise for ICH/IVH trial success.

Learning Objectives
1. The participant will understand the current developments in the CLEAR and MISTIE clot reduction clinical trials programs and the next intended steps aimed to demonstrate efficacy in specified groups where target clot reductions are achieved.
2. The participant will understand the mechanism of S1P receptor activity as relates to ICH and the possible effects of modulating this receptor as a more novel target in ICH.
3. The participant will learn about and consider whether a program modeled on the STAIR criteria for neuroprotection would be a helpful framework to guide development.

LEADER IN THE FIELD PRESENTATION
3:30 – 3:50 PM
ICH/IVH Reduction: Ongoing Clinical Trial Programs
Wendy Ziai, MD, MPH, FAHA, *Johns Hopkins University*

3:50 PM – 3:55 PM **Q&A**

DATA BLITZ PRESENTATION
3:55 PM – 4:05 PM
1.5T MRI to Investigate Potential Etiologies of Brain Swelling in Pediatric Cerebral Malaria
Michael Potchen, MD, *University of Rochester*

LEADER IN THE FIELD PRESENTATION
4:05 PM – 4:25 PM
Decipher Brain Edema after ICH
Fu-Dong Shi, MD, PhD, Barrow Neurological Institute

4:25 PM – 4:30 PM **Q&A**

DATA BLITZ PRESENTATION
4:30 PM – 4:40 PM
Incidence of Ischemic and Hemorrhagic Stroke Amongst Asians in the United States
Antonio Moya, MD, MPH, *New York Presbyterian Weill Cornell Medical Center*

LEADER IN THE FIELD PRESENTATION
4:40 PM – 5:00 PM
STAIR Criteria Development for ICH Research
Daniel F. Hanley, Jr., MD, *Johns Hopkins University*

5:00 PM – 5:05 PM **Q&A**

DATA BLITZ PRESENTATION
5:05 PM – 5:15 PM
Lowering Systolic Blood Pressure Does Not Increase Stroke Risk: An Analysis of the Systolic Blood Pressure Intervention Trial (SPRINT) Data
Jack Tsao, MD, DPhil, *University of Tennessee Health Science Center*

ICH/IVH: LEADERS IN THE FIELD PANEL DISCUSSION
5:15 PM – 5:30 PM

SESSION 2
BEHAVIORAL NEUROLOGY | *Nautilus 3*

Chair: David Wolk, MD, *University of Pennsylvania*
Co-Chair: David Jones, MD, *Mayo Clinic College of Medicine*

While the parietal lobe is generally linked to spatial function, it is critical in a number of fundamental cognitive processes. In this session, speakers will explore these diverse roles, including the basis for body schema/representations, sensory integration, and attention. In addition to describing recent advances in the functional neuroanatomy of these processes in normal individuals, dysfunction will be discussed in patients with neurological disorders.

Learning Objectives
1. An enhanced understanding of the nature of body representations and their dysfunction in Disease
2. An increased understanding and significance of parietal cortex in integration of sensory information
3. A deeper appreciation of disorders of attention linked to parietal dysfunction

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM
The Neural Basis of Body Schema
Branch Coslett, MD, *University of Pennsylvania*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM
Network Localization of Free Will Perception
Ryan Darby, MD, *Beth Israel Deaconess Medical Center*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM
Tactile and Visual Sensory Integration
Krishnankutty "Krish" Sathian, MBBS, PhD, FANA, *Penn State College of Medicine and Penn State Health Milton S. Hershey Medical Center*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM
Ecological Momentary Sensor Data Indexes Cognition and Behavior In-the-Wild in Drivers with Insulin-Dependent Diabetes
Matthew Rizzo, PhD, FAAN, FANA, *University of Nebraska Medical Center*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM
Attention, Space and the Parietal Cortex
Masud Husain, MA, DPhil, BM BCh, FRCP, FMedSci, *University of Oxford*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

Ventral Striatal Blood Flow and Network Synchrony Reflect Reward Learning and Behavior in Patients with Parkinson's Disease
Kalen Petersen, BS, *Vanderbilt University*

SESSION 4
ADVANCES IN ELECTRICAL STIMULATION FOR TREATMENT OF EPILEPSY & COMORBIDITIES | *Nautilus 4*

Chair: Barbara C. Jobst, MD, Dr. med, FAAN, *Dartmouth-Hitchcock Epilepsy Center*
Co-Chair: Anli Liu, MD, New York *University Langone Medical Center*

Advances in Neural Engineering have had significant impact on epilepsy devices using direct brain and peripheral nerve electrical stimulation for therapeutic brain modulation. Anterior thalamic deep brain stimulation and focal Responsive Neurostimulation have Class I evidence for seizure reduction. Peripheral nerve stimulation (Vagus nerve and Trigeminal nerve) have shown efficacy for seizure reduction. Further, neuro-stimulation has also shown evidence for improving common epilepsy comorbidities, depression and memory dysfunction.

Learning Objectives
1. Epilepsy is more than seizures and includes cognitive comorbidities
2. Advances in stimulation devices have led to new therapies
3. Stimulation devices show promise for cognitive enhancement

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM

Peripheral Nerve Stimulation: VNS and TNS Advances
Christopher M. DeGiorgio, MD, *University of California, Los Angeles*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

Evaluating the Diagnostic Accuracy of High-Frequency Oscillations for Localizing Epileptogenic Brain Using Intra-Operative Recordings
Shennan Weiss, MD, PhD, *Thomas Jefferson University*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

Central Nervous System Stimulation & Cognition
Nitin Tandon, MD, *University of Texas–Houston*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

Modeling Focal Cortical Dysplasia with CRISPRs and Human Stem Cells
Yu Wang, MD, PHD, *University of Michigan*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:05 PM

Responsive Neurostimulation
Barbara C. Jobst, MD, Dr. med, FAAN, *Dartmouth-Hitchcock Epilepsy Center*

5:05 PM – 5:10 PM **Q&A**

DATA BLITZ PRESENTATION
5:10 PM – 5:20 PM

Estimating Cortical Excitability During Chronic Subthreshold Cortical Stimulation to Treat Focal Epilepsy
Brian N. Lundstrom, MD, PhD, MSc, *Mayo Clinic*

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

Modulating Interictal Spiking Through Targeted Electrical Stimulation During a Word List Memory Task
Mark Gorenstein, BA, *Dartmouth-Hitchcock Medical Center*

SESSION 5
CEREBROVASCULAR DISEASE | *Nautilus 5*

Chair: Seemant Chaturvedi, MD, FANA, FAAN, *University of Miami, Miller School of Medicine*
Co-Chair: Magdy Selim, MD, *Harvard Medical School - Beth Israel Deaconess Medical Center*

The management of acute ischemic stroke has changed radically in the last two years. New insights have also been gained in various treatment strategies for brain hemorrhage. This session will include three invited talks relating to recent advances in stroke. The session will also include Data Blitz presentations from three high scoring abstracts.

Learning Objectives
1. To learn about new options for stroke rehabilitation
2. To understand the current status of mobile stroke units
3. To learn about the potential role of ischemic preconditioning in stroke prevention

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM

Telerehabilitation After Stroke
Steven Cramer, MD, *University of California, Irvine*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

Sensitivity and Specificity of CSF VZV Antibody and PCR Testing in Suspected VZV Vasculopathy
Justin Long, MD, PhD, *Washington University in St. Louis*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

Mobile Stroke Units: Real Impact on Patients or Expensive Toy?
James Grotta, MD, FAAN, *Memorial Hermann*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

Intermediate Risk of Cardiac Events and Recurrent Stroke After Stroke Admission in Young Adults
Peter Jin, MD, *Icahn School of Medicine at Mount Sinai*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM

Is Ischemic Preconditioning a Viable Stroke Prevention Tool?
David Hess, MD, *Augusta University*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

Machine Learning Approach to Automating Detection of Cerebral Vasospasm Using Transcranial Doppler Monitoring
Gyanendra Kumar, MBBS, MD, *Mayo Clinic*

SESSION 6
DIVERSITY, INCLUSION, AND EQUITY IN NEUROLOGY TRAINING (AUPN SPONSORED) | *Seabreeze*

Chair: Tracey A. Cho, MD, *Massachusetts General Hospital and Harvard Medical School*
Co-Chair: Charles Flippen, MD, *University of California-Los Angeles David Geffen School of Medicine*

Diversity, inclusion, and equity are critical for achieving a culture of academic excellence, and for working effectively and respectfully with patients and colleagues from all backgrounds. Despite increasing awareness of the value of diversity for institutions and healthcare systems, barriers still exist for women, people of color, and other underrepresented groups in medicine. This SIG will focus on diversity, inclusion, and equity as it pertains to neurology training. Invited speakers will discuss trainee perspective on diversity and inclusion in the workplace, unconscious bias and ways to mitigate it, opportunities for developing women leaders in neurology, and ways to increase recruitment of minorities and women into academic neurology.

Learning Objectives
1. Identify potential barriers to diversity and equity in neurology training and careers
2. Recognize factors that contribute to unconscious bias
3. List strategies to mitigate unconscious bias and promote diversity and equity in neurology training

LEADER IN THE FIELD PRESENTATIONS
3:30 PM – 3:45 PM
Introduction: Shining a Light on the Challenges of Diversity, Inclusion, and Equity in Neurology Training
Tracey A. Cho, MD, *Massachusetts General Hospital and Harvard Medical School*

3:45 PM – 4:05 PM
Perspective of a (Woman) (Muslim) Resident: Achieving Diversity, Inclusion, and Equity In Neurology Training
Altaf Saadi, MD, *National Clinical Scholars Program, University of California, Los Angeles*

4:05 PM – 4:25 PM
Mind Bugs: Identifying Unconscious Bias and its Challenges
Charles Flippen, MD, *University of California-Los Angeles David Geffen School of Medicine*

4:25 PM – 4:45 PM
Women Leading in Neurology: Are the Tides Turning?
Janice Massey, MD, *Duke University Medical Center*

4:45 – 5:30 PM **Panel – Audience Discussion**

SESSION 7
MULTIPLE SCLEROSIS | *Spinnaker*

Chair: Gregory Wu, MD, PhD, *Washington University in St. Louis*
Co-Chair: Ellen Mowry, MD, MCR, *Johns Hopkins University*

This SIG will focus on multiple sclerosis (MS) as a neuro-inflammatory disease. Invited speakers will discuss emerging understanding of the cellular and molecular basis of MS pathogenesis, along with clinical methods for assessing risk of progression using biomarkers, state-of-the-art techniques for monitoring disease progression using imaging, and cutting-edge therapeutic efforts aimed at protecting and restoring function in patients with MS. Data blitz speakers will be selected from submitted abstracts that address understanding, monitoring or treating progression in MS.

Learning Objectives
1. Identify various mechanisms of immune cell involvement in the pathogenesis of Multiple Sclerosis
2. Evaluate the contribution of various biomarkers for the diagnosis and prognosis of MS
3. Recognize the mechanisms and benefits of emerging therapies for Multiple Sclerosis

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM
Interactions between B cells, T cells and Myeloid in Multiple Sclerosis (MS)
Amit Bar-Or, MD, *University of Pennsylvania*

3:50 PM – 4:00 PM **Q&A**

LEADER IN THE FIELD PRESENTATION
4:00 PM – 4:20 PM
B Cells, Autoantibodies, and Demyelinating Disease
Jeffrey Bennett, MD, PhD, *University of Colorado*

4:20 PM – 4:30 PM **Q&A**

LEADER IN THE FIELD PRESENTATION
4:30 PM – 4:50 PM
Pediatric and Adult Multiple Sclerosis: Do B Cells Play a Role?
Nancy Monson, PhD, *University of Texas at Southwestern*

4:50 PM – 5:00 PM **Q&A**

DATA BLITZ PRESENTATION
5:00 PM – 5:10 PM
Rapid Development of Neuroinflammation Associated with the Formation of Subarachnoid B Cell Clusters in a Model of Multiple Sclerosis
Gregory Wu, MD, PhD, *Washington University in St. Louis*

DATA BLITZ PRESENTATION
5:10 PM – 5:20 PM
A Phenome-Wide Examination of the Comorbidity Burden Associated with Multiple Sclerosis Disease Severity
Zongqi Xia, MD, PhD, *University of Pittsburgh*

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM
Calorie Restriction Diets and Changes in the Metabolome in People with Multiple Sclerosis
Kathryn Fitzgerald, ScD, *Johns Hopkins University*

SESSION 8
MOVEMENT DISORDERS | *Marina 6*

Chair: Pravin Khemani, MD, *The University of Texas Southwestern Medical Center*
Co-Chair: Kathleen Poston, MD, MS, *Stanford University Medical Center*

Unraveling the clinical and biological complexity of Parkinson's disease and Parkinsonian disorders is a major challenge to the field of movement disorders. In this session, speakers will discuss recent molecular, genetic, and clinical discoveries that will help lead to future therapeutics for these devastating disorders.

Learning Objectives
1. Understand the biological and clinical heterogeneity of Parkinson's disease and Parkinsonian disorders
2. Understand the current challenges to therapeutic discovery
3. Understand the genetic contributions to Parkinson's disease clinical heterogeneity

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM

Future of Therapeutics in Progressive Supranuclear Palsy/ Cortico Basal Syndrome (PSP/CBS)
Irene Litvan, MD, *University of California, San Diego*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

Detection of Alpha-Synuclein Using Fibril Conformation-Selective Antibodies
Rizwan Akhtar, MD, PhD, *University of Pennsylvania*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

Non-motor Parkinson's Disease
Tanya Simuni, MD, *Northwestern University*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

Interplay of Genetic Risk at SNCA Locus and Dysbiosis of Gut Microbiome in Parkinson's Disease
Zachary Wallen, MS, *University of Alabama at Birmingham*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM

In Vitro Modeling of Oligodendroglial α-Synuclein Pathology in Multiple System Atrophy
Ryosuke Takahashi, MD, PhD, *Kyoto University Graduate School of Medicine, Kyoto, Japan*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

Slow-Wave Sleep Is Associated with Cognitive Performance in Patients with Parkinson's Disease
Amy Amara, MD, PhD, *University of Alabama at Birmingham*

5:30 PM – 7:00 PM **POSTER PRESENTATIONS AND RECEPTION I***
Pavilion (The Pavilion is located directly outside Grande Foyer, please follow signage)

MONDAY, OCTOBER 16, 2017

5:45 AM – 7:30 AM **SATELLITE SYMPOSIUM** | UPDATES IN DIAGNOSING AND TREATING ALZHEIMER DISEASE
Grande Ballroom C

Sponsored by Medscape (CME to be provided by Medscape)

6:30 AM – 5:45 PM **REGISTRATION HOURS** | *Bay View & Grande Foyers*

7:00 AM – 9:00 AM **BREAKFAST** | *Bay View & Grande Foyers*

7:30 AM – 9:00 AM **PROFESSIONAL DEVELOPMENT COURSES**

COURSE 2
THE MANY FACES OF ACADEMIC GLOBAL NEUROLOGY
STUDENTS, RESIDENTS, POST-DOCS AND FELLOWS-CAREER LEVEL
Nautilus 1 & 2

Chair: Farrah J. Mateen, MD, PhD, *Massachusetts General Hospital and Harvard Medical School*
Co-Chairs: Gretchen Birbeck, MD, MPH, DTMH, FAAN, *University of Rochester | 2017 Soriano Lectureship Award Recipient*
Frances Jensen, MD, *University of Pennsylvania*

This session will focus on the variety of career opportunities for academic neurologists in Global Health. Specifically, we will discuss ways in which one can build an academic career that includes or focuses on neurological research, clinical care, or education in low to middle income countries. This course is designed to benefit students, residents, post-docs, and fellows.

Learning Objectives
1. To appreciate the range of methods of engagement in global health endeavors at different career stages, including feasibility and timing of endeavors
2. To develop strategies to discuss global health interests with academic leadership in neurology departments and programs, including funding streams and opportunities
3. To discuss emerging trends in global health and neurology as a career pathway or a complement to one's academic career

7:30 AM – 7:45 AM

Learning to Localize on a Global Scale
Melissa Elafros, MD, PhD, *Johns Hopkins University*

7:45 AM – 8:00 AM

From Zambia to the Navajo Nation: Incorporating the "Local" in Global Neurology
Altaf Saadi, MD, *National Clinical Scholars Program, University of California Los Angeles*

8:00 AM – 8:15 AM

The Pearl of Africa, Lessons Learned
Cumara B. O'Carroll, MD, MPH, *Mayo Clinic*

8:15 AM – 8:30 AM

If It's Monday, it Must be Mekelle—A Senior Neurologist's Path to Ethiopia
David Clifford, MD, *Washington University in St. Louis*

8:30 AM – 8:40 AM

Combined Q&A for all presentations

8:40 AM – 9:00 AM

Panel Discussion on Global Neurology
Panelists: Gretchen Birbeck, MD, MPH, DTMH, FAAN, *University of Rochester 2017 Soriano Lectureship Award Recipient*
Frances Jensen, MD, *University of Pennsylvania*
Farrah J. Mateen, MD, PhD, *Massachusetts General Hospital and Harvard Medical School*

COURSE 2
ROADS LESS TRAVELED: CREATIVE CAREERS OFF THE BEATEN TRACK | *EARLY-TO MID-CAREER LEVEL* | *Nautilus 4 & 5*

Chair: Justin C. McArthur, MD, MBBS, MPH, *Johns Hopkins University*

This course is designed to benefit those in early- and mid-levels of their career.

Learning Objectives
1. To identify how to select a career pathway and develop actionable milestones for career development.
2. To identify resources within the CTSA and NIH to facilitate clinical and translational research.
3. To identify how to successfully develop a mentoring team and utilize the team for career advancement.

7:30 AM – 8:00 AM

An Academic Career in Clinical Research
Ellen Mowry, MD, MCR, *Johns Hopkins University*

8:00 AM – 8:30 AM
Conducting Research in the Middle of an Ebola Epidemic, and Growing a Career at the NINDS
Bridgette Jeanne Billioux, MD, *National Institute of Neurological Disorders and Stroke*

8:30 AM – 9:00 AM **Q&A and Discussion**

COURSE 2
POLITICS FOR NEUROLOGY CHAIRS | *AUPN CHAIR- LEVEL*
Nautilus 3

Faculty: Richard Kronick, PhD, *University of California, San Diego*

With the seismic shift in political alignment brought about by the 2016 federal election, the fates of the Affordable Care Act, Medicare and other major systems supporting healthcare are in question. When is it appropriate (and when inappropriate) for Chairs to be politically active and lobby for what academic neurology needs to meet its missions and goals? How do the goals for academic neurology differ from those for private practice neurologists? What are the most effective means to inform our legislators, executive branch, and the public of our perspective and needs? How do we prioritize those needs (more GME slots, better reimbursement for cognitive specialties, more funding for research)? What can/should we as Chairs do to promote a new plan for healthcare that accounts for the challenges faced by academic medical centers in general and neurology in particular?

Learning Objectives
1. To understand the major health policy issues confronted by Congress
2. To understand the major factors that influence Congressional decisions on these issues
3. To understand how neurology chairs could develop priorities for advocacy

7:30 AM – 3:30 PM **EXHIBITS OPEN*** | *Grande Foyer*
Open to All Registrants.

9:00 AM – 9:15 AM **COFFEE BREAK** | *Bay View & Grande Foyers*

9:15 AM – 11:15 AM **PLENARY SESSION**
PRESIDENTIAL SYMPOSIUM | TRANSLATIONAL NEUROSCIENCE RESEARCH TO IMPROVE OUTCOMES FOR THE 'BOTTOM BILLION' | *Grande Ballroom AB*

Chair and Moderator: Barbara Vickrey, MD, MPH, *Icahn School of Medicine at Mount Sinai*
Co-Chairs: Farrah J. Mateen, MD, PhD, *Massachusetts General Hospital and Harvard Medical School and* Peter Kilmarx, MD, *Fogarty International Center, National Institutes of Health*

The emphasis of the symposium is translational neuroscience research focused on conditions of high prevalence or greater relevance in low- and middle-income countries worldwide. Speakers will each focus on a particular disorder/set of disorders, for which that individual has made significant contributions in terms of understanding the cause/prevention, improving diagnosis or recognition, or developing effective treatments. The goal is to raise awareness among our colleagues in neurology about the importance and impact of global neurology research.

Learning Objectives
1. To explore and reveal the neurological burden of disease in low income settings globally
2. To appreciate interventions and solutions for neurological care by non-neurologists in the least resourced settings globally
3. To familiarize the audience with the basic points of opportunity for neurologists and neuroscientists to innovate for and work with low-income researchers and scientists for brain and nervous system disorders

9:15 AM – 9:20 AM **Overview**
Farrah J. Mateen, MD, PhD, *Massachusetts General Hospital and Harvard Medical School*

9:20 AM – 9:40 AM
On the Causation and Prevention of Konzo—A Distinct Upper Motor Neuron Disease Associated with Food (Cassava) Cyanogenic Poisoning in Sub-Saharan Africa
Desire Tshala-Katumbay, MD, MPH, PhD, FANA, *Oregon Health & Science University and Kinshasa School of Medicine*

DATA BLITZ PRESENTATION
9:40 AM - 9:45 AM
Nodding Syndrome: Multimycotoxin Case-Control Study in Northern Uganda
Jennifer Duringer, PhD, *Oregon State University*

9:45 AM – 10:05 AM
From Retroviruses to Herpesviruses and Beyond: Addressing CNS Infections and Global Health in Peru
Joseph Zunt, MD, MPH, *University of Washington*

DATA BLITZ PRESENTATION
10:05 AM – 10:10 AM
Longitudinal Cohort Study of Neurological Sequelae in Ebola Virus Disease Survivors in Liberia
Bridgette Jeanne Billioux, MD, *National Institute of Neurological Disorders and Stroke*

10:10 AM – 10:35 AM
Presentation of the 2017 Soriano Lectureship Award
Neuroprotective Studies in Cerebral Malaria: Can Africa Efforts Inform U.S. Neurology?
Gretchen Birbeck, MD, MPH, DTMH, FAAN, *University of Rochester 2017 Soriano Lectureship Award Recipient*

DATA BLITZ PRESENTATION
10:35 AM – 10:40 AM
Prevalence and Determinants of Peripheral Neuropathy Among Urban and Rural Bangladeshi Type 2 Diabetic Subjects
Palash Banik, MPhil, *Bangladesh University of Health Sciences (BUHS)*

10:40 AM – 10:55 AM
Unleashing the Power of Mobile Devices and Tele-Consultations for People Living with Epilepsy
Farrah J. Mateen, MD, PhD, *Massachusetts General Hospital and Harvard Medical School*

10:55 AM – 11:15 AM **Combined Q&A and Discussion**

11:00 AM – 7:00 PM **POSTER VIEWING*** | *Pavilion*
Poster presenters and judges will be in attendance from 5:30 PM – 7:00 PM.
(The Pavilion is located directly outside Grande Foyer, please follow signage)

11:15 AM – 11:45 AM **EXECUTIVE SESSION OF MEMBERSHIP***
Grande Ballroom AB

All ANA members, please attend this session where the gavel will be passed to the incoming ANA President, and new executive committee and board members will be elected.

11:45 AM – 1:00 PM **LUNCH** | *Bay View & Grande Foyers*
Boxed lunches available to be taken into Interactive Lunch Workshops.

11:45 AM – 1:00 PM **INTERACTIVE LUNCH WORKSHOPS**
(THESE WORKSHOPS ARE "LUNCH AND LEARNS")

WORKSHOP 1
MEET THE FOGARTY INTERNATIONAL CENTER AND GLOBAL NEUROLOGY AT NIH* | *Grande Ballroom C*

Moderator: Pedro Gonzalez-Alegre, MD, PhD, *Associate Professor of Neurology at the Pennsylvania Hospital, University of Pennsylvania*

This workshop provides trainees and junior faculty the opportunity to interact with a panel of global neurology researchers and obtain information about the center, the research of the panelist and the research opportunities in LMIC.

Panelists: Peter Kilmarx, MD, *Deputy Director, Fogarty International Center, National Institutes of Health*
Kathleen M. Michels, PhD, *Program Director, Division of International Training and Research, Fogarty International Center, National Institutes of Health*
Adam L. Hartman, MD, FAAP, FANA, FAES, *Program Director, Division of Clinical Research, National Institute of Neurological Disorders and Stroke, National Institutes of Health*
Clinton B. Wright, MD, MS, *Director of the Division of Clinical Research, National Institute of Neurological Disorders and Stroke, National Institutes of Health*
Brad A Racette, MD, *Executive Vice Chairman and Professor of Neurology, Washington University School of Medicine in St. Louis*

WORKSHOP 2
THE MICROBIOME AND THE NERVOUS SYSTEM | *Nautilus 1*

Chair: Bijal Mehta, MD, *University of California, Los Angeles*
Co-Chairs: Yang Mao-Draayer, MD, PhD, *University of Michigan*
Giulio Maria Pasinetti, MD, PhD, *Icahn School of Medicine at Mount Sinai*

The Microbiome as the bridge from a wired to wireless system. There has been recent evidence showing that novel bioactive brain-bioavailable polyphenolic metabolites may promote neuroresilience across the lifespan through mechanisms involving the gut microbiome. We will discuss novel interdisciplinary investigations being conducted in order to better understand how the gut/microbiome-brain axis may be leveraged to devise potential novel therapeutic approaches through the development of new generation probiotics. We are just starting to review what this involvement may have to the clinical practice of medication but also need to understand it from an etiological and physiological perspective.

Learning Objectives
1. Broaden understanding of how the observed change of intestinal bacteria in MS patients regulate immune functions involved in MS pathogenesis
2. Increase knowledge of the MS intestinal microbiota implication on MS systemic- and CNS-immunopathology; the possible contributions of MS low-grade microbial translocation (LG-MT) to the development of MS; and microbiota therapies for MS patients
3. Expand upon current knowledge of the microbiome by focusing on polyphenolic metabolites produced by the gut microbiota that may promote neuroresilience in mood and neurodegenerative disorders
4. Learn how vitamins influence the microbiome and how this influence effects the immune system in multiple sclerosis

11:45 AM – 12:05 PM
The Microbiome as the Bridge from a Wired to Wireless System
Yang Mao-Draayer, MD, PhD, *University of Michigan*

12:05 PM – 12:10 PM **Q&A**

12:10 PM – 12:30 PM
Role of GI Microbiota on Polyphenol-Mediated Attenuation of Stress Induced Psychological Impairment and Cognitive Deterioration Across the Life-Span
Giulio Maria Pasinetti, MD, PhD, *Icahn School of Medicine at Mount Sinai*

12:30 PM – 12:35 PM **Q&A**

12:35 PM – 12:55 PM
How Vitamins Effect the Microbiome
Bijal Mehta, MD, MPH, *University of California, Los Angeles*

12:55 PM – 1:00 PM **Q&A**

WORKSHOP 3
CONCUSSION AND YOUTH SPORTS | *Nautilus 2*

Chair: Christopher Giza, MD, *University of California, Los Angeles*
Co-Chair: Meeryo Choe, MD, *University of California, Los Angeles*

Discussion of the recognition of concussion in youth athletes with considerations regarding management and return to play.

Learning Objectives
1. Improved physician education, diagnosis, and patient care for youth athletes with concussion.
2. Recognition of physiological and biological differences of concussion in the developing brain
3. Better awareness of the distinctions between high level sports neurological care and the implications for youth sports

11:45 AM – 12:00 PM
Management of Concussion in Youth Athletes: Return to Play
Meeryo Choe, MD, *University of California, Los Angeles*

12:00 PM – 12:15 PM
Basic Science of Pediatric Concussions
Mayumi Prins, PhD, *University of California, Los Angeles*

12:15 PM – 12:30 PM
Perspective from Another Point of View
Brett Kissela, MD, MS, *University of Cincinnati*

12:30 PM – 1:00 PM **Group Discussion and Q&A**

WORKSHOP 4
ROLE OF POSITRON EMISSION TOMOGRAPHY (PET) IN NEURODEGENERATIVE DISORDERS | *Nautilus 3*

Chair: Beau Ances, MD, PhD, MSc, *Washington University in St. Louis*
Co-Chair: Gil Rabinovici, MD, *University of California, San Francisco*

We will review the role of PET imaging methods (including amyloid, tau, and inflammatory ligands) in the study and clinical evaluation of common neurodegenerative disorders, including Alzheimer's disease (AD), fronto-temporal dementia (FTD), dementia with Lewy bodies (DLB).

Learning Objectives
1. Enhance understanding of the role of multiple PET imaging modalities for the study and diagnosis of neurodegenerative disorders
2. Study potential of PET imaging agents to understand timeline of disease progression
3. Appreciate the potential application of PET imaging methods for evaluating therapeutics

11:45 AM – 12:05 PM
Role of Amyloid PET in Neurodegenerative Diseases
Gil Rabinovici, MD, *University of California, San Francisco*

12:05 PM – 12:25 PM
Role of Tau PET in Neurodegenerative Disorders
Bradford Dickerson, MD, *Massachusetts General Hospital*

12:25 PM – 12:45 PM
Role of Inflammatory PET in Neurodegenerative Disorders
Beau Ances, MD, PhD, MSc, *Washington University in St. Louis*

12:45 PM – 1:00 PM **Q&A and Discussion**

11:45 AM – 1:00 PM ADDITIONAL LUNCH WORKSHOPS

WORKSHOP 1
AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY (ABPN) MAINTENANCE OF CERTIFICATION (MOC) PROGRAM: LIFE-LONG LEARNING FOR NEUROLOGISTS* | *Nautilus 4*

Faculty: Larry Faulkner, MD, *American Board of Psychiatry and Neurology*
Dr. Faulkner will lead the session by providing background on the ABMS MOC program, recent changes to the MOC program, and perspective on the future of MOC. Dr. Faulkner will detail the four-part ABPN MOC Program, giving specific requirements related to self-assessment, CME, and performance in practice components.

Learning Objectives
1. To become familiar with the rationale and background of MOC
2. To learn the 4-part ABPN MOC Program components
3. To become familiar with the online ABPN personalized physician Folios system
4. To learn about the future direction for the ABPN MOC Program

WORKSHOP 2
17TH ANNUAL WOMEN OF THE ANA LUNCH PROGRAM EMPOWERING WOMEN TO CLOSE THE SALARY GAP*
Nautilus 5

Chair: Kathleen Digre, MD, *University of Utah*
Co-Chair: Karen C. Johnston, MD, MSc, *University of Virginia*
Facilitator: Jody Corey-Bloom, MD, PhD, *University of California, San Diego*
Speakers: Vivian Reznik, MD, MPH, *University of California, San Diego*
Kathleen Shannon, MD, *University of Wisconsin*

The women of the ANA will present a program to consider current issues relating to the gender salary gap. This topic has gained national attention in recent months as it has been widely reported that the average female salary is approximately 80% of the average male salary for full time work. Join us for a discussion with the women of the ANA who will share their perspectives and consider best practices. All are invited to attend and women of the ANA are encouraged to bring their female and male colleagues to engage in the session.

Learning Objectives
1. The attendee will be able to list 3 resources for looking into salary at her/his own institution
2. The attendee will gain a better understanding of navigating a system for advancement
3. The attendee will be able to list challenges to salary equity

12:00 PM – 12:02 PM
Welcome and Introductions
Kathleen Digre, MD, *University of Utah*

12:02 PM – 12:10 PM
Salary Inequity in Neurology—What Does the Data Say?
Kathleen Shannon, MD, *University of Wisconsin–Madison*

12:10 PM – 12:25 PM
Know Your Institution: Using Data and Understanding Culture to Advance an Academic Career
Vivian Reznik, MD, MPH, *University of California, San Diego*

12:25 PM – 1:00 PM
Panel Discussion with the Audience: Sharing Best Practices, Tips and Suggestions for Improving Salary Equality through Academic Advancement.

1:15 PM – 3:15 PM PLENARY SESSION
PRECISION MEDICINE IN NEUROLOGIC DISEASE
Grande Ballroom AB

Chair: Rachel Saunders-Pullman, MD, MPH, MS, *Icahn School of Medicine at Mount Sinai*
Co-Chair: Conrad Chris Weihl, MD, PhD, *Washington University in St. Louis | 2017 Derek Denny-Brown Young Neurological Scholar Award Recipient in Basic Science*

Next generation sequencing and advances in molecular genetics now allow both researchers and practitioners the ability to interrogate the genetic makeup of patients with both rare and common neurologic disorders. With these data, a new field of "precision medicine" has emerged. This encompasses novel genetic approaches and interpretation of these data for diagnosis, prognosis and therapy. In addition, the development of new tools related to genome editing now allow potential precision genetic therapy that can correct one's genetic disorder. Additional challenges include how therapeutic trials are designed and tailored to rare diseases with low numbers of patients. Lessons from the field of oncology are informative in addressing these challenges.

Learning Objectives
1. To become familiar with major successes and lessons from precision medicine in oncology
2. To improve understanding of the current status of mechanisms and methods of treatment for polyglutamine repeats and MECP2 related mechanisms and disease
3. To increase familiarity with therapeutic gene editing, specifically in muscles and muscle stem cells.
4. To consider methods of implementation of precision medicine in neurology and ways this may guide more efficient trials, especially in the area of movement disorders.

1:15 PM – 1:45 PM
Presentation of the 2016 George W. Jacoby Lectureship Award
Using Genetics to Identify Pathways that Regulate Proteins Driving Neurodegeneration
Huda Y. Zoghbi, MD, *Howard Hughes Medical Institute, Baylor College of Medicine, Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital | 2016 George W. Jacoby Lectureship Award Recipient*

1:45 PM – 2:10 PM
Therapeutic Gene Editing in Muscles and Muscle Stem Cells
Amy Wagers, PhD, *Harvard University*

2:10 PM – 2:35 PM
Precision Medicine in Oncology: Of Platforms and Baskets
Donald Berry, PhD, *The University of Texas, M.D. Anderson Cancer Center*

2:35 PM – 3:00 PM

Designing Neurology Trials in the Era of Precision Medicine
Cristina Sampaio, MD, PhD, *CHDI Foundation*

DATA BLITZ PRESENTATIONS

3:00 PM – 3:15 PM *(5 minutes each)*

ASO Lowering of SOD1 Markedly Extends Survival and Reverses Muscle Denervation in SOD1 ALS Rodent Models
Timothy Miller, MD, PhD, *Washington University in St. Louis*

Neuroanatomical Correlates of SCN1A Common Variant Linking Mesial Temporal Lobe Epilepsy, Hippocampal Sclerosis, and Febrile Seizures
Saud Alhusaini, MD, PhD, *Montreal Neurological Institute and Hospital*

Post-Injury Delivery of AAV9-SMN Accelerates Behavioral and Electrophysiological Recovery Following Peripheral Nerve Injury
Christopher Wier, BS, *The Ohio State University*

3:15 PM – 3:30 PM | **COFFEE BREAK** | *Bay View & Grande Foyers*

3:30 PM – 5:30 PM SPECIAL INTEREST GROUP SESSIONS

SESSION 1
BIOMARKERS OF TRAUMATIC BRAIN INJURY: IMAGING, MOLECULES, AND ENDOPHENOTYPES | *Grande Ballroom C*

Chair: Ramon Diaz-Arrastia, MD, PhD, *University of Pennsylvania*
Co-Chair: Chris Giza, MD, *University of California, Los Angeles*

Traumatic brain injury (TBI) is one of the oldest and most common maladies affecting humankind. Over the last several decades, the failure of multiple clinical trials of therapies shown to be beneficial in animal models has forced a re-evaluation of translational research in this space. The conclusion of multiple expert workshops is that validated biomarkers will be critical for the development of new therapies, for use in (1) selecting patients with injury mechanisms targeted by a particular therapy; (2) confirming target engagement and demonstrating physiologic efficacy; and (3) fine tuning important issues such as dose, timing, and duration of therapies. Recent large investments in North America and Europe have focused on developing such precision-medicine tools. This session will review recent advances in imaging and biochemical biomarkers of TBI, and will discuss how these can be used to identify endophenotypes of TBI, which can be targeted by the next generation of clinical trials.

Learning Objectives

1. Understand the different ways in which biomarkers can be useful: as diagnostic, prognostic, predictive, and pharmacodynamic measures
2. Understand the concept of endophenotypes and how it is useful to guide therapy in complex disorders
3. Become familiar with novel magnetic resonance imaging (MRI) tools and how they reveal subtle abnormalities in brain structure relevant to TBI
4. Become familiar with novel, ultrasensitive immunoassays, and their utility in measuring proteins in blood that reflect brain pathology

LEADER IN THE FIELD PRESENTATION

3:30 PM – 3:50 PM

Magnetic Resonance Imaging Biomarkers of Traumatic Brain Injury
Esther Yuh, MD, PhD, *University of California, San Francisco*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION

4:00 PM – 4:10 PM

18F-AV1451 Tau PET in Patients at Risk for Chronic Traumatic Encephalopathy
Orit Lesman-Segev, MD, *MMedSc, University of California, San Francisco*

LEADER IN THE FIELD PRESENTATION

4:10 PM – 4:30 PM

Molecular Biomarkers of Traumatic Brain Injury
Henrik Zetterberg, MD, PhD, *University of Gothenburg*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION

4:40 PM – 4:50 PM

Association Between Head Injury and Brain Amyloid Deposition
Andrea Schneider, MD, PhD, *Johns Hopkins University*

LEADER IN THE FIELD PRESENTATION

4:50 PM – 5:10 PM

Endophenotypes of Traumatic Brain Injury: What We Need to Know for the Next Generation of Clinical Trials
Ramon Diaz-Arrastia, MD, PhD, *University of Pennsylvania*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION

5:20 PM – 5:30 PM

Microstructural Tissue and Vascular Injury within Regions of Encephalomalacia in Chronic Traumatic Brain Injury
Danielle Sandsmark, MD, PhD, *University of Pennsylvania*

SESSION 2
CLINICAL AND BASIC BIOLOGY OF HUMAN SLEEP | *Nautilus 1*

Chair: Louis Ptacek, MD, *University of California, San Francisco*
Co-Chair: Miranda Lim, MD, PhD, *Oregon Health & Science University and Portland VA*

Sleep and circadian regulation originates in the brain. However, there are also important interactions between sleep and clock originating in the brain and signals from the environment and from peripheral tissues. There are many sleep and circadian disorders that thus fall into the field of neurology. In addition, healthy sleep is critical for our general health. Chronic disruption of sleep increases risks of (and rates of progression of) many human diseases including autoimmune disorders, neurodegeneration, psychiatric disorders, metabolic syndromes and many cancers. Thus understanding normal sleep in humans, circadian regulation, and disorders of sleep are increasingly important. This session will focus on normal aspects of sleep and circadian biology and disorders of circadian function and sleep homeostasis.

Learning Objectives

1. Appreciate the importance of sleep disorders to health in general
2. Have insights into potential roles for incorporating such information into the clinic
3. Appreciate the importance of healthy brain for sleep and unhealthy brain on sleep disorders

LEADER IN THE FIELD PRESENTATION

3:30 PM – 3:50 PM

Sleep/Circadian Disruption in Autism Spectrum Disorder
Beth Malow, MD, MS, *Vanderbilt University*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

Analysis of Circadian Rhythms in Preclinical Alzheimer Disease
Erik Musiek, MD, MMedSc, *University of California, San Francisco*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

Factors Associated with REM Sleep Behavior Disorder Across the Lifespan
Michael Silber, MBChB, *Mayo Clinic*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

Dysregulated BMAL1 Translation Underlies Circadian Abnormalities in Tuberous Sclerosis Complex
Jonathan Lipton, MD, PhD, *Boston Children's Hospital, Harvard Medical School*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM

A Cryptochrome 2 Mutation Yields Advanced Sleep Phase in Humans
Ying-Hui Fu, PhD, *University of California, San Francisco*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

Mapping the Neural Basis of Functional Connectivity in Genetically-Encoded Calcium Indicator (GECI) Mice During Wakefulness, Sleep, and Under Anesthesia
Eric Landsness, MD, PhD, *Washington University in St. Louis*

SESSION 3
UPDATE ON INTERVENTIONAL NEUROLOGY | *Nautilus 2*

Chair: Robin Novakovic, MD, *The University of Texas Southwestern Medical Center at Dallas*
Co-Chair: Santiago Ortega-Gutierrez, MD, *University of Iowa*

This session serves as a review to recent advances in interventional neurology. This is a rapidly evolving field with new trials that have recently been published as well as technological advances that continue to revolutionize the field. We will concentrate on the recent stroke trials, which build on past evidence for thrombectomy in acute stroke, this time reviewing data that the procedure may be efficacious in selected patients in extended time windows. We will then move on to an update on technological advances in arteriovenous malformation management. Then we will discuss new technology that allows for minimally invasive, even endoscopic, removal of intracerebral hemorrhage and hear the recent clinical data.

Learning Objectives

1. Review the data from recently completed and ongoing trials to evaluate the efficacy of thrombectomy in acute stroke beyond the 6-hour time window
2. Assess new types of endovascular technology, including new liquid embolics and delivery catheters, in the treatment of arteriovenous malformations
3. Evaluate the new technology being used to treat intracerebral hemorrhage in a minimally invasive manner and review the current clinical data

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM

From Time to Tissue Window: Lessons from DAWN and Other Extended Time Window Trials
Jeff Saver, MD, *University of California, Los Angeles*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

Impact of Time Metric System on Reducing Door to Reperfusion Time for Endovascular Stroke Treatment
Shuichi Suzuki, MD, *University of California, Irvine*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

Advances in Arteriovenous Malformation Management
Santiago Ortega-Gutierrez, MD, *University of Iowa*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

Venous Sinus Stenting for Idiopathic Intracranial Hypertension: A Systematic Analysis
Hamidreza Saber, MD, MPH, *Wayne State University School of Medicine*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM

Minimally Invasive and Endoscopic ICH Evacuation
Jonathan White, MD, FAANS, FACS, *The University of Texas Southwestern Medical Center*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

Plumbing Failure or Electrical? Syncope from Baroreceptor Reflex Failure After Carotid Surgery
Richa Tripathi, MD, *Wayne State University School of Medicine*

SESSION 4
CASE STUDIES IN NEUROLOGY | *Nautilus 3*

Chair: S. Andrew Josephson, MD, FAAN, FANA *University of California, San Francisco*
Co-Chairs: Martin A. Samuels, MD, DSc (hon), FAAN, MACP, FRCP, FANA, *Brigham and Women's Hospital, Harvard Medical School*
2011 Distinguished Neurology Teacher Award Recipient
Amy Pruitt, MD, *University of Pennsylvania*

This session will be entirely case-based. The real case summaries are taken from selected patients seen on a busy consultation service. They will be presented as unknowns to the audience, including the relevant history, examination, imaging and laboratory studies. Attendees will be encouraged to participate in the case discussions. For each case, salient lessons will be gleaned and sources of possible errors reviewed.

Learning Objectives

1. Learn how to use the neurologic examination to make difficult diagnoses
2. Understand the roles of framing and bias in medical decision making
3. Discuss advanced testing and uses for complex neurological disorders

LEADERS IN THE FIELD PRESENTATION
3:30 PM – 5:30 PM

Case Presentations

S. Andrew Josephson, MD, FAAN, FANA, *University of California, San Francisco*

Martin A. Samuels, MD, DSc (hon), FAAN, MACP, FRCP, FANA, *Brigham and Women's Hospital, Harvard Medical School*

Amy Pruitt, MD, *University of Pennsylvania*

SESSION 5
AUTOIMMUNE NEUROLOGY | *Nautilus 4*

Chair: Stacey Lynn Clardy, MD, PhD, *University of Utah and Salt Lake City VHA, Clinical Neurosciences Center*

Co-Chair: Jenny Linnoila, MD, PhD, *Massachusetts General Hospital*

This session will explore advances across the spectrum of Autoimmune Neurology, including both peripheral and central nervous system manifestations, of both paraneoplastic and non-cancer associated etiologies. This SIG is designed to help neurologists stay current in clinical practice, and to discuss new relevant research. Topics include autoantibody testing and interpretation, treatment strategies, mechanisms of injury, and cancer immunotherapy-associated autoimmunity.

Learning Objectives

1. Learn about recent advances and limitations of antibody testing
2. Explore the overlap between autoimmune neurology and emerging discoveries in other neurologic Subspecialties, including both central and peripheral manifestations.
3. Explore the emerging concerns surrounding neurologic autoimmunity induced by newer cancer immunotherapies.

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM

Commercial vs. Laboratory Testing for Antibodies: New Mechanistic Research of Interest

Eric Lancaster, MD, PhD, *University of Pennsylvania*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

Activating and Inhibitory Astrocytic FcγReceptors Mediate IgG-Induced Internalization of the Aquaporin-4 Water Channel and Its Linked Glutamate Transporter EAAT2

Vanda Lennon, MD, PhD, *Mayo Clinic College of Medicine*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

Chronic Immune Demyelinating Polyneuropathy (CIDP) and Associated Antibodies

Susumu Kusunoki, MD, PhD, *Kindai University, Osaka, Japan*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

An Anti-Plexin D1 Autoantibody Is Associated with Immunotherapy-Responsive Neuropathic Pain

Takayuki Fujii, MD, *Kyushu University, Fukuoka, Japan*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM

Cancer Immunotherapy-induced Autoimmunity

Amanda Guidon, MD, *Massachusetts General Hospital*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

SHP2: A Potential Therapeutic Agent for MuSK-Myasthenia

Michelangelo Cao, MD, *University of Oxford, Oxford, England*

SESSION 6
DEMENTIA AND AGING | *Nautilus 5*

Chair: Erik Roberson, MD, PhD, *University of Alabama at Birmingham*

Co-Chair: Jennifer Whitwell, PhD, *Mayo Clinic*

This session will feature three leaders in the field of aging and dementia research and three talks from abstracts submitted in this area. There has been tremendous progress in identifying basic mechanisms underlying the degenerative dementias, in understanding the relationship between aging, cognition, and dementing disease, in developing imaging, genetic, and other biomarkers for these disorders; and in designing innovative trials and novel therapeutic approaches. The goals of the session are to provide attendees with greater understanding of cutting-edge issues across these areas within the field.

Learning Objectives

1. Describe recent advances in understanding mechanisms of dementing diseases, especially FTD
2. Recognize the role of autosomal dominant disease in research and therapeutic trials
3. Discuss recent advances in neuroimaging and biomarker research for early detection of dementia

LEADER IN THE FIELD PRESENTATIONS
3:30 PM – 3:50 PM

Molecular Pathogenic Mechanisms and Therapeutic Targets of C9ORF72-Related FTD/ALS

Fen-Biao Gao, PhD, *University of Massachusetts Medical School*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

A Link Between Tuberous Sclerosis Complex, mTOR Signaling, Tau Metabolism and Frontotemporal Lobar Degeneration

Aimee Kao, MD, PhD, *University of California, San Francisco*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

Update on Prevention Trials in Autosomal Dominant AD

Randy Bateman, MD, *Washington University in St. Louis*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

Differential Genotypic Variance in PET and CSF Measures of Amyloid Burden in Autosomal Dominant AD: Findings from the DIAN Study

Jasmeer Chhatwal, MD, PhD, *Massachusetts General Hospital and Harvard Medical School*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM

Biomarkers in Cognitively Normal Older Individuals

Elizabeth Mormino, PhD, *Stanford University School of Medicine*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

The Longitudinal Pattern of Systemic Inflammation and White Matter Structural Integrity in the Elderly
Keenan A. Walker, MD, *Johns Hopkins University*

SESSION 7
HEALTH SERVICES RESEARCH IN NEUROLOGY | *Spinnaker*

Chair: Allison Willis, MD, MS, *University of Pennsylvania*
Co-Chair: Brian C. Callaghan, MD, MS, *University of Michigan Health System*

The Health Service Research SIG brings together researchers, clinician-scientists, policymakers, and students interested in exchanging knowledge, building researchers' skills and disseminating research findings related to health care use, outcomes quality, delivery, access, disparities and economics to inform basic science, policy and clinical decision-making.

Learning Objectives
1. To provide information on differences in neurological disease care and outcomes that will support the development of strategies to improve the quality and delivery of health care
2. To evaluate current local, national strategies to overcome inequalities in health care for neurological disease
3. To demonstrate how health services research can generate new, testable preclinical/ mechanistic hypotheses and translate into policy initiatives

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM

Health Disparities in Neurology
Nicte I. Mejia MD, *Massachusetts General Hospital*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

Derivation and Application of a Quantitative Approach to Estimate Global Stroke Risk Reduction for Multi-Faceted Interventions to Prevent Recurrent Stroke
Adam Richards, MD, PhD, MPH, *University of California, Los Angeles*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

HSR in Multiple Sclerosis
Annette Langer-Gould, MD, *Kaiser Permanente Southern California*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

"Worth the Walk": A Community-Partnered Intervention to Decrease Stroke Risk for Minority Seniors
Sarah Song, MD, MPH, *Rush University Medical Center*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM

Community-based Participatory Research (CBPR) in Stroke
Lesli Skolarus, MD, MS, *University of Michigan | 2017 Derek Denny-Brown Young Neurological Scholar Award Recipient in Clinical Science*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

Does Nighttime Enoxaparin Administration Improve Compliance with Pharmacologic DVT Prophylaxis?
Christine Hessler, MD, *University of California, San Francisco*

SESSION 8
MECHANISMS OF MIGRAINE HEADACHE, CANCER PAIN, AND OPIOID ANALGESIA | *Seabreeze*

Chair: K.C. Brennan, MD, University of Utah
Co-Chair: Rami Burstein, MD, *Harvard Medical School, Beth Israel Deaconess Medical Center*

The session will cover current understanding of genetic, cellular, anatomical, physiological, pharmacological and behavioral aspects of headache, pain and spinal analgesia.

Learning Objectives
1. Explain the key neural pathways underlying opioid analgesia
2. Describe the cellular and network mechanisms of cancer pain
3. Describe how extra- and intra-cranial neural can contribute to migraine pain

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:55 PM

Mechanisms of Opioid Analgesia
Tony Yaksh, PhD, *University of California, San Diego*

3:55 PM – 4:05 PM **Q&A**

LEADER IN THE FIELD PRESENTATION
4:05 PM – 4:30 PM

Mechanisms that Drive Bone Cancer Pain
Patrick Mantyh, PhD, JD, *University of Arizona Cancer Center*

4:30 PM – 4:40 PM **Q&A**

LEADER IN THE FIELD PRESENTATION
4:40 PM – 5:05 PM

Extracranial vs. Intracranial Origin of Migraine Headache
Rami Burstein, MD, *Harvard Medical School, Beth Israel Deaconess Medical Center*

5:05 PM – 5:15 PM **Q&A**

5:15 PM – 5:30 PM **Group Discussion**

SESSION 9
NEUROMUSCULAR DISORDERS—ADVANCES | *Marina 6*

Chair: Laurie Gutmann, MD, *University of Iowa Carver College of Medicine*
Co-Chair: Jayashri Srinivasan, MD, PhD, FRCP, *Lahey Hospital and Medical Center*

Neuromuscular disorders are moving farther along with clinical trials and treatments. Understanding of the physiology continues to be a major focus and new techniques are being developed at the cellular level as well as in imaging and treatment trial design to enhance and take advantage of advances in this area.

Learning Objectives
1. The participant will understand the utility and limitations of imaging in understanding neuromuscular diseases, their progression and the potential use of imaging as a biomarker in clinical studies

2. The participant will have reviewed the current status of treatment for spinal muscular atrophy and the next steps in research opportunities. The importance of early recognition of SMA and outcomes of recent clinical trials will also be reviewed
3. The participant will gain an understanding of iPS cells in research. The knowledge gained will help understand the limitations and advantages of iPS cells in identifying basic science of specific disorders as well as looking for treatment targets

LEADER IN THE FIELD PRESENTATION
3:30 PM – 3:50 PM

Spinal Muscular Atrophy—Where We Are, Where We Are Going
Richard Finkel, MD, FANA, *Nemours Children's Hospital*

3:50 PM – 4:00 PM **Q&A**

DATA BLITZ PRESENTATION
4:00 PM – 4:10 PM

Autoimmune Neuromuscular Complications Triggered by PD-1 Inhibitors: Balancing Treatment Efficacy and Side Effects
Michael Isfort, MD, *University of Pittsburgh Medical Center*

LEADER IN THE FIELD PRESENTATION
4:10 PM – 4:30 PM

MFN1 augmentation as a therapeutic strategy for Charcot-Marie-Tooth type 2A
Robert Baloh, MD, PhD, *Cedars-Sinai | 2016 Derek Denny-Brown Young Neurological Scholar Award Recipient in Basic Science*

4:30 PM – 4:40 PM **Q&A**

DATA BLITZ PRESENTATION
4:40 PM – 4:50 PM

Masitinib in the Treatment of Amyotrophic Lateral Sclerosis
Angela Genge, MD, FRCP(c), *Montreal Neurological Institute and Hospital*

LEADER IN THE FIELD PRESENTATION
4:50 PM – 5:10 PM

ALS-TOP43 May Be Cured with SCA31 Related RNA Repeats
Hidehiro Mizusawa, MD, PhD, *National Center of Neurology and Psychiatry, Tokyo, Japan*

5:10 PM – 5:20 PM **Q&A**

DATA BLITZ PRESENTATION
5:20 PM – 5:30 PM

Proteomics of Rimmed Vacuoles in Inclusion Body Myositis Identify a New Risk Gene
Conrad Chris Weihl, MD, PhD, *Washington University in St. Louis 2017 Derek Denny-Brown Young Neurological Scholar Award Recipient in Basic Science*

5:30 PM – 7:00 PM **POSTER PRESENTATION AND RECEPTION II*** *Pavilion (The Pavilion is located directly outside Grande Foyer, please follow signage)*

7:00 PM – 9:00 PM **PRESIDENT'S RECEPTION*** | *Bay View Lawn*

TUESDAY, OCTOBER 17

6:30 AM – 2:15 PM **REGISTRATION HOURS** | *Bay View & Grande Foyers*

7:00 AM – 8:45 AM **BREAKFAST** | *Bay View & Grande Foyers*

7:00 AM – 8:30 AM **PROFESSIONAL DEVELOPMENT COURSES**

COURSE 3
PREPARING FOR YOUR FIRST FACULTY POSITION —A WORKSHOP FOR NEW ACADEMIC NEUROLOGISTS
STUDENTS, RESIDENTS, POST-DOC AND FELLOWS-CAREER LEVEL
Nautilus 1 & 2

Chair: Allison Willis, MD, MS, *University of Pennsylvania*
Co-Chair: Brett Kissela, MD, *University of Cincinnati College of Medicine*
The American Neurological Association (ANA) and the Association of University Professors of Neurology (AUPN) are excited to announce this brand-new workshop! The workshop will begin with a faculty member who will speak on the essential skills needed for a successful job seeking experience in Academic Neurology. Following the presentation, attendees, faculty and seasoned ANA and AUPN members will break into small groups to practice interviewing skills, and to demonstrate and practice 'elevator talks'. This course is designed to benefit students, residents, and fellows.

Learning Objectives
1. Acquire knowledge of essential skills needed for a successful job seeking experience in Academic Neurology.
2. Develop crucial interviewing skills
3. Increase your understanding of the importance and methods of negotiating differences
4. Learn how to market your scientific research by developing the essential skill: the 'elevator talk'

7:00 AM – 8:00 AM

Interview Skills: Story Telling for an Interview or Negotiation
Camille Primm, *Primm & Partners*

8:00 AM – 8:30 AM **Smaller Group Discussions**

COURSE 3
THE VIEW FROM THE NIH AND SUCCESSFUL GRANT WRITING | EARLY-TO MID-CAREER LEVEL | *Nautilus 4 & 5*

Chair: Amy Pruitt, MD, *University of Pennsylvania*
Faculty: Walter Koroshetz, MD, *National Institute of Neurological Disorders and Stroke*
Justin McArthur, MD, MBBS, MPH, *Johns Hopkins University*

This session is designed to provide participants with tools that will enhance the ability to write successful grant proposals. This course is designed to benefit those in early- and mid-levels of their career.

Learning Objectives
1. To learn how to prepare for grant applications, in terms of developing specific aims, mapping out a timetable, developing training plans, forming a mentoring group, and assembling NIH biosketch
2. To learn how to respond to critiques of grant applications
3. To learn about the range of sources of funding ~ NIH, DoD, VA, foundations etc

7:00 AM – 7:30 AM
Walter Koroshetz, MD, *National Institute of Neurological Disorders and Stroke*

7:30 AM – 8:00 AM
Justin McArthur, MD, MBBS, MPH, *Johns Hopkins University*

8:00 AM – 8:30 AM **Q&A**

COURSE 3
WINTER IS COMING, BUT MACRA IS HERE: REIMBURSEMENT FOR QUALITY AND THE SHIFT TO POPULATION-BASED CARE
AUPN CHAIR- LEVEL | *Nautilus 3*

Faculty: Marc Nuwer, MD, PhD, *University of California, Los Angeles*
Lyell Jones, MD, *Mayo Clinic Rochester*

The Medicare Access and CHIP Reauthorization Act of 2015 (MACRA) ended the Sustainable Growth Rate formula, which threatened massive reductions in Medicare payments, and replaced it with a program that bases reimbursements on quality and innovation. How will this change affect academic Neurology departments? What are the implications of MACRA for academic neurology? How can we address the new MACRA requirements using either Advanced Alternative Payment Models (APMs) or the Merit-based Incentive Payment System (MIPS)? More broadly, how will population health measures including disease prediction, prevention, and early intervention, be incorporated into academic neurology practice? Can such practices improve outcomes and reduce costs, and will they be adequately reimbursed?

Learning Objectives
1. Explain MACRA's two major pathways: the Merit-based Incentive Payment System (MIPS) and Advanced Alternative Payment Models (AAPMs)
2. Implement a plan to report under MIPS or participate in AAPMs
3. Develop strategies to manage the impact of value based care on academic neurology practices

8:30 AM – 8:45 AM **BREAK** | *Bay View & Grande Foyers*

POSTER JUDGING RESULTS WILL BE DISPLAYED ON MONITORS AND BOARDS

8:45 AM – 10:45 AM **PLENARY SESSION**
ANTISENSE OLIGONUCLEOTIDE TREATMENT OF GENETIC NEUROLOGICAL DISEASES | *Grande Ballroom AB*

Chair: Laura P.W. Ranum, PhD, *University of Florida*
Co-Chair: Timothy Miller, MD, PhD, *Washington University in St. Louis*

Antisense oligonucleotides have been used to successfully target RNA in preclinical models of neurological disease. More recently ASO have been used in human clinical studies. For human studies, the ASOs are delivered to the cerebral spinal fluid intrathecally. Studies are currently ongoing for Huntington's disease, Amyotrophic Lateral Sclerosis, and Tauopathies. ASOs that affect SMN splicing have recently been FDA approved for spinal muscular atrophy and splicing ASOs have received conditional approval for Duchenne's muscular dystrophy. Both preclinical and clinical trials using ASO will be reviewed. Given the growing number of clinical trials using this approach and the recent approvals, it is import-ant hear about this work from experts in these topic areas.

Learning Objectives
1. Understand ASOs are a versatile and powerful approach to treat a wide range of neurological disorders
2. Understand challenges and demand for delivery to patient community of newly FDA approved drugs
3. Understand that ASO and other therapies are enabling precise genetic treatments based on prior basic science investigations and that these opportunities are likely to rapidly grow in upcoming years

8:45 AM – 9:10 AM
Gene Silencing Therapy for Human Neurodegenerative Disease
Don W. Cleveland, PhD, *University of California, San Diego*

9:10 AM – 9:40 AM
Presentation of the 2017 F.E. Bennett Memorial Lecture Award
ASO Therapy for SMA: Harnessing the Power of a Backup Gene
Adrian R. Krainer, PhD, *Cold Spring Harbor Laboratory | 2017 F.E. Bennett Memorial Lecture Award Recipient*

9:40 AM – 10:05 AM
Getting the Message: Antisense Oligonucleotide Therapy for Duchenne Muscular Dystrophy and Spinal Muscular Atrophy
Richard Finkel, MD, FANA, *Nemours Children's Hospital*

10:05 AM – 10:30 AM
Antisense Oligonucleotide Therapy for Huntington's Disease: A Clinical Trials Perspective
Sarah J. Tabrizi, MBChB, FRCP, PhD, FMedSci, *UCL Huntington's Disease Centre, UCL Institute of Neurology, University College London*

DATA BLITZ PRESENTATIONS
10:30 AM – 10:45 AM *(5 minutes each)*

Safety and Efficacy of Inotersen in Patients with Hereditary Transthyretin Amyloidosis with Polyneuropathy (NEURO-TTR)
Annabel Wang, MD, *University of California, Irvine*

Neurofilament Light Protein in Blood as a Biomarker of Neurodegeneration in Huntington's Disease
Edward Wild, MD, PhD, *University College London Institute of Neurology, London, England*

Salivary Biomarkers for Huntington's Disease (HD)
Jody Corey-Bloom, MD, PhD, *University of California, San Diego*

10:45 AM – 11:00 AM **BREAK** | *Bay View & Grande Foyers*

11:00 AM – 12:00 PM **LUNCH** | *Bay View & Grande Foyers*

11:00 AM – 12:00 PM **INTERACTIVE LUNCH WORKSHOPS**

WORKSHOP 1
AN OVERVIEW OF GLOBAL NEUROLOGY CONTRIBUTIONS OF INTERNATIONAL OUTREACH COMMITTEE OF ANA*
Grande Ballroom C

Chair: José Biller, MD, FACP, FAAN, FANA, FAHA, *Loyola University Chicago Stritch School of Medicine*

Co-Chair: Igor Koralnik, MD, FANA, FAAN, *Rush Medical College*

This session will provide the roles and contributions of selected mem-bers of International Outreach Committee of ANA. The description will include various parts of the countries where we are involved in education of countries with limited economic resources, particularly African, South America, and south East Asian countries. The countries include Cambodia, Bhutan, Mongolia, and Tanzania. A detailed program will be provided. There will be discussion about fellowship funded by ANA, methodologies and disseminations to all Department chairs of Neurology for the would-be candidates for the fellowship position.

Learning Objectives
1. Enhance understand the responsibilities and contributions of the ANA International Outreach Committee
2. Acquire knowledge about clinical care, education activities, research, and future plans to enhance such activities in Zambia, South America and India
3. Obtain information about ANA scholarships for neurology residents, fellows and junior faculty that support research and education projects in developing countries and learn about methodologies for participation

11:00 AM – 11:12 AM
Neurology in Africa
Igor Koralnik, MD, FANA, FAAN, *Rush Medical College*

11:12 AM – 11:15 AM **Q&A**

11:15 AM – 11:27 AM
Neurology in South America
José Biller, MD, FACP, FAAN, FANA, FAHA, *Loyola University Chicago Stritch School of Medicine*

11:27 AM – 11:30 AM **Q&A**

11:30 AM – 11:42 AM
Future of Global Neurology and ANA Fellowship
Shrikant Mishra, MD, MS, FANA, FAAN, *University of Southern California Keck School of Medicine*

11:42 AM – 11:45 AM **Q&A**

11:45 AM – 11:57
Neurology in India
Sanjeev Thomas, MD, *Sree Chitra Tirunal Institute for Medical Sciences and Technology, Kerala, India*

11:57 AM – 12:00 PM **Q&A**

WORKSHOP 2
MEET THE NEUROLOGY DEPARTMENT CHAIRS* | *Nautilus 1*

Moderator: Allison Willis, MD, MS, *University of Pennsylvania*
Panelists: David M. Holtzman, MD, *Washington University in St. Louis*
Frances E. Jensen, MD, *University of Pennsylvania*
David M. Greer, MD, MA, FCCM, FAHA, FNCS, FAAN, FANA, *Boston University School of Medicine*
S. Thomas Carmichael, MD, PhD, *University of California, Los Angeles*
David Lee Gordon, MD, *University of Oklahoma Health Sciences Center*

Prominent chairs of neurology will discuss how they handle their position, including what's involved with being a chair; what the process is for attaining their position, and how to interact with chairs.

WORKSHOP 3
EXTRANIGRAL PARKINSON DISEASE AND PARKINSONISM
Nautilus 2

Chair: Rachel Saunders-Pullman, MD, MPH, MS, *Icahn School of Medicine at Mount Sinai*
Co-Chair: Beau Ances, MD, PhD, MSc, *Washington University in St. Louis*

The non-motor features of Parkinson Disease and Parkinsonism have emerged as challenging treatment aspects of these diseases. In particular, cognitive decline and dementia as well as psychiatric features frequently develop during the course of PD and atypical parkinsonism. Further, eye movement abnormalities may be seen with parkinsonism. The role of saccades and saccadic intrusions in understanding diagnosis and pathophysiology of specific parkinsonisms will be discussed.

Learning Objectives
1. Expand knowledge of underlying disorders of cognition in PD
2. Improve the understanding of overlap of cognitive syndromes in parkinsonism and how this impacts differential diagnosis and approach
3. Improve the understanding of eye movement abnormalities, particularly saccadic intrusions in parkinsonism

11:00 AM – 11:20 AM
Cognitive Disturbances in Parkinsonism
Irene Litvan, MD, FAAN, FANA, *University of California, San Diego*

11:20 AM –11:30 AM **Q&A**

11:30 AM –11:50 AM
Eye Movements in Parkinsonism—Focus on Saccadic Intrusions
Yoshikazu Ugawa, MD, PhD, *Fukushima Medical University, Fukushima City, Japan*

11:50 AM – 12:00 PM **Q&A**

WORKSHOP 4
THE EVOLVING FIELD OF CLINICAL NEUROGENETICS IN THE NEXT-GENERATION SEQUENCING ERA | *Nautilus 4*

Chair: Henry Paulson, MD, PhD, *University of Michigan*
Co-Chair: Brent Fogel, MD, PhD, *University of California, Los Angeles*

Speakers will discuss the current utility and usage of genetic and genomic diagnostic tools in outpatient neurology clinical practice.

Learning Objectives
1. Understand how advances in genetics are shaping current clinical neurology practice
2. Learn the indications, utilization, and yield of clinical genetic testing and ways to incorporate these into an outpatient neurology practice
3. Understand the various genetic and genomic diagnostic testing options available in an outpatient setting and discuss cost-effective strategies for their use

11:00 AM – 11:10 AM
Overview on Impact of Genomics on Neurology
Henry Paulson, MD, PhD, *University of Michigan*

11:10 AM – 11:13 AM **Q&A**

11:13 AM – 11:33 AM
Implementing a General Neurogenetics Clinic
Pedro Gonzalez-Alegre, MD, PhD, *University of Pennsylvania*

11:33 AM – 11:36 AM **Q&A**

11:36 AM – 11:56 AM
Genetic Testing in the Evaluation of Patients Presenting with Neurological Disease
Brent Fogel, MD, PhD, *University of California, Los Angeles*

11:56 AM – 12:00 PM **Q&A**

WORKSHOP 5
MEET THE EDITORS II* | *Nautilus 3*

Editors from the named journals will be available to discuss the submission process, publishing, tips, and other key topics of interest.

Panelists: S. Andrew Josephson, MD, *Editor,* JAMA Neurology; *Professor and Chair of Department of Neurology, University of California, San Francisco*
John "Jack" Kessler, MD, *Editor-in-Chief,* Annals of Clinical and Translational Neurology®; *Professor and Chair of Department of Neurology, Northwestern University*
Heather Wood, PhD, *Chief Editor,* Nature Reviews Neurology

11:00 AM – 12:00 PM **ADDITIONAL LUNCH WORKSHOP**

AUPN'S NETWORKING LUNCH FOR SMALL ACADEMIC DEPARTMENTS OF NEUROLOGY* | *Nautilus 5*

Moderator: Gretchen E. Tietjen, MD, *University of Toledo*

While all Neurology departments share some common attributes, there are challenges unique to smaller academic departments, including handling teaching and clinical service responsibilities, while protecting time for research and faculty development. This lunch, sponsored by the AUPN and hosted by Gretchen E. Tietjen, MD, Chair of Neurology at the University of Toledo since 1998, provides an opportunity for chairs of smaller departments to meet, discuss issues and share strategies.

12:15 PM – 2:15 PM **PLENARY SESSION** | MOLECULAR IMAGING IN NEUROLOGIC DISEASE | *Grande Ballroom AB*

Chair: Rebecca Gottesman, MD, PhD, *Johns Hopkins University*
Co-Chair: Gil Rabinovici, MD, *University of California, San Francisco*

With an ever-growing armamentarium of molecular imaging probes, neuroscientists have an unprecedented ability to assess brain pathophysiology in vivo. This session will provide an overview of clinical and research applications of PET/SPECT in neurological diseases. The role of tracers for glucose metabolism, the dopamine system, amyloid-beta, tau, synaptic markers and activated microglia in investigating disease mechanisms, therapeutic development and clinical care will be discussed.

Learning Objectives

1. Understand the range of molecular events that can be imaged with brain radioligands
2. Recognize appropriate clinical uses of molecular imaging in assessing neurological diseases
3. Appreciate applications of molecular imaging to the study of disease mechanisms and development of therapeutics

12:15 PM – 12:40 PM

Presentation of the 2017 Raymond D. Adams Lectureship Award
Imaging in Early Diagnosis of Alzheimer's Disease

Reisa Sperling, MD, *Harvard Medical School, Brigham and Women's Hospital, Massachusetts General Hospitall | 2011 Derek Denny-Brown Young Neurological Scholar | 2017 Raymond D. Adams Lectureship Recipient*

12:40 PM – 1:05 PM

Molecular Imaging of Parkinson's Disease: The Cholinergic Compensatory Hypothesis
Nicolaas I. Bohnen, MD, PhD, *University of Michigan & Veterans Affairs Medical Center (VAMC)*

1:05 PM – 1:30 PM

Synaptic Density Imaging of Neurologic Disease Using PET
Richard E. Carson, PhD, *Yale University*

1:30 PM – 1:55 PM

Molecular Imaging in Neuroinflammation
Martin Pomper, MD, PhD, *Johns Hopkins University*

DATA BLITZ PRESENTATIONS

1:55 PM – 2:10 PM *(5 minutes each)*

Amyloid Beta Stable Isotope Labeling Kinetics and Concentrations of Human Plasma are Highly Specific to CNS Amyloidosis
Randall Bateman, MD, *Washington University in St Louis*

Does APOE ε4 Have an Aβ-Independent Effect on Tau Pathology? Neuroimaging Investigations in Cognitively Normal Elders and Patients with Alzheimer's Disease
Renaud La Joie, PhD, *University of California, San Francisco*

Characterization of D2 Receptor Binding in Manganese-Exposed Workers by ^{11}C (N-methyl)benperidol Positron Emission Tomography
Susan Criswell, PhD, *University of California, San Francisco*

2:10 PM – 2:15 PM **Q&A and Discussion**

2:15 PM | **MEETING ADJOURNS**

IN MEMORIAM

HENRY J. M. BARNETT | OCTOBER 2016
BRUCE O. BERG | OCTOBER 2016
TERESITA ELIZAN | OCTOBER 2016
MAURICE R. HANSON | OCTOBER 2016
PEDRO PASIK | OCTOBER 2016
DANIEL S. SAX | OCTOBER 2016
ALLAN L. SHERWIN | OCTOBER 2016
CARMINE D. CLEMENTE | NOVEMBER 2016
PIERRE M. DREYFUS | NOVEMBER 2016
RICHARD F. MAYER | NOVEMBER 2016
DAVID A. DRACHMAN | DECEMBER 2016
DIETER JANZ | DECEMBER 2016
FLOYD J. BRINLEY | JANUARY 2017
LEWIS P. ROWLAND | MARCH 2017
THOMAS E. TWITCHELL | MARCH 2017
ARNOLD B. SCHEIBEL | APRIL 2017
JEAN H. THURSTON | APRIL 2017
DAVID E. KUHL | MAY 2017
ISABELLE RAPIN | MAY 2017
BERNARD TOMLINSON | MAY 2017
W. EUGENE STERN | JULY 2017

ANA 2017 SPEAKER ABSTRACTS

SATURDAY, OCTOBER 14

PRE-MEETING SYMPOSIUM:
Big Science & the BRAIN Initiative

Structure of the NIH BRAIN Initiative

Walter Koroshetz, MD
National Institute of Neurological Disorders and Stroke (NINDS)

Neuroscience research has brought remarkable insights about how individual brain cells and synapses work, but has had less success decoding how circuits of interconnected nerve cells carry out the complex higher functions of the brain - including how circuit dysfunction causes disability. Saddled with crude tools we are limited in our understanding of circuit dysfunction that underlies neuro/mental/substance abuse disorders. The NIH Brain Research for Advancing Innovative Neurotechnologies (BRAIN) Initiative was launched in September 2014, to support the development of an arsenal of new tools, multiscale maps and new knowledge of neural circuits in both health and disease. It has attracted scientists from bioengineering, mathematics, chemistry, as well as neuroscience to attack some very tough scientific issues, some of which are of such a scale that they can only be achieved through team science.

The architects of the NIH BRAIN Initiative were a high-level group of neuroscientists who embarked on a year-long strategic planning process culminating in BRAIN 2025: A Scientific Vision. This foundational planning document set forth seven high-level research priorities. These include: 1) identify and provide experimental access to all brain cell types; 2) generate circuit diagrams at multiple scales; 3) produce a dynamic picture of the functioning brain through large-scale monitoring of neural activity; 4) causally link brain activity to behavior with precise interventional tools; 5) discover the fundamental principles underlying complex information processing; 6) apply new technologies to understand human brain and treat its disorders; and 7) discover how dynamic patterns of neural activity are transformed into higher order brain functions. To achieve these bold aims, NIH has invested ~$285 million in 233 BRAIN awards to more than 400 investigators from September 2014 to date. This fall, NIH will launch a major effort to create a comprehensive 3D mouse reference brain cell atlas and lay the groundwork for similar efforts in the human brain.

A working group of NIH Council members and expert scientists provides ongoing input to the program directors of the BRAIN Initiative. Understanding how human brains function is uniquely imbued with ethical implications. NIH supports research to address and inform ethical issues arising from BRAIN projects. In addition, the BRAIN Initiative's external scientific advisory group is augmented by a standing Neuroethics Division.

Investments by the BRAIN Initiative have already resulted in an array of innovative, high-throughput approaches to identify and classify brain cells and has yielded a suite of invasive and non-invasive tools for interrogating and modulating circuits in animal-based research. Investigators are also applying new technologies for recording and modulating circuit activity in patients with Parkinson's, obsessive compulsive disorder, stroke, epilepsy, depression, and essential tremor. Exciting advances in brain-machine interfaces aim to restore movement to people who are paralyzed, and sight to visually-impaired individuals.

References

1. Understanding the brain through large, multidisciplinary research initiatives. Quaglio G, Corbetta M, Karapiperis T, Amunts K, Koroshetz W, Yamamori T, Draghia-Akli R. Lancet Neurol. 2017 Mar;16(3):183-184.
2. Worldwide initiatives to advance brain research. Grillner S, Ip N, Koch C, Koroshetz W, Okano H, Polachek M, Poo MM, Sejnowski TJ. Nat Neurosci. 2016 Aug 26;19(9):1118-22
3. What cell biologists should know about the National Institutes of Health BRAIN Initiative?

New Tools to Develop a Human Brain Cell Census

Arnold Kriegstein, MD, PhD
University of California, San Francisco

The developing human brain contains a huge number of cells whose identities have not yet been fully explored. We are using single cell approaches to establish an integrative definition of cell types in the developing human neocortex. Based on Single-cell RNA-Sequencing (scRNA-seq), we have identified over 20 molecularly distinct cell states during cortical development spanning known and novel features of cell diversity. Our single cell genomics analysis has revealed the molecular identity of a key human progenitor cell, termed an outer radial glia cell (oRG) (1). The developing human cortex contains a massively expanded outer subventricular zone that contains this specific subtype of radial glial cell, the oRG cell, that contributes to the developmental and evolutionary increase in cortical size and complexity of the human brain. We sequenced mRNA from single human progenitor cells for unbiased classification of cell identity and for detection of activated signaling pathways. We observed a functional coherence among genes enriched in oRG cells that relate to extracellular matrix production, epithelial-to-mesenchymal transition, and stem cell maintenance, suggesting mechanisms by which human oRG cells actively maintain the OSVZ as a neural stem cell niche (2).

Expanding multimodal analysis of single cells, we have recently developed a system that combines single-cell transcriptomics with physiological response characteristics to achieve a high dimensional characterization of cellular diversity. This approach has enabled the discovery of novel cell signaling networks active in progenitor cells and immature neurons. For example, our results indicate a switch in responsiveness as cells differentiate, from responses to purinergic and serotonergic stimuli in progenitors, to neuromodulatory transmitters in maturing neurons. While single cell analysis of cell diversity in the developing human brain is just beginning, the molecular insights have already informed informed a novel model of primate corticogenesis (3), suggested a relationship between oRG cells and glioblastoma, and helped identify the mechanism of Zika virus microcephaly (4).

References

1. Hansen DV, Lui JH, Parker PR, Kriegstein AR. Neurogenic radial glia in the outer subventricular zone of human neocortex. Nature 2010;464: 554-561.
2. Pollen, AA, Nowakowski, TJ, Chen, J, Retallack, H, Sandoval-Espinosa, C, Nicholas, CR, Shuga, J, Liu, SJ, Oldham, MC, Diaz, A, Lim, DA, Leyrat, AA, West, JA, and Kriegstein, AR. Molecular identity of human outer radial glia during cortical development. Cell 2015;163: 55-67.
3. Nowakowski TJ, Pollen AA, Sandoval-Espinosa C, Kriegstein AR. Transformation of the radial glia scaffold demarcates two stages of human cerebral cortex development. Neuron 2016;91:1219-27.

4. Retallack H1, Di Lullo E, Arias C, Knopp KA, Laurie MT, Sandoval-Espinosa C, Mancia Leon WR, Krencik R, Ullian EM, Spatazza J, Pollen AA, Mandel-Brehm C, Nowakowski TJ, Kriegstein AR, DeRisi JL. Zika virus cell tropism in the developing human brain and inhibition by azithromycin. Proc Natl Acad Sci USA. 2016 113:14408-14413.

Optogenetic, Tissue Clearing, and Viral Vector Approaches to Understand and Influence Whole-Animal Physiology and Behavior

Viviana Gradinaru, PhD
California Institute of Technology

Our research group at Caltech develops and employs optogenetics, tissue clearing, and viral vectors to gain new insights on circuits underlying locomotion, reward, and sleep. In particular we will discuss how bidirectional manipulation of mesopontine cholinergic cell bodies exerted opposing effects on locomotor behavior and reinforcement learning and how these effects were separable via limiting photostimulation to PPN cholinergic terminals in the ventral substantia nigra pars compacta or to the ventral tegmental area, respectively (Xiao et al, Neuron, 2016). Genetically encoded tools that can be used to visualize, monitor, and modulate mammalian neurons are revolutionizing neuroscience. However, use of genetic tools in non-transgenic animals is often hindered by the lack of vectors capable of safe, efficient, and specific delivery to the desired cellular targets. To begin to address these challenges, we have developed an in vivo Cre-based selection platform (CREATE) for identifying adeno-associated viruses (AAVs) that more efficiently transduce genetically defined cell populations (Deverman et al, Nature Biotechnology, 2016). As a first test of the CREATE platform, we selected for viruses that transduced the brain after intravascular delivery and found a novel vector, AAV-PHP.B, that transduces most neuronal types and glia across the brain. We also demonstrate how whole-body tissue clearing can facilitate transduction maps of systemically delivered genes (Yang et al, Cell, 2014; Treweek et al, Nature Protocols, 2016) and how non-invasive delivery vectors can be used to achieve dense to sparse labeling to enable morphology tracing (unpublished). Since CNS disorders are notoriously challenging due to the restrictive nature of the blood brain barrier, the recombinant vectors engineered to overcome this barrier can enable potential future use of exciting advances in gene editing via the CRISPR-Cas, RNA interference and gene replacement strategies to restore diseased CNS circuits. In addition to control of neuronal activity we need feedback on how exactly the tissue is responding to modulation. We have worked on two related topics: optical voltage sensors and imaging of single molecule RNA in cleared tissue. We used directed evolution of opsins to make them better at reporting action potentials (Flytzanis et al, Nature Communications, 2014). Changes in RNA transcripts can also report on activity history of brain circuits. Preserving spatial relationships while accessing the transcriptome of selected cells is a crucial feature for advancing many biological areas, from developmental biology to neuroscience. Collaborators and us recently reported on methods for multi-color, multi-RNA, imaging in deep tissues. By using single-molecule hybridization chain reaction (smHCR), PACT tissue hydrogel embedding and clearing and light-sheet microscopy we detected single-molecule mRNAs in ~mm-thick brain tissue samples (Shah et al, Development, 2016) and by rRNA labeling we mapped the identity and growth rate of pathogens in clinical samples (DePas et al, mBio, 2016). Together these technologies can enable high content anatomical and functional mapping to define changes that affect cell function and health body-wide.

References

1. K Chan, M Jang, B Yoo, A Greenbaum, N Ravi, W Wu, L Sánchez-Guardado, C Lois, S Mazmanian, B Deverman, V Gradinaru, Engineered adeno-associated viruses for efficient and noninvasive gene delivery throughout the central and peripheral nervous systems Nature Neuro 2017 Jun doi:10.1038/nn.4593.
2. Cho JR, Treweek JB, Robinson JE, Xiao C, Bremner LR, Greenbaum A, Gradinaru V. Dorsal Raphe Dopamine Neurons Modulate Arousal and Promote Waking by Salient Stimuli. Neuron 2017 Jun Advanced Online publication PMID: 28602690.
3. Deverman BE, Pravdo P, Simpson B, Banerjee A, Kumar, S.R., Chan K, Wu WL, Yang B, Gradinaru V. Cre-Dependent Capsid Selection Yields AAVs for Global Gene Transfer to the Adult Brain. Nature Biotechnol. 2016 Feb 34(2): 204-9. PMID: 26829320 PMCID in Process. F1000 Special Significance. Scientific American in Advances, Neuroscience.
4. Yang B, Treweek JB, Kulkarni RP, Deverman BE, Chen CK, Lubeck E, Shah S, Cai L, Gradinaru V. Single-cell phenotyping within transparent intact tissue through whole-body clearing. Cell. 2014 Aug 14;158(4): 945-58. PMCID: PMC4153367. Highlighted by NIH, Nature, Science, F1000. Scientific American 10 World Changing Ideas 2014. Nature Biotechnology News and Views.

New Tools for Monitoring and Analyzing Human Brain Activity/Neurology

Sydney Cash, MD, PhD
Massachusetts General Hospital

The Brain Research through Advancing Innovative Neurotechnologies® (BRAIN) Initiative and related endeavors have been major supporters of the development and utilization of innovative technologies that permit investigation of neural activity, in patients, at unprecedented scales. In this presentation, we will survey the history and current landscape of available approaches toward obtaining single neuron level information from patients as well as why this type of information sheds new light on the circuits involved in both normal and pathological brain activity (see [1], [2] for reviews). We will also examine how such microscale information complements larger, more meso or macroscale information with an eye toward reviewing developing technologies that extend the utility of more typical recording systems. We will also discuss the expanding range of innovative technologies that are being developed to advance the current state of the art. In addition, the data now being obtained with both micro and macroscale systems can quickly approach 1-3 Tb per patient. With new technologies, this amount of data is expected to increase substantially. As a result, such data sets bring with them both the power and problems of "big data" sets. This presentation will also discuss novel ways this kind of data is being analyzed, with an emphasis on deep or machine learning (see [3] for a review) and dimensionality reduction techniques (see [4] for a discussion of the later topic). This combination of big data analytics and neurotechnologies that can be safely and efficiently employed in patients is opening unprecedented views into the normal and pathological functioning of the human brain.

References

1. E. F. Chang, "Towards Large-Scale, Human-Based, Mesoscopic Neurotechnologies," Neuron, vol. 86, no. 1, pp. 68–78, 2015.
2. S. S. Cash and L. R. Hochberg, "The Emergence of Single Neurons in Clinical Neurology," Neuron, vol. 86, no. 1, pp. 79–91, Apr. 2015.
3. M. Helmstaedter, "The Mutual Inspirations of Machine Learning and Neuroscience," Neuron, vol. 86, no. 1, pp. 25–28, Apr. 2015.

4. J. P. Cunningham and B. M. Yu, "Dimensionality reduction for large-scale neural recordings," Nat. Neurosci., vol. 17, no. 11, pp. 1500–1509, Aug. 2014.

Microscopic Foundation of Multimodal Human Imaging

Anna Devor, PhD
University of California, San Diego

Today, most major programs in Neuroscience and Psychology have their own functional imaging systems and laboratories. We can assess hemodynamic changes with functional Magnetic Resonance Imaging (fMRI) and functional Near-Infrared Spectroscopy (fNIRS), broad regional electrical activity with magneto/electroencephalography (MEG/EEG), and metabolism/neurochemistry with Positron Emission Tomography (PET). And yet, despite this widespread adoption, the power of available human neuroimaging methods remains limited, leaving a gap between the macroscopic activity patterns available in humans and the rich, detailed view achievable in model organisms (1). Thus, a central challenge facing neuroscience today is leveraging these mechanistic insights from animal studies to accurately draw physiological inferences from noninvasive signals in humans, essentially asking the fundamental question: what information about neuronal circuit activity can we reliably determine from noninvasive functional imaging in humans? On the essential path towards this goal is the development of a detailed "bottom-up" forward model bridging neuronal activity at the level of cell-type-specific populations to noninvasive imaging signals (2, 3). The general idea is that specific neuronal cell types have identifiable signatures in the way they drive changes in cerebral blood flow, cerebral metabolic rate of O2 (measurable with quantitative functional Magnetic Resonance Imaging, fMRI), and electrical currents/potentials (measurable with magneto/electroencephalography, MEG/EEG) (4). This forward model would then provide the "ground truth" for the development of new tools for tackling the inverse problem – estimation of neuronal activity from multimodal noninvasive imaging data.

References

1. Devor A, et al. (2013) The challenge of connecting the dots in the B.R.A.I.N. Neuron 80(2): 270-274.
2. Uhlirova H, et al. (2016) The roadmap for estimation of cell-type-specific neuronal activity from non-invasive measurements. Philos Trans R Soc Lond B Biol Sci 371(1705).
3. Gagnon L, et al. (2015) Quantifying the microvascular origin of BOLD-fMRI from first principles with two-photon microscopy and an oxygen-sensitive nanoprobe. J Neurosci 35(8):3663-3675.
4. Uhlirova H, et al. (2016) Cell type specificity of neurovascular coupling in cerebral cortex. Elife 5.

SUNDAY, OCTOBER 15

PLENARY SESSION: Linking Circuits to Behavior: Promise & Perils

Towards Comprehensive Analysis of Neural Circuit Functions

Edward Boyden, PhD
Massachusetts Institute of Technology

To enable the understanding and repair of complex biological systems such as the brain, we are creating novel optical tools that enable molecular-resolution maps of large scale systems, as well as technologies for observing and controlling high-speed physiological dynamics in such systems.

First, we have developed a method for imaging large 3-D specimens with nanoscale precision, by embedding them in a swellable polymer, homogenizing their mechanical properties, and exposing them to water – which causes them to expand isotropically manyfold. This method, which we call expansion microscopy (ExM), enables scalable, inexpensive diffraction-limited microscopes to do large-volume nanoscopy, in a multiplexed fashion. We originally discovered that isotropic expansion was possible in 2015 (1), and since then have developed versions optimized for the visualization of protein (2) or RNA (3). ExM enables the visualization of large-scale circuits with molecular information and nanoscale precision, on ordinary microscopes.

Second, we have developed a set of genetically-encoded reagents, known as optogenetic tools, that when expressed in specific neurons, enable their electrical activities to be precisely driven or silenced in response to millisecond timescale pulses of light. Recently we have begun to work on ways to noninvasively stimulate neurons deep in the brain, without stimulating overlying areas (4). Our hope is that we can make 3-D, millisecond control of the brain feasible in animals and humans in the next few years.

Finally, we have collaboratively developed strategies to image and record fast physiological processes in 3-D with millisecond precision, and are using them to acquire neural activity maps with single cell resolution in living brain circuits. In this way we aim to enable the systematic mapping, control, and dynamical observation of complex biological systems like the brain.

References

1. Chen, F.*, Tillberg, P.W.*, Boyden, E.S. (2015) Expansion Microscopy, Science 347(6221): 543-548. (*equal contribution)
2. Tillberg, P.W.*, Chen, F.*, Piatkevich, K.D., Zhao, Y., Yu, C.-C., English, B.P., Gao, L., Martorell, A., Suk, H.-J., Yoshida, F., DeGennaro, E.M., Roossien, D.H., Gong, G., Seneviratne, U., Tannenbaum, S.R., Desimone, R., Cai, D., Boyden, E.S. (2016) Protein-retention expansion microscopy of cells and tissues labeled using standard fluorescent proteins and antibodies, Nature Biotechnology 34: 987–992. (*co-first authors)
3. Chen, F.*, Wassie, A.T.*, Cote, A.J., Sinha, A., Alon, S., Asano, S., Daugharthy, E.R., Chang, J.-B., Marblestone, A., Church, G.M., Raj, A., Boyden, E.S. (2016) Nanoscale Imaging of RNA with Expansion Microscopy, Nature Methods 13(8): 679-84. (*co-first authors)
4. Grossman N, Bono D, Dedic N*, Kodandaramaiah SB*, Rudenko A, Suk HJ, Cassara AM, Neufeld E, Kuster N, Tsai LH, Pascual-Leone A, Boyden ES (2017) Noninvasive Deep Brain Stimulation via Temporally Interfering Electric Fields, Cell 169(6):1029-1041. (*equal contribution)

Promise and Perils of Neural Circuit Manipulations

Bence Ölveczky, PhD
Harvard University

The development of increasingly sophisticated methods for manipulating neural activity is revolutionizing neuroscience. By probing how activity patterns in different types of neurons and circuits contribute to behavior these tools can test and inform mechanistic models of brain function and explain the roles of different neural circuit elements. But in embracing these new methods, we must recognize that they are sharp tools that should be used with caution. Indeed, how specific perturbations of neural activity affect the function of complex and interconnected neural networks, and how such experiments inform mechanistic models of brain function are often far from obvious. While there are no universal rules for designing and interpreting causality experiments in neuroscience, being cognizant of the complexities involved and explicit about the assumptions that underlie each

experiment is likely to improve the utility of these remarkable technologies. The purpose of my talk will be to highlight some of the issues I believe are important and relevant for neural circuit manipulations in behaving animals. In particular, I will describe experiments from my lab that compares and contrasts acute manipulations of neural activity, of the type enabled by optogenetics, with chronic manipulations, such as lesions (Otchy et al., 2015). We show that acute behavioral effects of sudden perturbations may over-estimate the functional role of the targeted area by interfering with processing in downstream circuits. These acute effects are also seen in the immediate aftermath of lesions, but they can subside spontaneously in the ensuing hours and days, a recovery process we speculate involve homeostatic regulation of neural activity in non-lesions, but initially affected circuits. Beyond informing the use of circuit manipulation tools, these results also speak to how the brain recovers after injury.

Reference

Otchy, T.M., Wolff, S.B.E., Rhee, J.Y., Pehlevan, C., Kawai, R., Kempf, A., Gobes, S.M.H., and Ölveczky, B.P. (2015). Acute off-target effects of neural circuit manipulations. Nature 528, 358–363.

Iterative Strategies to Refine and Optimize DBS for Depression

Helen Mayberg, MD
Emory University

It is now more than twelve years since the first study of Deep Brain Stimulation (DBS) for treatment resistant depression (TRD) (1). While multiple centers, testing this and other targets, have replicated these initial positive findings, pivotal industry clinical trials have proven unsuccessful (2). Strategies to understand these contradictory outcomes are now a priority in the field, particularly with continued interest in development of more advanced invasive neurotechnologies for depression and other treatment refractory neuropsychiatric disorders. Given emerging evidence of sustained long-term positive outcomes despite short term failed trials, a systematic assessment of variables contributing to the observed response heterogeneity are critically needed.

To this end, the refinement of DBS of the subcallosal cingulate (SCC) for TRD is illustrative. Until recently, surgical implantation of DBS electrodes relied on high-resolution structural images to localize the SCC grey matter-white matter border followed by trial-and-error behavioral testing of chronic stimulation at individual contacts (1, 3-4). Clinical response however, may be optimized by more precise targeting along specific white matter tracts, as evidenced by recent diffusion tensor imaging and tractography analyses of DBS responders and non-responders (5). Based on these retrospective findings, standardization of the surgical procedure has now been improved by use of individualized maps to prospectively guide electrode targeting (6). The use of close clinical monitoring and systematic long-term follow-up using small experimental cohorts outside of industry-sponsored trials has further provided new perspectives on the time course, trajectory and sustainability of DBS-mediated effects (7). Next-generation devices additional allow ongoing recordings of local field potentials during acute and chronic stimulation enabling real-time electrophysiological measurements of the time course, trajectory and sustainability of DBS-mediated antidepressant effects. This strategic integration of combined multimodal neuroimaging, behavioral and neural recordings offers a unique opportunity to link first person experiences to changes in brain state towards a more comprehensive understanding of illness and recovery at the neural level.

References

1. Mayberg, HS, Lozano A, Voon V, et al. DBS for TRD. Neuron, 2005; 45: 651-660.
2. Fins JJ, Kubu CS, Mayberg HS, et al. Being open minded about neuromodulation trials: Finding success in our "failures". Brain Stimulation. 2017; 10:181-186.
3. Kennedy SH, Giacobbe P, Rizi SJ, et al. DBS for TRD: Follow-up after 3 to 6 years. Am J Psych 2011; 168:502-10.
4. Holtzheimer PE, Kelley ME, Gross RE, et al. SCC DBS for treatment resistant unipolar and bipolar depression. Archives Gen Psychiatry 2012; 69:150-158.
5. Riva-Posse, Choi KS, Holtzheimer PE, et al. Defining Critical White Matter Matter Pathways Mediating Successful SCC DBS for TRD. Biol Psychiatry 2014; 76: 963-9.
6. Riva-Posse P, Choi KS, Holtzheimer PE, et al. A connectomic approach for SCC DBS surgery: prospective targeting in TRD. Molecular Psychiatry 2017 online April 11.
7. Crowell AL, Garlow SJ, Riva-Posse P, Mayberg HS. Characterizing the therapeutic response to DBS for TRD; a single center long-term perspective. Front Integr Neurosci 2015; 15 June

The Brain-Behavior Relationship: Understanding Versus Causality

John Krakauer, MD
Johns Hopkins University

The recent emphasis on and excitement about circuit dissection in neuroscience is driven largely by the ever more sophisticated tools available. Unfortunately, thinking about what these tools offer in terms of understanding has lagged behind the rush to use them. The core issue is that the new approaches available are predicated on a totalizing, and often unexamined, belief in the reductionist program for understanding the link between the brain and behavior. The goal of this program is causal explanation through interventions on neural circuits that allow testing of necessity and sufficiency claims. As we have recently argued (1), this reductionist view, although perfectly respectable and indeed essential for therapeutic goals, is not equivalent to the type of understanding achieved through careful theoretical and experimental decomposition of behavior. Specifically, detailed characterization of tasks and the behavior they generate allows discovery of component processes and their underlying algorithms. In most cases, circuit analysis depends on and should come after behavioral work. Even when the goal of research is to come up with neural targets for therapeutic intervention you still need to know what the circuit is computing, to have a fine-grained behavioral outcome measure, and have a conceptually grounded reason to believe that the behavioral phenotype in the animal model maps onto the human one.

Reference

1. John W. Krakauer, Asif A. Ghazanfar, Alex Gomez-Marin, Malcolm A. MacIver, David Poeppel. Neuroscience Needs Behavior: Correcting a Reductionist Bias. Neuron (2017) Volume 93, Issue 3, p480–49

PLENARY SESSION: Derek Denny-Brown Young Neurological Scholar Symposium

Instructive, Pragmatic, and Successful Trials in Acute Brain Injury: Making Intracerebral Hemorrhage the LEAST Devastating Form of Stroke

Kevin N. Sheth, MD, FAHA, FCCM, FNCS, FAAN, FANA
Yale University School of Medicine | 2017 Derek Denny-Brown Young Neurological Scholar Award in Clinical Science Recipient

Specificity is of paramount importance in stroke translation, particularly when we attack new biological targets, aim to back translate and work with an unknown effect size. Early work from our group demonstrated that intracranial pressure is often not the primary cause of neurological deterioration after severe brain injury and that tissue swelling was a more promising target. TRPM4-SUR1 was implicated in the development of brain swelling and glyburide appears to block this channel, prevent swelling, and improve outcome. The identification of a proof of principle population was critical for effective translation (1). Similarly, biological targets for secondary brain injury such as S1P have emerged in patients with intracerebral hemorrhage (ICH). S1P is a recognized target for fingolimod in multiple sclerosis where it plays a role in lymphocyte egress (in addition to other effects). S1P agonists after ICH may reduce perihematomal edema, secondary injury, and improve outcomes. In a critically ill population that may be susceptible to bradycardia, a recognized adverse effect of S1P agonists, a "brain selective" S1P modulator is required. To adequately test the hypothesis as to whether or not this target can improve biological or clinical consequences of ICH, early phase studies must be designed to exclude ICH characteristics (such as intraventricular hemorrhage) that may obscure any signal of benefit (2). In order to demonstrate biological or clinical effect, a small, specific population may be required in order to detect biological activity.

Pragmatic trials should consider interventions that have a large effect size. A focus of our group is to test the application of therapies to populations of brain injury survivors who have been previously neglected. Anticoagulant therapy has been proven to prevent 60-80% of ischemic strokes that would otherwise occur from atrial fibrillation (AF). However, patients with atrial fibrillation AND a history of intracerebral hemorrhage have been excluded from clinical trials. Whether to use anticoagulation in these patients represents a major knowledge gap and clinical dilemma. Our group and others have shown that anticoagulation in ICH survivors with AF is associated with improved outcome (3). A major determinant of ICH recurrence is location. Preliminary data from several multicenter multinational cohorts have found that anticoagulation is strongly associated with a decreased risk of ischemic stroke and overall mortality with no associated increased risk of recurrent hemorrhagic stroke, even in patients with lobar ICH. These results are highly susceptible to confounding, even after adjustment of relevant factors, but they do provide strong data to support a prospective, randomised and blinded study of anticoagulation versus aspirin in ICH survivors with AF.

Getting to Successful Trials in ICH. There is no efficacious treatment approach to improve outcomes in ICH, the most devastating form of stroke. This context is relevant for defining acceptable definitions of victory, as demonstrated recently (4). An improved understanding of the underlying biology or the pursuit of large effect sizes, when coupled with clinical trial designs that are tailored to enhance efficacy, will lead to successful candidates for clinical practice.

References

1. Sheth KN, Elm JJ, Molyneaux BJ, Hinson H, Beslow LA, Sze GK, Ostwaldt AC, del Zoppo G, Simard JM, Jacobson S, Kimberly WT. Safety and efficacy of intravenous glyburide on brain swelling after large hemispheric infarction (GAMES-RP): a randomised, double-blind, placebo controlled phase 2 trial. Lancet Neurol, 2016; 15(11): 1160-9.
2. Urday S, Kimberly WT, Beslow LA, Vortmeyer AO, Selim MH, Rosand J, Simard JM, Sheth KN. Targeting secondary injury in intracerebral hemorrhage – perihematomal edema. Nat Rev Neurol, 2015; 11(2): 111-22.
3. Murthy SB, Gupta A, Merkler AE, Navi BB, Mandava P, Iadecola C, Sheth KN, Hanley DF, Ziai WC, Kamel H. Restarting anticoagulant therapy after intracranial hemorrhage: A Systematic Review and Meta-Analysis. Stroke, 2017; 48(6): 1594-600.
4. Hanley DF, Lane K, McBee N, Ziai W, Tuhrim S, Lees KR, Dawson J, Gandhi D, Ullman N, Mould WA, Mayo SW, Mendelow AD, Gregson B, Butcher K, Vespa P, Wright DW, Kase CS, Carhuapoma JR, Keyl PM, Diener-West M, Muschelli J, Betz JF, Thompson CB, Sugar EA, Yenokyan G, Janis S, John S, Harnof S, Lopez GA, Aldrich EF, Harrigan MR, Ansari S, Jallo J, Caron JL, LeDoux D, Adeoye O, Zuccarello M, Adams HP, Rosenblum M, Thompson RE, Award IA, CLEAR III Investigators. Thrombolytic removal of intraventricular hemorrhage in treatment of severe stroke: results of the randomized, multicentre, multiregion, placebo-controlled CLEAR III trial. Lancet, 2017; 389 (10069): 603-11.

Reducing the Burden of Stroke in a Disadvantaged Community

Lesli E. Skolarus, MD, MS

University of Michigan | 2017 Derek Denny-Brown Young Neurological Scholar Award Recipient in Clinical Science

Flint is an urban postindustrial city with a population of about 100,000 people. The population is predominately Black and has high rates of poverty, violent crime and poor health outcomes. Tragedy struck Flint in 2014 when a cost saving strategy changed the city's water supply creating a cascade that ultimately resulted in lead leaching out of plumbing and into the city's drinking water. Flint has one of the highest incidence rates of stroke in Michigan and the lowest acute stroke treatment rate of any community of its size in the US. 1 Thus, there is a substantial community need for stroke prevention and increasing stroke preparedness. Guided by health behavior theory, Theory of Planned Behavior and the Self-Determination Theory, and through a community based participatory research approach, a form of community engagement, my research has focused on improving health equity through stroke prevention and stroke preparedness in Flint, Michigan. At the request of the Flint community to focus on stroke primary prevention, we designed and tested, Reach Out, a mobile health, self-monitoring and feedback intervention to reduce high blood pressure. The first trial was conducted in Black churches and to expand our ability to reach the working age population, the second trial was conducted in an Emergency Department. 2 These trials supported the feasibility and acceptability as well as suggest the efficacy of Reach Out. We are currently testing Reach Out in a randomized, controlled, factorial design clinical trial performed in a safety net Emergency Department in Flint and in partnership with the local Federally Qualified Health Center. My research has also focused on Stroke Preparedness, the ability to recognize stroke and the intention to respond immediately by calling emergency medical services, a crucial step to increasing the number of stroke patients who are eligible for acute stroke treatments. Academic and community partners designed and tested Stroke Ready, a peer-led, workshop-based, health behavior intervention to increase stroke preparedness among African American youth and adults in Flint. Due to the lack of psychometrically sound intermediate endpoints for stroke preparedness intervention, I also developed the video Stroke Action Test, a series of simulated patient video vignettes in English and Spanish, that is a valid and seemingly reliable measure of stroke preparedness. 3 We showed that Stroke Ready increased stroke preparedness. 4 Currently, we are implementing and testing the socio-ecologically motivated, theory-based, culturally sensitive Stroke Ready program, that includes both hospital and community interventions to increases acute stroke treatment rates in Flint. I believe that every neurologist and neuroscientist can contribute in unique ways to promote health equity.

References

1. Skolarus LE, Meurer WJ, Shanmugasundaram K, Adelman EE, Scott PA, Burke JF. Marked Regional Variation in Acute Stroke Treatment Among Medicare Beneficiaries. Stroke 2015;46:1890-6.
2. Skolarus LE, Cowdery J, Dome M, et al. Reach Out Churches: A Community-Based Participatory Research Pilot Trial to Assess the Feasibility of a Mobile Health Technology Intervention to Reduce Blood Pressure Among African Americans. Health Promotion Practice 2017:1524839917710893.
3. Skolarus LE, Mazor KM, Sánchez BN, Dome M, Biller J, Morgenstern LB. Development and Validation of a Bilingual Stroke Preparedness Assessment Instrument. Stroke 2017:STROKEAHA. 116.015107.
4. Skolarus LE, Zimmerman MA, Bailey S, et al. Stroke Ready Intervention: Community Engagement to Decrease Prehospital Delay. Journal of the American Heart Association 2016;5:e003331.

Modeling C9ORF72 Disease: A Crucial Step for Therapeutic Development in ALS and Frontotemporal Dementia

Clotilde Lagier-Tourenne MD, PhD
Massachusetts General Hospital

Expanded GGGGCC repeats in a non-coding region of the C9ORF72 gene represent the most common genetic cause of amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD). Several pathogenic mechanisms have been proposed including loss of function from reduced expression of C9ORF72 and/or toxicity derived from the expansion-containing RNAs. Accumulation of nuclear RNA foci and dipeptide repeat proteins (DPRs) aberrantly translated from the repeat-containing RNAs are pathological hallmarks of the disease. Recent efforts to identify modifiers of C9ORF72 RNA and dipeptides toxicity have uncovered compromised nucleocytoplasmic transport as a central disease mechanism in C9ORF72 ALS/FTD. Notably, age-dependent disruption of nuclear integrity is also a major component of Huntington's disease, another repeat expansion neurological disorder (1, 2).

By generating several C9ORF72 mouse models, we identified gain of toxicity as a central disease mechanism and established antisense oligonucleotides (ASO)-mediated degradation of expanded RNAs as a significant therapeutic approach for ALS/FTD (3). Indeed, hexanucleotide expansions caused age-, repeat length- and expression level-dependent accumulation of RNA foci and DPRs, accompanied by loss of hippocampal neurons, increased anxiety, and impaired cognitive function in transgenic mice expressing 450 repeats. Antisense oligonucleotides (ASOs) were identified which reduce GGGGCC-containing nuclear foci without altering overall C9ORF72 RNA levels in patient cells (4). By contrast, siRNAs failed to reduce nuclear RNA foci despite marked reduction in overall C9ORF72 RNAs. In mice, single dose intracerebroventricular injection of ASOs that target repeat-containing RNAs produced sustained reductions in RNA foci and dipeptide-repeat proteins, and ameliorated behavioral deficits. These findings represent strong foundation for further testing the therapeutic potential of ASOs in C9ORF72 ALS/FTD patients.

References

1. Gasset-Rosa F., Chillon-Marinas C., Goginashvili A., et al. (2017). Polyglutamine-expanded Huntingtin exacerbates age-related disruption of nuclear integrity and nucleocytoplasmic transport. Neuron 94(1):48-57.
2. Grima J., Daigle G., Arbez N., et al. (2017). Mutant Huntingtin disrupts the nuclear pore complex. Neuron 94(1): 93-107.
3. Jiang J., Zhu Q., Gendron TF., et al. (2016). Gain of toxicity from ALS/FTD-linked repeat expansions in C9ORF72 is alleviated by antisense oligonucleotides targeting GGGGCC-containing RNAs. Neuron 90(3):535-550.
4. Lagier-Tourenne C., Baughn M., Rigo F., et al. (2013). Targeted degradation of sense and antisense C9orf72 RNA foci as therapy for amyotrophic lateral sclerosis and frontotemporal dementia. PNAS 110:E4530-9.

Connecting Protein Quality Control Pathways in Skeletal Muscle and Muscle Disease

Conrad C. Weihl, MD, PhD
Washington University in St. Louis | 2017 Derek Denny-Brown Young Neurological Scholar Award Recipient in Basic Science

Protein aggregation underlies the pathogenesis of many neurodegenerative diseases such as dementia and motor neuron disease. Similarly, protein aggregates are a pathologic hallmark in a diverse and expanding group of rare muscle diseases termed protein aggregate or rimmed vacuolar inclusion body myopathies (RV-IBM). These myopathies are unified by the presence of rimmed vacuoles, ubiquitinated proteins, TDP-43 inclusions and autophagic proteins suggesting common pathogenic pathways [1]. Indeed, RV-IBMs are due to mutations in proteins associated with converging aspects of the protein quality control pathway. Mutations in VCP and SQSTM1 cause an RV-IBM syndrome associated with ALS/FTD and disrupt ubiquitin dependent autophagic protein degradation. VCP, in particular, participates in ubiquitin dependent endolysosomal sorting and the clearance of damaged lysosomes [2]. Mutations in the RNA binding proteins HNRNPA2B1, HNRNPA1 and TIA1 that all contain low complexity and aggregate prone domains also cause RV-IBM associated with ALS/FTD [3]. Mutations in these RNA binding proteins disrupt stress granule clearance -- serving as sites for TDP-43 aggregation. Mutations in molecular chaperones such DNAJB6 and BAG3 also cause RV-IBM [4]. Mutations in these proteins impair the organization and proper folding of sarcomeric proteins leading to myofibrillar disarray. Their dysfunction requires interactions with other protein chaperones and abrogating these interactions maybe therapeutic. More recently, we have explored the pathogenesis of sporadic RV-IBM (sIBM). sIBM is the most common cause of acquired muscle weakness in patients older than 55. Some sIBM patients carry rare mutations in VCP and SQSTM1 suggesting they pathogenically overlap with hereditary forms of RV-IBM. Using a combined proteomic/genetic approach, we further identified rare variants in another autophagic adaptor protein, FYCO1, that were overrepresented in sIBM patients as compared with controls [5]. These studies demonstrate the connection between multiple protein quality control pathways in skeletal muscle disease. Moreover, they illustrate the pathomechanistic intersection between RV-IBM and neurodegeneration.

References

1. Weihl, C.C. and A. Pestronk, Sporadic inclusion body myositis: possible pathogenesis inferred from biomarkers. Curr Opin Neurol, 2010. 23(5): 482-8.
2. Meyer, H. and C.C. Weihl, The VCP/p97 system at a glance: connecting cellular function to disease pathogenesis. J Cell Sci, 2014. 127(Pt 18): 3877-83.
3. Kim, H.J., et al., Mutations in prion-like domains in hnRNPA2B1 and hnRNPA1 cause multisystem proteinopathy and ALS. Nature, 2013. 495(7442): 467-73.
4. Harms, M.B., et al., Exome sequencing reveals DNAJB6 mutations in dominantly-inherited myopathy. Ann Neurol, 2012. 71(3): 407-16.
5. Guttsches, A.K., et al., Proteomics of rimmed vacuoles define new risk allele in inclusion body myositis. Ann Neurol, 2017. 81(2): 227-239.

Targeting a Core Axonal Degeneration Program to Treat Vincristine and Bortezomib-Induced Axonal Degeneration

Stefanie Geisler, MD
Washington University in St. Louis | 2017 Wolfe Neuropathy Research Prize Recipient
Co-Authors: Ryan A. Doan, Xin Huang, Jeffrey Milbrandt and Aaron DiAntonio

Peripheral axonal polyneuropathy is a common, potentially dose-limiting side effect of many chemotherapeutic agents despite disparate mechanisms of action, suggesting that the axon destructive properties of various chemotherapies converge on a common axonal degeneration (AxD) program. Components of such a putative program had until recently been largely unknown, until others and we discovered that genetic deletion of SARM1 dramatically protects axons from degeneration after axotomy and prevents neuropathy induced by the commonly used chemotherapeutic agent vincristine in a mouse model. It remains unknown, however, whether the same upstream regulators and downstream effectors of SARM1 act in vincristine-induced axon degeneration and axotomy, and whether the protective effects of SARM1 deletion are also realized by chemotherapeutic agents with different mechanisms of action. To address these questions, we used cultured mouse dorsal root ganglion neurons and two chemotherapeutic agents, vincristine and bortezomib (BTZ). Vincristine acts by stabilizing tubulin polymerization and interfering with intracellular trafficking, whereas BTZ inhibits the proteasome. We demonstrate that genetic deletion of SARM1 strongly decreases not only vincristine-induced neurite degeneration, but also axonal destruction following administration of BTZ. In axotomy, SARM1 is activated by a loss of NMNAT and acts through catastrophic decrease of NAD+. As in axotomy, neurite degeneration after vincristine and BTZ is preceded by loss of NAD+. Maintaining NAD+ levels by overexpressing nicotinamide riboside kinase (NRK) and supplementation with NR strongly protect from both vincristine and BTZ-induced degeneration. Furthermore, as in axotomy, overexpressing cytosolic NMNAT1 in the axon prevents degeneration following both vincristine and BTZ. However, while targeting with pharmacological inhibitors the same MAP-kinase pathway that regulates SARM1 in axotomy protects from vincristine-induced AxD, it does not decrease BTZ-induced AxD. BTZ induced degeneration instead is transcriptionally regulated and can be blocked by over-expressing the anti-apoptotic factor BCL-XL. These findings indicate that different upstream pathways converge on a core axonal degeneration program which consists of NMNAT, SARM1 and NAD+ and which mediates both acute and chronic axonal degeneration. Excitingly, we are able to inhibit this program and, thus pathological AxD in vitro, by virus mediated expression of a SARM1-dominant/negative mutant. We suggest that targeting the core axonal degeneration pathway either by directly inhibiting SARM1 or maintaining NAD+ through supplementation may have great therapeutic value in the prevention of multiple variants of chemotherapy-induced neuropathy and possibly other peripheral polyneuropathies.

MONDAY, OCTOBER 16

PLENARY SESSION | PRESIDENTIAL SYMPOSIUM: Translational Neuroscience Research to Improve Outcomes for the 'Bottom Billion'

On the Causation and Prevention of Konzo – A Distinct Upper Motor Neuron Disease Associated With Food (Cassava) Cyanogenic Poisoning In Sub-Saharan Africa

Desire Tshala-Katumbay, MD, MPH, PhD, FANA, et. al.
Oregon Health & Science University and Kinshasa School of Medicine

Research consortium by *Oregon Health & Science University, USA* (PI: Tshala-Katumbay); *Michigan State University, USA* (co-PI: Michael Boivin) and *National Institute of Biomedical Research, Congo-Kinshasa* (co-PI: Mumba Ngoyi); NIH (NIEHS/FIC) grant R01ES019841.

A substantial body of evidence indicates that chronic dietary reliance of foodstuffs from insufficiently processed cassava results in outbreaks of konzo, a distinct spastic paraparesis in children and women of childbearing age in sub-Saharan Africa[1]. Major outbreaks continue to occur in Congo and, for the first time, in Zambia (http: //www.parliament.gov.zm/). We also showed that subjects may present with a large spectrum of deficits ranging from subtle fine motor dysfunction to deficits in cognition[2].

Urinary level of thiocyanate (U-SCN) is indicative of exposure to cassava cyanogens in konzo-affected communities. However, this marker of cyanogenic exposure may not correlate with the extent of the neurological deficits in contrast to serum 8,12-iso-iPF2□-VI isoprostane (marker of lipid peroxidation i.e. oxidative damage)[3] and carbamoylated albumin fragments KVPQVSTPTLVEVSR (residues 438-452) and LDELRDEGKASSAK (residues 206-219) (markers of carbamoylation indicating protein damage). Neurological impairments may not be mediated by genetic polymorphisms in cyanide detoxification enzymes such as thiosulfate sulfur transferase, mercaptopyruvate sulfur transferase, or redox regulator Cu/Zn superoxidase dismutase-1 (Manuscript in preparation).

The continued rise in the number of outbreaks and that of affected countries, together with the recent evidence for cognition deficits in children from konzo areas, suggests that the overall burden of cassava neurological disease has been underestimated. We recently demonstrated the effectiveness of a novel cassava processing method (a.k.a. "wetting method") in the prevention of konzo in DRC. The method was taught to rural women by health professionals from the Ministry of Health to efficiently minimize the amount of cyanogens in cassava prior to human consumption[4]. A task-shifting parading is now being proposed to assess the effectiveness of a peer-led model of intervention (women training other women in the WTM) in a village-cluster randomized non-inferiority trial to scale up prevention efforts.

References

1. Tshala-Katumbay, D., et al., Cassava food toxins, konzo disease, and neurodegeneration in sub-Sahara Africans. Neurology, 2013. 80(10): 949-51.
2. Boivin, M.J., et al., Neuropsychological effects of konzo: a neuromotor disease associated with poorly processed cassava. Pediatrics, 2013. 131(4): e1231-9.
3. Makila-Mabe, B.G., et al., Serum 8,12-iso-iPF2alpha-VI isoprostane marker of oxidative damage and cognition deficits in children with konzo. PLoS One, 2014. 9(9): e107191.
4. Banea, J.P., et al., Effectiveness of wetting method for control of konzo and reduction of cyanide poisoning by removal of cyanogens from cassava flour. Food Nutr Bull, 2014. 35(1): 28-32.

From Retroviruses to Herpesviruses and Beyond: Addressing CNS Infections and Global Health in Peru

Joseph Zunt, MD, MPH
University of Washington

My research in Peru started in 1996 as an infectious diseases fellow examining the neurologic manifestations of HTLV-1 infection upon female sex workers (FSW) (1). This research expanded to compare the epidemiology of HTLV-1, HTLV-2, HIV and retroviral co-infections in the

general population, in indigenous populations, in men who have sex with men, and in children (2). This research lead to projects examining other sexually transmitted infections, such as human papillomavirus – leading to improved testing and treatment of marginalized populations, as well as research examining cervical cancer screening and treatment and qualitative work to define stigma associated with cancer affecting women (3). We then developed a nationwide surveillance in five Peruvian cities to define etiologies of meningitis and encephalitis – with the anticipated finding that the majority of identified causes of encephalitis were due to herpes simplex virus (4).

Since 2004, I have mentored 65 US and Peruvian medical students and physicians who have completed 11-month research projects in Peru – most culminating in publications and many in academic and leadership positions (5). Over the first six years of the NIH Fogarty Global Health Fellows and Scholars Program, our Northern Pacific Global Health Consortium has supported training of 131 doctoral students and post-doctoral trainees in 8 countries. Through NIH-supported programs, I have participated in the development of syllabi, workshops and hybrid on-line/in-person training to improve research methodology and priorities, research ethics, capacity building and mentorship training offered across the globe (6).

References

1. Zunt JR, Montano SM, Beck I, et al. HTLV-I Associated Myelopathy/ Tropical Spastic Paraparesis: Viral load and muscle tone are correlated. J Neurovirology 2006;12:466-72.
2. Stewart J, Heitzinger K, Pollett S, et al. The changing epidemiology of HTLV-1 infection in Peruvian female sex workers, 1993-2010. Am J Trop Med Hygiene 2017 Feb 8;96(2):373-379.
3. Stewart J, Calderon M, Hathaway A, et al. Human Papillomavirus among male clients of female sex workers soliciting sex in brothels in Peru. Int J of STD and AIDS 2017, Jan 1 [Epub ahead of print].
4. Montano SM, Mori N, Nelson CA, et al. Herpes simplex virus encephalitis in Peru: a multicentre prospective study. Epidemiol Infect 2016;6:1-6.
5. Zunt JR, Chi BH, Heimburger DC, et al. The NIH Fogarty International Center Global Health Scholars and Fellows Program: collaborating across five consortia to strengthen research training. Am J Trop Med Hygiene 2016 Sep 7;95(3):728-34.
6. John CC, Carabin H, Montano SM, et al. Global research priorities for infections that affect the nervous system. Nature 2015 Nov 19;527(7578):S178-86.
7. Cottler LB, Zunt JR, Weiss B, et al. Building Global Capacity for Brain Disorders Research. Nature 2015; Nov 19;527(7578): S207-13.

Neuroprotective Studies in Cerebral Malaria: Can Africa's Efforts Inform U.S. Neurology?

Gretchen Birbeck, MD, MPH, DTMH, FAAN
University of Rochester | 2017 Soriano Lectureship Award Recipient

Despite global eradication efforts, malaria remains a public health threat to almost half of the world's population. Case fatality rates in severe malaria are 15-25% (1), but the burden of neurologic morbidity in child survivors of severe malaria actually exceeds mortality with ~1/3rd of pediatric cerebral malaria (PCM) survivors developing sequelae including neuro-disabilities, behavioral disorders, cognitive impairment, and epilepsy. (2-4) Malaria brain injuries occurred in ~400,000 African children in 2015 and neuroprotective interventions should be a major public health priority in endemic regions. Neuroprotective clinical trials conducted in the U.S. for stroke, traumatic brain injury and other conditions have proven challenging (5), but several characteristics of PCM make it an ideal human disease for studying potential neuroprotective agents and management strategies. Clinically, PCM is remarkably homogenous with a predictable clinical course and outcome frequencies. Adverse neurologic outcomes are common. The latency period between the malaria injury and delayed effects, such as epilepsy and behavioral disorders, is relatively brief. And finally, potentially modifiable risk factors for neurologic sequelae have been identified that offer targets for interventions—targets that are feasible and scalable in resource limited settings. When these interventions are studied systematically in clinical trials, the findings may offer important insights to neuroscientists and neurologists globally. Do 'seizures beget seizures' or are acute symptomatic seizures simply indicative of an already completed injury? Prospective PCM studies optimizing seizure management with newer, safer, antiepileptic agents could answer this question. Can normothermia, rather than hypothermia, offer neuroprotection during/after an acute brain injury? Studies of aggressive antipyretics in PCM could tell us. And within the context of interventions with affordable agents such as magnesium sulfate, serial imaging and small molecule studies could offer critical insights into human epileptogenesis, something almost impossible to otherwise study. Collaborative malaria research engaging clinicians, scientists and stakeholders across economic and geographic divides can advance science with global benefits.

References

1. WHO. World Malaria Report 2016. Available at http: //www.who.int/malaria/publications/world-malaria-report-2016/report/en/. Accessed 8April2017, 2017.
2. Birbeck GL, Molyneux ME, Kaplan PW, et al. Blantyre Malaria Project Epilepsy Study (BMPES) of neurological outcomes in retinopathy-positive paediatric cerebral malaria survivors: a prospective cohort study. Lancet Neurol 2010;9:1173-1181.
3. Idro R, Gwer S, Kahindi M, et al. The incidence, aetiology and outcome of acute seizures in children admitted to a rural Kenyan district hospital. BMC pediatrics 2008;8:5.
4. John CC, Bangirana P, Byarugaba J, et al. Cerebral malaria in children is associated with long-term cognitive impairment. Pediatrics 2008;122:e92-99.
5. DeGraba TJ, Pettigrew LC. Why do neuroprotective drugs work in animals but not humans? Neurol Clin 2000;18:475-493.

Unleashing the Power of Mobile Devices and Tele-Consultations for People Living with Epilepsy

Farrah J. Mateen, MD, PhD
Massachusetts General Hospital and Harvard Medical School

Epilepsy occurs predominantly in low- and middle-income countries (LMICs), affecting ~1 percent of the global population or ≥60 million people. The number of people with epilepsy in LMICs who access care is generally low due to multiple factors: a higher level of poverty among people with epilepsy, a dearth of specialized healthcare workers, stigma impacting care seeking behavior, limited access to health technologies, fewer antiepileptic drugs including medication "stock outs," and seizure related limits on transportation to receive care. In 2017, smartphones and teleneurology offer a practical solution to distribute neurotechnologies to populations (1). There are 3.9 billion smartphone owners globally, making smartphones the first and often only way that people in LMICs interface with the internet. By 2022, there will be 6.8 billion smartphone owners and 8.9 billion mobile subscriptions. Market expansion for mobile phones is highest in LMICs, where 80% of all new smartphone subscriptions will occur in the next five years (2). Use of mHealth for epilepsy care and tele-consultations exemplifies a "disruptive" technological leap for people with neurological disorders through a growing network of neurologist and non-neurologist providers. For instance, >95% of sub-Saharan African neurologists in training have a smartphone (3). As an illustrative example, a smartphone-based EEG

(4), if successfully employed, could newly allow investigation into a myriad of incompletely understood seizure disorders where resources are limited.

References

1. Saadi A, Mateen F. Teleneurology in humanitarian crises: lessons from the Médicins sans Frontières experience. Neurology 2017;89:e16-e19.
2. Ericsson Mobility Report. Accessed at: https://www.ericsson.com/assets/local/mobility-report/documents/2017/ericsson-mobility-report-june-2017.pdf
3. Mateen FJ, Clark SJ, Borzello M, Kabore J, Seidi O. Neurology training in sub-Saharan Africa: a survey of people in training in 19 countries. Ann Neurol 2016;79:871-881.
4. McKenzie ED, Lim AS, Leung EC, et al. Validation of a smartphone-based EEG among people with epilepsy: a prospective study. Sci Rep 2017;7:45567.

PLENARY SESSION: Precision Medicine in Neurologic Disease

Using Genetics to Identify Pathways that Regulate Proteins Driving Neurodegeneration

Huda Y. Zoghbi, MD
Howard Hughes Medical Institute, Baylor College of Medicine, Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital | 2016 George W. Jacoby Lectureship Award Recipient

The most common neurodegenerative diseases—Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis, Huntington's disease—are clinically and pathologically heterogeneous, but they do share several features besides their appearance in adulthood. Most notably, these diseases tend to involve protein misfolding. Early pathological studies had described abnormal protein deposits in autopsy samples over a hundred years ago, but it was not until the advent of genetic tools that we began to understand how certain mutations predisposed specific proteins to adopt an abnormal conformation. Our discovery of the mutation that causes Spinocerebellar ataxia type 1 (SCA1) (namely, the expansion of a translated CAG repeat that encodes glutamines in Ataxin-1) made it possible to generate the first mouse model in which an expanded polyglutamine tract targeted into the endogenous Ataxin-1 locus reproduced all the features of the human disease. These Sca1154Q/+ mice taught us that the polyglutamine expansion makes mutant Ataxin-1 resist degradation, which slowly increases its steady-state levels, driving pathogenesis; we also found that modest reductions of Ataxin-1 mitigate disease1. This observation inspired us to perform cross-species genetic screens in human cells and fruit flies to identify modulators of Ataxin-1 levels. We discovered that mitogen-stress kinase 1 and 2 (Msk1 and Msk2) regulate Ataxin-1 levels2, and we are now identifying inhibitors for Msk1 and 2 in hope of developing therapeutics. In the meanwhile, further work in animal models demonstrated that overexpression of even wild-type ataxin1 produced neurodegeneration, and rare cases of Alzheimer's and Parkinson's caused by genetic duplications of disease-relevant loci (and thus elevated levels of disease-relevant proteins) led us to hypothesize that these typically sporadic diseases might also reflect neurons burdened with too much of a particular protein. We proposed that there must be genes and gene networks whose inhibition would reduce the steady-state levels of tau and alpha-synuclein and embarked on screening the kinome in human cells and Drosophila models that express genes encoding these proteins. This screen has yielded previously unknown regulators of tau and alpha-synuclein3,4, and we are now pursuing them as a potential therapeutic targets for tau. We have also embarked on screening ~7000 other druggable targets in the human genome and have already identified several additional candidate modulators of Ataxin-1, tau, and alpha-synuclein. Exploring the mechanism by which these modulaters alter the disease-driving proteins will help us better understand their normal function and should yield additional therapeutic targets. We predict that a combination therapy that partially inhibits 2-3 targets would reduce untoward side effects that might emerge from strong inhibition of any one target.

References

1. Jafar-Nejad P, Ward CS, Richman R, Orr HT, Zoghbi HY. Regional rescue of spinocerebellar ataxia type 1 phenotypes by 14-3-3epsilon haploinsufficiency in mice underscores complex pathogenicity in neurodegeneration. Proc Natl Acad Sci U S A 2011;108:2142-7.
2. Park J, Al-Ramahi I, Tan Q, et al. RAS-MAPK-MSK1 pathway modulates ataxin 1 protein levels and toxicity in SCA1. Nature 2013;498:325-31.
3. Rousseaux MW, de Haro M, Lasagna-Reeves CA, et al. TRIM28 regulates the nuclear accumulation and toxicity of both alpha-synuclein and tau. Elife 2016;5.
4. Lasagna-Reeves CA, de Haro M, Hao S, et al. Reduction of Nuak1 Decreases Tau and Reverses Phenotypes in a Tauopathy Mouse Model. Neuron 2016;92:407-18.

Therapeutic Gene Editing in Muscles and Muscle Stem Cells

Amy Wagers, PhD
Harvard University

Duchenne muscular dystrophy (DMD) is an X-linked genetic disorder that arises from frame-disrupting mutations in the DMD gene, encoding DYSTROPHIN. Lack of DYSTROPHIN expression destabilizes muscle fiber membranes, increases susceptibility to contraction-induced injury and drives muscle degeneration (1). Current therapies for DMD are limited, and focus mainly on managing symptoms. However, for many DMD mutations, targeted removal of one or more exons from the mutated transcript can produce an in-frame mRNA and a truncated but still functional protein that can complement DYSTROPHIN-deficiency (2). Based on these data, we sought to adapt the gene-editing potential of the CRISPR-Cas9 system, which enables irreversible modification of targeted gene loci (3), for enduring production of functional DYSTROPHIN protein in dystrophic heart, skeletal muscle and muscle stem cells (also known as satellite cells).

Coupling clustered regularly interspaced short palindromic repeats (CRISPR)-Cas9 endonucleases, delivered via adeno-associated virus (AAV), with paired guide RNAs flanking exon23 of the Dmd gene, which is mutated in mdx mice, we demonstrate programmed excision of intervening DNA and restoration of Dystrophin reading frame and protein expression in vivo in both skeletal and cardiac muscles. This AAV-CRISPR system shows target-specific genome modifying activity in both neonatal and adult animals and with both local and systemic delivery. DYSTROPHIN expression in AAV Dmd-CRISPR treated mdx mice was sufficient to partially recover functional deficiencies of dystrophic muscle, including increasing muscle strength and improved resistance to eccentric contraction-induced damage. Finally, using a novel fluorescent reporter system to facilitate detection of gene edited cells, we demonstrate in vivo targeting of the mdx mutation in endogenous muscle stem cells, suggesting that AAV-CRISPR may provide a means to support ongoing repair of dystrophic fibers with corrected muscle precursors. Together, these proof-of-concept studies support the feasibility and efficacy of in vivo genome editing to correct frame-disrupting mutations in DMD (4).

References

1. Tabebordbar M, Wang ET, Wagers AJ. Skeletal muscle degenerative diseases and strategies for therapeutic muscle repair. Annu Rev Pathol. 2013;8:441-75. Epub 2012/11/06. doi: 10.1146/annurev-pathol-011811-132450.

2. Lu QL, Mann CJ, Lou F, Bou-Gharios G, Morris GE, Xue SA, Fletcher S, Partridge TA, Wilton SD. Functional amounts of dystrophin produced by skipping the mutated exon in the mdx dystrophic mouse. Nat Med. 2003;9(8):1009-14. Epub 2003/07/09. doi: 10.1038/nm897.
3. Jinek M, Chylinski K, Fonfara I, Hauer M, Doudna JA, Charpentier E. A programmable dual-RNA-guided DNA endonuclease in adaptive bacterial immunity. Science. 2012;337(6096): 816-21. doi: 10.1126/science.1225829.
4. Tabebordbar M, Zhu K, Cheng JK, Chew WL, Widrick JJ, Yan WX, Maesner C, Wu EY, Xiao R, Ran FA, Cong L, Zhang F, Vandenberghe LH, Church GM, Wagers AJ. In vivo gene editing in dystrophic mouse muscle and muscle stem cells. Science. 2016;351(6271): 407-11. doi: 10.1126/science.aad5177.

Precision Medicine in Oncology: Of Platforms and Baskets

Donald Berry, PhD
The University of Texas, M.D. Anderson Cancer Center

The current revolution in cancer clinical trials is being driven by biology. Biologists are now slicing and dicing cancers into finer and finer categories. The old clinical trial paradigm of one-size fits all cannot work. I'll describe two types of innovations. One is adaptive platform trials in which many therapies that are available for treating patients are evaluated, with the being matching therapies to responding patient subsets. (1-4) Therapies enter the trial at different times, are evaluated, and move on, perhaps to a confirmatory trial or perhaps to evaluation by regulators for market approval based on the therapy's performance in the trial. The concept was developed in oncology but it has moved into other therapeutical areas, including neurology. Examples including Alzheimer's (4) and Duchenne muscular dystrophy.

I will describe particular platform trials and convey some lessons learned from developing and running them. One is phase 2 trial I-SPY 2 (1, 2,) and the other is phase 3 trial GBM AGILE (3). Both are potentially never-ending. Both focus on matching therapies to patients. Both involve continuous learning and updating as the trial continues. Both use adaptive randomization, with higher probabilities for assigning to therapies that are performing better for the patient in question. GBM AGILE uses a seamless shift from learn stage to a very small confirm stage. All patients count in a therapy's final analysis. Both trials utilize a common control arm depending on patient subtype. Both compare experimental therapies with all controls in the trial via a "time machine" model. Both trials are driven by predictive probability. And both use longitudinal modeling of disease burden over time to inform longer-term end points and to help in assessing therapeutic effects. The other type of innovation is basket trials. A particular genomic aberration may be present in cancers of many organ types. A therapy targeting that aberration is evaluated across various organ types for patients who harbor that aberration. Borrowing information across tumor types can lead to marketing approval with very small sample sizes.

References

1. Berry DA. The Brave New World of clinical cancer research: Adaptive biomarker-driven trials integrating clinical practice with clinical research. Mol Oncol 2015;9:951-959.
2. Berry DA. State of the Art: Emerging innovations in clinical trial design. Clin Pharmacol Ther 2016;99:82-91.
3. Alexander BM, Ba S, Berger MS, Berry DA, et al. Adaptive Global Innovative Learning Environment for Glioblastoma: GBM AGILE. Clin Cancer Res 2017;Aug 16. doi:10.1158/1078-0432.CCR-17-0764. [Epub ahead of print]
4. European Prevention of Alzheimer's Dementia Consortium. https://www.imi.europa.eu/content/epad Accessed September 25, 2017.

Designing Neurology Trials in the Era of Precision Medicine

Cristina Sampaio, MD, PhD
CHDI Foundation

Roughly, 37% of all registered clinical trials are done for to support registration of new drugs(1). The likelihood of success from phase I to approval is 9.6% (all indications) and 8.4% for Neurology; such low rates are a matter of concern. The global oncology rate is 5%, even less than Neurology, but the figure jumped to 25% with the use of biomarkers (2).

Prognostic and Predictive Biomarkers are likely to become equally important in informing clinical trials in Neurology. Having such biomarkers available is in itself a proxy for a far greater understanding of the disease under study and a larger control over the mechanism of action of the intervention.

Biomarker guided trials (BGT) are those that use biomarkers to constraint the population that is recruited and/or analyzed, per se, they do not imply adaptation(3). Adaptive trials are trials that plan for adjustments in their execution taking into account aspects of the data that is being accrued. There are many, different types of adaptations. Some of these envisage to adapt in function of the readouts of predefined biomarkers - these are biomarker guided adaptive trials. Adaptive trials are becoming the norm if one considers simple adaptations like sample size re-estimation. DIAN-TU(4) is a platform that only enrolls Familiar Alzheimer disease participants, i.e., it selects for the presence of the presenilin mutation. The adaptations in DIAN-TU are not predicated on the recruitment biomarker (presenilin mutation) but rather on other biomarkers used to evaluate target engagement or the dose window (amyloid deposition, (CSF) Aβ and tau, magnetic resonance imaging (MRI) brain atrophy, and positron emission tomography (PET) imaging with 2-[18F] fluoro-2-deoxy-D-glucose (FDG PET). We will discuss DIAN-TU as a successful platform for adaptive trials in familiar AD.

In Neurology (oncology indications excluded), BGT adaptive or not are still scarce. We will provide examples from ongoing trials:

- GZ/SAR402671 in Parkinson's Disease Patients Carrying a Glucocerebrosidase (GBA) Gene Mutation (MOVES-PD);
- WVE-120101 and WVE-120102 Oligonucleotides for Huntington's Disease;
- Targeting Residual Activity by Precision, Biomarker-Guided Combination Therapies of Multiple Sclerosis (TRAP-MS).

References

1. Viergever RF, Li K. Trends in global clinical trial registration: an analysis of numbers of registered clinical trials in different parts of the world from 2004 to 2013. BMJ Open 2015; 5: e008932. doi: 10.1136/bmjopen-2015-008932
2. Mullard A. Parsing clinical success rates. Nature Reviews Drug Discovery 2016; 15, 447 doi:10.1038/nrd.2016.136
3. Antoniou M, Kolamunnage-Dona R, Jorgensen AL. Biomarker-Guided Non-Adaptive Trial Designs in Phase II and Phase III: A Methodological Review. J. Pers. Med. 2017; 7, 1; doi: 10.3390/jpm7010001.
4. Bateman RJ, Benzinger TL, Berry S, et al., and the DIAN-TU Pharma Consortium for the Dominantly Inherited Alzheimer Network. The DIAN-TU Next Generation Alzheimer's prevention trial: Adaptive design and disease progression model. Alzheimer's & Dementia 2017; 13, 8-19.

TUESDAY, OCTOBER 17

PLENARY SESSION: Antisense Oligonucleotide Treatment of Genetic Neurological Diseases

Gene Silencing Therapy for Human Neurodegenerative Disease

Don W. Cleveland, PhD
University of California, San Diego

The genes whose mutation causes human neurodegenerative disease are widely expressed within neurons and non-neurons of the nervous system, producing damage not only within the most vulnerable neurons but also within their partner neurons and. Sustained gene silencing or altered pre-mRNA splicing broadly within neurons and non-neurons throughout the nervous system has been achieved using a clinically feasible "designer DNA drug" injection of antisense oligonucleotides into the nervous system (1). Single dose injection of an ASO has been shown to produce sustained, catalytic (RNase H-dependent) RNA degradation of a target mRNA, thereby producing slowing of disease progression for inherited ALS in rodents or sustained partial disease reversal for Huntington's-like disease (2). An ASO that corrects the splicing of the SMN2 gene has been approved as an effective therapy for spinal muscular atrophy (SMA), one of the most abundant childhood inherited diseases. Hexanucleotide expansion in the C9orf72 gene is the most frequent cause of both ALS and the second most frequent human dementia, frontal temporal dementia. Single dose ASO infusion has been demonstrated to catalyze selective destruction of repeat-containing C9ORF72 RNAs, without targeting mRNAs encoding the C9ORF72 protein (3). Efficacy of ASOs in lowering expression or altering splicing of tau mRNA has been demonstrated, and clinical trials are now likely with ASOs in Alzheimer's disease and chronic brain injury. Finally, an extension of this approach is development of synthetic CRISPR RNAs to induce transient activation of Cas9 nuclease to cleave and permanently inactivate a selected target gene (4).

References

1. Smith, R.A., Miller, T.M., Yamanaka, K., et al. Antisense oligonucleotide therapy for neurodegenerative disease. J. Clin. Invest 2006; 116: 2290-2296.
2. Kordasiewicz, H.B., Stanek, L.M., Wancewicz, E.V. et al. Sustained therapeutic reversal of Huntington's disease by transient repression of huntingtin synthesis. Neuron 2012; 74: 1031-1044.
3. Jiang, J., Zhu, Q., Gendron, T. et al. Gain of toxicity from ALS/FTD-linked repeat expansions in C9orf72 is alleviated by antisense oligonucleotides targeting GGGGCC-containing RNAs. Neuron 2016; 90:535-550.
4. Rahdar, M., McMahon, M., Prakash, T. et al. Synthetic CRISPR RNA-Cas9 guided genome editing in human cells. Proc. Natl. Acad. Sci. (2015); 112: E7110-E7117.

ASO Therapy for SMA: Harnessing the Power of a Backup Gene

Adrian R. Krainer, PhD
Cold Spring Harbor Laboratory | 2017 F.E. Bennett Memorial Lecture Award Recipient

SMA is a motor-neuron disease, caused by mutations in the SMN1 gene. Patients retain one or more copies of the nearly identical SMN2 gene, which mainly expresses mRNA lacking exon 7, coding for an unstable protein isoform. The small amount of full-length mRNA and protein expressed from SMN2 only partially compensates for the loss of SMN1. Together with Ionis Pharmaceuticals, we developed nusinersen, a splice-switching antisense oligonucleotide (ASO) that efficiently promotes SMN2 exon 7 inclusion and restores SMN protein levels. Nusinersen hybridizes to intron 7 of the SMN2 pre-mRNA, preventing binding of the splicing repressors hnRNPA1/A2 to a bipartite intronic splicing silencer; this in turn facilitates binding of U1 snRNP to the intron 7 5' splice site, resulting in enhanced exon 7 inclusion (1,2). Clinical trials of nusinersen in SMA patients, sponsored by Ionis and Biogen, began at the end of 2011 (3). Nusinersen (SpinrazaTM) was approved by the FDA in December 2016, and by the EMA in June 2017.

We are continuing to explore aspects of SMA pathogenesis and treatment, using ASO therapy in SMA mouse models. We found that SMA is not motor-neuron cell-autonomous in the mouse models, such that correcting SMN2 splicing in peripheral tissues exclusively is necessary and sufficient for full phenotypic rescue (4). We are also exploring prenatal ASO treatment, as it is likely that early intervention will have the greatest clinical benefit.

References

1. Hua Y, Vickers TA, Okunola HL, Bennett CF, Krainer AR. Antisense masking of an hnRNP A1/A2 intronic splicing silencer corrects SMN2 splicing in transgenic mice. Am J Hum Genet 2008;82: 834-848.
2. Hua Y, Sahashi K, Rigo F, Hung G, Horev G, Bennett CF, Krainer AR. Peripheral SMN restoration is essential for long-term rescue of a severe spinal muscular atrophy mouse model. Nature 2011;478:123-126.
3. Finkel RS, Chiriboga CA, Vajsar J, Day JW, Montes J, De Vivo DC, Yamashita M, Rigo F, Hung G, Schneider E, Norris DA, Xia S, Bennett CF, Bishop KM. Treatment of infantile-onset spinal muscular atrophy with nusinersen: a phase 2, open-label, dose-escalation study. Lancet 2017;388:3017-3026.
4. Hua Y, Liu YH, Sahashi K, Rigo F, Bennett CF, Krainer AR. Motor neuron cell-nonautonomous rescue of spinal muscular atrophy phenotypes in mild and severe transgenic mouse models. Genes Dev 2015;29: 288-297.

Getting the Message: Antisense Oligonucleotide Therapy for Duchenne Muscular Dystrophy and Spinal Muscular Atrophy

Richard Finkel, MD, FANA
Nemours Children's Hospital

Spinal Muscular Atrophy (SMA) and Duchenne Muscular Dystrophy (DMD) represent two of the more common debilitating, progressive pediatric neuromuscular disorders. Until recently, the only therapy for these conditions was supportive management. Following the discovery of the causative genes for SMA and DMD, numerous targeted treatment strategies have been investigated in the clinic. Antisense oligonucleotides (ASO) have been developed for modulation of RNA expression in SMA and DMD, and two have received regulatory approval in 2016, the first approved drugs for these diseases.

DMD is caused by a variety of deletions, duplications and point mutations in the DMD gene. "Out-of-fame" deletions result in the expression of a non-functional dystrophin protein. ASOs have been developed to skip an adjacent exon and bring the mutation back "in-frame", translating a truncated but functional protein, akin to that normally produced in the milder Becker MD phenotype. Two strategies have been pursued, both targeting skipping of exon 51. Drisapersen, a 2'-O-methyl-phosphorothioate ASO, failed to show efficacy in a phase 3 study and regulatory approval was denied. Eteplirsen, a phosphorodiamidate morpholino oligomer ASO, gained regulatory approval with limited clinical data (1) after a contentious review process, and is now available commercially.

SMA is a monogenic disorder due to deletions or mutations in the SMN1 gene. A small amount of normal SMN protein is produced by a "backup" parologous gene, SMN2, which differs from SMN1 by a single nucleotide that affects splicing, largely excluding exon 7 from the transcript. Nusinersen, a 2'-O-methoxyethyl phosphorothioate-modified ASO, targets ISS-N1, an intronic splice inhibitor site, to increase exon 7 inclusion. Proof-of-concept was demonstrated in a Phase 2 study (2), and two Phase 3 studies (3, 4) demonstrated safety and efficacy, leading to regulatory approval by the FDA and EMA. Questions remain regarding sustainability of the effect, long-term safety, immunogenicity, and the high cost of these drugs.

ASO therapy for neuromuscular diseases is now a reality. Antisense oligonucleotides offer meaningful benefit, if not a cure, and will hopefully provide similar benefit for other genetic disorders.

References

1. Mendell JR, Goemans N, Lowes LP, et al. Longitudinal effect of eteplirsen versus historical control on ambulation in Duchenne muscular dystrophy. Annals of neurology 2016;79: 257-271.
2. Finkel RS, Chiriboga CA, Vajsar J, et al. Treatment of infantile-onset spinal muscular atrophy with nusinersen: a phase 2, open-label, dose-escalation study. Lancet (London, England) 2016;388:3017-3026.
3. Finkel RS, Mercuri E, Muntoni F, et al. Primary efficacy and safety results from the phase 3 ENDEAR study of nusinersen in infants diagnosed with spinal muscular atrophy (SMA) 43rd Annual Congress Br Paediatr Neurol Assoc; January 13, 2017; Cambridge, UK
4. Mercuri E, Finkel RS, Kirschner J, et al. Efficacy and safety of nusinersen in children with later-onset spinal muscular atrophy (SMA). 69th Annual Meeting Am Acad Neurol, April 24, 2017; Boston, US.

Antisense Oligonucleotide Therapy for Huntington's Disease: A Clinical Trials Perspective

Sarah J. Tabrizi
UCL Huntington's Disease Centre, UCL Institute of Neurology, University College London

Huntington's disease (HD) is an autosomal dominant neurodegenerative disease caused by a CAG repeat expansion in the HTT gene resulting in polyglutamine expansion in the huntingtin protein. There are currently no treatments that cure HD or modify its progression. Antisense oligonucleotide (ASO) therapy has emerged as a viable approach to modify production of proteins involved in currently untreatable neurodegenerative diseases. ASOs are single-stranded nucleotides, approximately 20 bases in length that bind to complementary regions on target RNA and lead to RNA degradation. In transgenic rodent models of HD, CNS delivery of ASOs improves motor phenotype, anxiety, gene expression deficits and survival. In non-human primates, intrathecal (IT) delivery of ASOs causes suppression of huntingtin mRNA and protein throughout the CNS, including key regions implicated in HD, and target mRNA suppression is sustained for an extended period after treatment discontinuation.

A comprehensive drug discovery effort towards identifying an ASO suitable for clinical testing in HD patients was conducted in silico, in rodent models of HD and in larger species. This work yielded IONIS-HTTRx, a well-tolerated, potent ASO with high specificity to human HTT mRNA. The first clinical trial of IONIS-HTTRx was initiated in September 2015. The trial is a multi-center, randomized, double-blind, placebo-controlled, multiple ascending-dose design in patients with early manifest HD (NCT02519036). In this trial, study drug is administered by IT injection into the cerebrospinal fluid. Each patient receives four doses of study drug, with doses four weeks apart. Study endpoints include neuroimaging, electrophysiological, clinical and biochemical measures. The primary objective of the trial is evaluation of the safety of IONIS-HTTRx in HD patients. Other objectives include characterization of IONIS-HTTRx pharmacokinetics and effects on target engagement and clinical outcomes. In summary, ASO-mediated reduction of HTT mRNA, which suppresses translation of the huntingtin protein and has been shown in preclinical studies to be safe and efficacious, is a promising strategy for disease-modifying treatment of HD; and IONIS-HTTRx, a huntingtin-targeting ASO, is currently in clinical testing.

Support: *Ionis Pharmaceuticals, Roche, CHDI, Wellcome Trust*

PLENARY SESSION: Molecular Imaging in Neurologic Disease

Imaging in Early Diagnosis of Alzheimer's Disease

Reisa Sperling, MD
Harvard Medical School
2011 Derek Denny-Brown Young Neurological Scholar
2017 Raymond D. Adams Lectureship Recipient

The accurate detection of Alzheimer's disease (AD) pathophysiology at the earliest possible phase of disease may be critical for therapeutic intervention. The development of PET ligands to detect and track both amyloid-beta and tau deposition has already accelerated clinical research in Alzheimer's disease. PET imaging of amyloid was first described almost 15 years ago. Amyloid PET ligands detect amyloid accumulation in beta-pleated sheet conformations, found in both in parenchymal plaque pathology and cerebral amyloid angiopathy (CAA). There are now multiple FDA approved Amyloid PET ligands available for clinical and research use. Amyloid imaging has already been incorporated into multiple clinical trials, and the clinical utility of Amyloid PET is being evaluated for CMS reimbursement in the IDEAS study. Tau PET imaging was introduced in 2011. Most Tau PET ligands detect paired-helical filament conformations of tau, found in neurofibrillary tangles and tau neurites. Multiple Tau PET ligands are still under active development and validation, and are increasingly being incorporated in AD clinical research.

One of the continued dilemmas in the field is how best to identify individuals who are clearly on the AD trajectory but at an earlier enough stage of pathology to be maximally responsive to therapeutic intervention. Converging data from PET amyloid imaging, cerebrospinal fluid studies and large autopsy series suggest that one-third of clinically normal older individuals harbor a substantial burden of cerebral amyloid-beta. Accumulating evidence from these "amyloid-positive normals" show aberrant network, cortical thinning, increased neocortical tau on Tau PET imaging, and other "AD-like" abnormalities on multi-modality imaging. Recent studies have reported an association between amyloid burden and memory performance, greater subjective cognitive concerns (1) and an increased risk of cognitive decline (2,3). Recent studies suggest that older individuals with markers of both amyloid accumulation and neurodegeneration, including Tau PET, have the fastest rates of cognitive decline. Several secondary prevention trials in both genetic at-risk (Dominantly Inherited Alzheimer Network and the Alzheimer Prevention Initiative) and age at-risk individuals (A4 and EARLY Study) are now ongoing, testing anti-amyloid mechanisms at the preclinical stages of AD (4).

References

1. Amariglio RE, Mormino EC, Pietras AC, et al. Subjective cognitive concerns, amyloid-beta, and neurodegeneration in clinically normal elderly. Neurology. 2015;85(1): 56-62.
2. Mormino EC, Papp KV, Rentz DM, et al. Early and late change on the preclinical Alzheimer's cognitive composite in clinically normal older individuals with elevated amyloid-beta. Alzheimers Dement. 2017.

3. Donohue MC, Sperling RA, Petersen R, et al. Association Between Elevated Brain Amyloid and Subsequent Cognitive Decline Among Cognitively Normal Persons. JAMA. 2017;317(22): 2305-2316.
4. Sperling RA, Rentz DM, Johnson KA, et al. The A4 study: stopping AD before symptoms begin? Sci Transl Med. 2014;6(228): 228fs213.

Molecular Imaging of Parkinson's Disease: The Cholinergic Compensatory Hypothesis

Nicolaas I. Bohnen, MD, PhD
University of Michigan & Veterans Affairs Medical Center (VAMC)

Recent evidence supports a role for cholinergic dysfunction in motor abnormalities of Parkinson's disease (PD) (1), expanding its traditional association with cognition (2). Although cholinergic losses have been associated with falls and gait changes in PD (3, 4), the cholinergic system appears to play regionally selective roles in locomotor functions. Hypocholinergic innervation in the parietal and occipital cortices is robustly associated with gait difficulties; and hypocholinergic activity in the brainstem, motor cortex, hippocampus and cerebellum is significantly associated with reduced anticipatory and reactive postural control and sensory orientation. These findings suggest that in the dopamine-depleted PD brain, cholinergic cell loss reveals the full impact of striatal dopamine loss on motor performance, reflecting loss of compensatory attentional supervision of monitoring of gait, postural and complex movements. Cholinergic system breakdown - or compensation - appears to affect brain regions differentially where denervation occurs initially in posterior cortical areas in the setting of apparent increased activity in the thalami, striata and frontal cortices. The clinical significance of increased cholinergic activity is not well understood. Preliminary data suggest a gradient of decreasing postural instability and gait difficulties (PIGD) and increasing tremor-predominant (TD) motor phenotype from hypo- to hypercholinergic status in PD. The TD motor phenotype is present in the majority of patients with hypercholinergic status. Longitudinal data are needed to investigate the postulated 'compensatory' hypothesis of the cholinergic system in the PD brain.

References

1. Muller ML, Bohnen, NI. Cholinergic dysfunction in Parkinson's disease. Curr Neurol Neurosci Rep 2013; 13:377.
2. Kehagia AA, Barker RA, Robbins TW. Neuropsychological and clinical heterogeneity of cognitive impairment and dementia in patients with Parkinson's disease. Lancet Neurol 2010; 9:1200-13.
3. Bohnen NI, Muller, ML, Koeppe RA, et al. History of falls in Parkinson disease is associated with reduced cholinergic activity. Neurology 2009; 73:1670-6.
4. Bohnen NI, Frey KA, Studenski S, et al. Gait speed in Parkinson disease correlates with cholinergic degeneration. Neurology 2013; 81:1611-6.

Synaptic Density Imaging of Neurologic Disease Using PET

Richard E. Carson, PhD
Yale University

Many neuropsychiatric diseases involve the loss of neurons and synapses. There are many brain imaging methods that quantify surrogates for brain synaptic density, including gray matter density in MR, and 18F FDG, which assesses glucose metabolism. However, tracers for new molecular targets are needed to directly monitor synaptic density loss in neuropsychiatric disorders. One suitable target is the synaptic vesicle glycoprotein 2 (SV2), an essential membrane protein. One of its isoforms, SV2A, is ubiquitously expressed in virtually all synapses (1). SV2A is specifically decreased in resected brain tissue from epilepsy patients, and is the site of action of the antiepileptic drug levetiracetam (2). Thus, SV2A imaging could provide a highly useful indicator of synaptic density.

We recently developed 11C UCB J, a PET tracer for quantitative SV2A imaging in vivo. In nonhuman primates (3), tracer uptake was high in gray matter, consistent with the ubiquitous expression of SV2A. Pretreatment with levetiracetam induced 60-90% occupancy. Also, in baboon, we found excellent correlation between in vivo PET SV2A measures and in vitro Western blot assays of SV2A and synaptophysin, a widely used synaptic marker, as well as with SV2A homogenate binding data.

In first-in-human studies (4), 11C UCB-J had high brain (peak SUV of ~10), good plasma free fraction (~30%), and moderate peripheral metabolism. Compartment model analysis produces high-quality parametric images with excellent test/retest reliability (~5%). Blocking studies in humans with levetiracetam clearly demonstrated specific binding in gray matter.

We compared 11C-UCB-J binding in ten patients (6 males and 4 females, 39 ± 12 years of age) with temporal lobe epilepsy to the binding pattern of 18F-FDG. For 11C UCB J, regional binding potential (BPND) values were estimated, and asymmetry indices were calculated and compared to 18F FDG. In all subjects, there was a clear reduction in 11C-UCB-J BPND values in the epileptogenic temporal lobe compared to the contralateral side. The asymmetry was predominantly located in the hippocampus, with BPND asymmetries of -50±39%. The corresponding asymmetry in 18F-FDG SUV was -17±6%; the reductions in 11C-UCB-J were 2.7-fold larger than for 18F-FDG.

These data demonstrate that 11C UCB-J is an excellent tracer for quantitative imaging of SV2A in the human brain. Preliminary data in other populations such as Alzheimer's disease support the use of 11C UCB J PET as an in vivo biomarker of synaptic density loss.

References

1. Bajjalieh SM, Frantz GD, Weimann JM, McConnell SK, Scheller RH. 1994. Differential expression of synaptic vesicle protein 2 (SV2) isoforms. The Journal of neuroscience : the official journal of the Society for Neuroscience 14: 5223-35
2. Loscher W, Gillard M, Sands ZA, Kaminski RM, Klitgaard H. 2016. Synaptic Vesicle Glycoprotein 2A Ligands in the Treatment of Epilepsy and Beyond. CNS Drugs 30:1055-77
3. Nabulsi N, Mercier J, Holden D, Carre S, Najafzadeh S, et al. 2016. Synthesis and Preclinical Evaluation of 11C-UCB-J as a PET Tracer for Imaging the Synaptic Vesicle Glycoprotein 2A in the Brain. J Nucl Med
4. Finnema SJ, Nabulsi NB, Eid T, Detyniecki K, Lin SF, et al. 2016. Imaging synaptic density in the living human brain. Science Translational Medicine 8:348ra96

Molecular Imaging in Neuroinflammation

Martin Pomper, MD, PhD
Johns Hopkins University

The mobilization of a variety of immune cells and mechanisms under conditions of neuronal injury and repair within the central nervous system (CNS) has been referred to as neuroinflammation. Central insults such as infection, traumatic brain injury (TBI), spinal cord damage, as well as neurodegenerative and psychiatric disease and injuries within the periphery have been shown to produce neuroinflammation. Although neuroinflammation has been proffered as a pathogenic factor in a variety of neuropsychiatric disorders (1), its specific non-invasive detection and measurement has remained elusive. Furthermore, the significance of immune system activity intrinsic to the brain is a matter of some debate. For instance, in opposition to studies that focus on one or a few cytokines at a time, a recent systems approach was unable to uncover over-expression of

inflammatory genes in schizophrenia (2). Perhaps the most widely studied clinical imaging target for neuroinflammation has been the translocator protein 18 kDa (TSPO), present on activated microglia and astrocytes (3). Since use of first-generation positron-emitting radiotracers targeting TSPO, this target has been fraught with difficulties including lack of binding specificity of the first-generation agent [11C]PK11195, which has been used in hundreds of pre-clinical and human studies, the genotype sensitivity of the second-generation agents, their lack of immune cell specificity and a lack of sensitivity for detecting mild inflammation. Nevertheless, the second-generation agents for positron emission tomography (PET) have yielded valuable information about the inflammatory component of neuropsychiatric disease, particularly when coupled with central and peripheral inflammatory markers. We will discuss targeted TSPO PET imaging in the context of several such disorders, including schizophrenia (4, 5) and sports-related TBI (6). We will also present data on emerging neuroinflammatory imaging targets, the capacity to track the movement of immune cells and provide perspective on new directions for imaging neuroinflammation.

References

1. Albrecht DS, Granziera C, Hooker JM, et al. In vivo imaging of human neuroinflammation. ACS Chem Neurosci 2016;7:470-483.
2. Birnbaum R, Jaffe AE, Chen Q, et al. Investigating the neuroimmunogenic architecture of schizophrenia. Mol Psychiatry 2017; Epub ahead of print.
3. Chen M-K, Guilarte TR. Translocator proten 18 kDa (TSPO): Molecular sensor of brain injury and repair. Pharmacol Ther 2008;118:1-17.
4. Notter T, Coughlin JM, Gschwind et al. Translational evaluation of translocator protein as a marker of neuroinflammation in schizophrenia. Mol Psychiatry 2017;17: Epub ahead of print.
5. Coughlin JM, Wang Y, Ambinder EB et al. In vivo markers of inflammatory response in recent-onset schizophrenia: a combined study using [11C]DPA-713 positron emission tomography. Transl Psychiatry 2016;6:e777.
6. Coughlin JM, Wang Y, Minn I, et al. Imaging of glial cell activation and white matter integrity in brains of active and recently retired national football league players. JAMA Neurol 2017;74:67-74.

ANA 2017 ANNUAL MEETING

THANK YOU TO OUR SPONSORS:
Alnylam Pharmaceuticals
Mayo Clinic
Medscape
MT. Pharma
Sanofi Genzyme
Wiley

THANK YOU TO OUR DONORS:
India Marie Clamp
Pennsylvania State University
Patricia A. Grady, PhD
Bethesda, MD
Fredrick J. Seil, MD,
Oregon Health & Science University
Susan T. Iannaccone, MD
UT Southwestern Medical Center

THANK YOU TO OUR 2017 EXHIBITORS:
Alnylam Pharmaceuticals
Ascension
Brooke Army Medical Center
Glut1 Deficiency Foundation
Medlink Corp
Penn State Health
Rosman Search
Strongbridgebio
Upsher-Smith Laboratories

SUPPORTED BY GENEROUS INDEPENDENT MEDICAL EDUCATIONAL GRANTS FROM:
Abbvie, Inc.
Allergan
Amgen
Eli Lilly
GE Healthcare
Lundbeck
Mallinckrodt Pharmaceuticals
Pfizer

SAVE the DATES

ANA2018 | 143rd Annual Meeting of the American Neurological Association
OCTOBER 21–23, 2018 | Atlanta, Georgia | Hyatt Regency Atlanta

ANA2019 | 144th Annual Meeting of the American Neurological Association
OCTOBER 13–15, 2019 | St. Louis, Missouri | Marriott St. Louis Grand Hotel

ANA 2017 AWARDEES

SCIENTIFIC AWARDEES

RAYMOND D. ADAMS LECTURESHIP

This award honors **Dr. Raymond D. Adams**, emeritus Bullard Professor of Neuropathy at Harvard Medical School and emeritus Chief of Neurology Service at the Massachusetts General Hospital.

TUESDAY, OCTOBER 17
12:15 PM – 12:40 PM | *Grande Ballroom AB*

Reisa Sperling, M.D, MMSc
Harvard Medical School

Presentation Title:
Imaging in Early Diagnosis of Alzheimer's Disease

This award will be presented at the Molecular Imaging in Neurologic Disease Symposium.

Dr. Reisa Sperling is a neurologist focused on the detection and treatment of Alzheimer's disease, even before clinical symptoms are evident. She is the co-Principal Investigator, with Dr. Keith Johnson, of the Harvard Aging Brain Study in Boston. Her research uses neuroimaging and cognitive tests to understand the aging brain and the earliest changes associated with Alzheimer's disease. Dr. Sperling is a Professor in Neurology at Harvard Medical School, Director of the Center for Alzheimer Research and Treatment at Brigham and Women's Hospital, and Director of Neuroimaging for the Massachusetts ADRC at Massachusetts General Hospital. Dr. Sperling led the NIA-Alzheimer's Association workgroup to develop guidelines for "Preclinical Alzheimer's disease," and currently serves on the Advisory Council of the National Institute on Aging. Dr. Sperling is also the Project Leader for the Anti-Amyloid Treatment in Asymptomatic AD (A4) study - a landmark secondary prevention trial in over 1000 clinically normal older individuals with PET amyloid imaging evidence of early Alzheimer's disease pathology. In 2011, Dr. Sperling received the Derek Denny-Brown Young Neurological Scholar Award. Dr. Sperling is a 2015 awardee of the American Academy of Neurology Potamkin Prize, and was named one of the 2017 Most Disruptive Women to Watch in Healthcare.

F.E. BENNETT MEMORIAL LECTURESHIP

This F.E. Bennett Memorial Lectureship began in 1979 to recognize outstanding neuroscientists.

TUESDAY, OCTOBER 17
9:10 AM – 9:40 AM | *Grande Ballroom AB*

Adrian Krainer, PhD
Cold Spring Harbor Laboratory

Presentation Title:
ASO Therapy for SMA: Harnessing the Power of a Backup Gene

This award will be presented at the Antisense Oligonucleotide Treatment of Genetic Neurological Diseases Symposium.

Dr. Adrian Krainer is a Professor and Program Chair of Cancer & Molecular Biology at Cold Spring Harbor Laboratory, which he joined in 1986. His laboratory studies splicing regulation, and is also engaged in developing targeted therapies to correct or modulate alternative splicing in genetic diseases and cancer. Together with Ionis Pharmaceuticals, they developed nusinersen, an antisense oligonucleotide that corrects defective splicing of the SMN2 gene and is the first FDA-approved therapy for spinal muscular atrophy. Prof. Krainer is a Pew Scholar in the Biomedical Sciences, a MERIT-award recipient from the NIH, a past President of the RNA Society, and a member of the Royal Society of Medicine and the American Academy of Arts and Sciences.

SORIANO LECTURESHIP

This Award was established in 1987 by ANA member Dr. Victor Soriano and his wife to provide a "brilliant lecture delivered by an outstanding scientist" who is a member of the Association.

MONDAY, OCTOBER 16
10:10 AM – 10:35 AM | *Grande Ballroom AB*

Gretchen Birbeck, MD, MPH, DTMH, FAAN
University of Rochester

Presentation Title:
Neuroprotective Studies in Cerebral Malaria: Can Africa's Efforts Inform U.S. Neurology?

This award will be presented at Presidential Symposium: Translational Neuroscience Research to Improve Outcomes for the 'Bottom Billion'.

Gretchen L. Birbeck is the Rykenboer Professor of Neurology at the University of Rochester. In 1994, as a University of Chicago medical student she traveled to Chikankata Hospital in rural Zambia for an extended elective. At Chikankata, her burgeoning interest in seizures deepened as she encountered an unprecedented burden of acute symptomatic seizures and undiagnosed, untreated epilepsy. Her subsequent work, largely funded by the US NIH, has established that much of this burden was due to CNS malaria. Today, Professor Birbeck's work includes interventions aimed at decreasing the medical and social morbidity of seizures and epilepsy in sub-Saharan Africa.

GEORGE W. JACOBY LECTURESHIP (2016)

The Jacoby Award is given triennially to a member of the ANA who, in the judgment of a Committee, has conducted some especially meritorious experimental work upon any neurologic or psychiatric subject.

SUNDAY, OCTOBER 15
1:15 PM – 1:45 PM | *Grande Ballroom AB*

Huda Zoghbi, MD
Baylor College of Medicine

Presentation Title:
Using Genetics to Identify Pathways that Regulate Proteins Driving Neurodegeneration

This award will be presented at Precision Medicine in Neurologic Disease Symposium.

Huda Zoghbi grew up in Beirut, Lebanon where she obtained a Bachelor of Science and started medical school at the American University of Beirut before transferring to Meharry Medical College during the Lebanese civil war. She trained in Pediatrics, Neurology, and Molecular Genetics at Baylor College of Medicine where she is now the Ralph D. Feigin Professor of Pediatrics, Neuroscience, and Molecular and Human Genetics and an Investigator with the Howard Hughes Medical Institute. She is the founding Director of the Jan and Dan Duncan Neurological Research Institute at Texas Children's Hospital.

Her patient-inspired research led to the discovery of the spinocerebellar ataxia type 1 gene and mechanisms mediating neurodegeneration (with Harry Orr), and the discovery of the Rett syndrome gene and its effects on the brain. Her cross-species studies with Juan Botas are leading to potential therapeutic entry points for Alzheimer and Parkinson. Her curiosity-driven research led to the discovery that Atoh1 governs the development of several components of the balance, hearing, and breathing pathways. She is a member of the National Academy of Medicine and National Academy of Sciences. Among Dr. Zoghbi's honors are the 2017 Canada Gairdner International Award, the 2017 Breakthrough Prize in Neurodegeneration, the Shaw Prize in Life Science and Medicine for 2016; the National Academy of Science's 2016 Jessie Stevenson Kovalenko Medal; the 2014 March of Dimes Prize in Developmental Biology; the 2013 Pearl Meister Greengard Prize from Rockefeller University; and the 2011 Neuroscience Prize of The Peter and Patricia Gruber Foundation.

DEREK DENNY-BROWN YOUNG NEUROLOGICAL SCHOLAR

A basic and a clinical award is given each year during the Annual Meeting to new members of the association, who have achieved significant stature in neurological research and who show promise as one who will continue making major contributions to the field of neurology.

DEREK DENNY-BROWN YOUNG NEUROLOGICAL SCHOLAR AWARD IN BASIC SCIENCE

SUNDAY, OCTOBER 15
2:35 PM – 3:00 PM | *Grande Ballroom AB*

Conrad Chris Weihl, MD, PhD
Washington University in St. Louis

Presentation Title:
Connecting Protein Quality Control Pathways in Skeletal Muscle and Muscle Disease

Dr. Weihl is an Associate Professor of Neurology within the Neuromuscular Division at Washington University School of Medicine in St. Louis, Missouri. He has gained international recognition for his work on protein quality control in inherited and acquired myopathies. Specifically, he has defined the pathophysiology and contributed to the genetic identification of disorders that lead to protein aggregation in skeletal muscle. His studies have led to the emerging appreciation that pathogenic pathways across many neurologic disorders such as amyotrophic lateral sclerosis (ALS), fronto-temporal dementia and degenerative myopathies are related.

DEREK DENNY-BROWN YOUNG NEUROLOGICAL SCHOLAR AWARD IN CLINICAL SCIENCE

SUNDAY, OCTOBER 15
1:20 PM – 1:45 PM | *Grande Ballroom AB*

Kevin N. Sheth, MD, FAHA, FCCM, FNCS, FAAN, FANA
Yale University School of Medicine

Presentation Title:
Instructive, Pragmatic, and Successful Trials in Acute Brain Injury: Making Intracerebral Hemorrhage the LEAST Devastating Form of Stroke

Dr. Kevin Sheth graduated from Johns Hopkins University and the University of Pennsylvania School of Medicine. He was a neurology chief resident at Partners Neurology before being appointed the first neurology trained intensivist at the R Adams Cowley Shock Trauma Center. Subsequently, he was recruited to Yale as the founding chief of the Division of Neurocritical Care and Emergency Neurology, where he is also Associate Chair for Clinical Research. He is an internationally recognized leader in translational trials and outcomes for patients with devastating acute neurological syndromes, especially those complicated by brain swelling and hemorrhage. He is a winner of the Robert Siekert Award from the AHA and the author of over 130 publications in critical care neurology and stroke. His highly collaborative work, fostered through innovation and discovery, is dedicated to the improved understanding and treatment of acute neurological disease.

DEREK DENNY-BROWN YOUNG NEUROLOGICAL SCHOLAR AWARD IN CLINICAL SCIENCE

SUNDAY, OCTOBER 15
1:45 PM – 2:10 PM | *Grande Ballroom AB*

Lesli Skolarus, MD, MS
University of Michigan

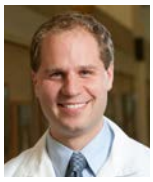
Presentation Title
Reducing the Burden of Stroke in a Disadvantaged Community

Dr. Skolarus is an Associate Professor of Neurology at the University of Michigan. She is a board-certified, fellowship-trained, vascular neurologist whose research focuses on behavioral trials to promote health equity within the context of community based participatory research and health services research. She holds a Master's degree in Health and Health Care Research. She is currently the principal investigator of an NIH-funded U01 award to increase acute stroke treatment rates in Flint, Michigan, an R01 to reduce blood pressure among the working age population in Flint and an R01 to understand the drivers of racial disparities in post-stroke disability. Dr. Skolarus has published over 70 peer-reviewed manuscripts.

DISTINGUISHED NEUROLOGY TEACHER AWARD

The award recognizes and rewards contributions by gifted and talented teachers of neurology. Nominees come from the entire field of clinical neurology or neuroscience.

SUNDAY, OCTOBER 15
1:15 PM | *Grande Ballroom AB*



Zachary Nathaniel London, MD, FAAN
University of Michigan

Dr. London will receive his award in the Derek-Denny Brown Young Neurological Scholar Symposium.

Zachary London has been the residency director at the University of Michigan since 2007. Dr. London's scholarly focus is the development of interactive educational tools. He created EMG Whiz, a popular web-based EMG training simulator. He also developed two mobile applications to teach the fundamentals of neuroanatomic localization, Nerve Whiz and Neuro Localizer. Together, these have been downloaded by over 200,000 users worldwide. He recently published The Lesion: Charcot's Tournament, a tabletop strategy board game about neuroanatomy. He has held numerous leadership positions on national education committees and is currently serving as chair of the Consortium of Neurology Program Directors.

THE GRASS FOUNDATION- ANA AWARD IN NEUROSCIENCE

Established in 2007, the award honors outstanding young investigators conducting research in basic or clinical neuroscience.

SUNDAY, OCTOBER 15
2:10 PM – 2:35 PM | *Grande Ballroom AB*

Clotilde Lagier-Tourenne, MD, PhD
Massachusetts General Hospital and Harvard Medical School

Presentation Title:
Modeling C9ORF72 Disease: A Crucial Step for Therapeutic Development in ALS and Frontotemporal Dementia

This award will be presented in the Derek Denny-Brown Young Neurological Scholar Symposium.

Trained as a medical Geneticist at the University Louis Pasteur of Strasbourg, France, and at Columbia University. After a postdoctoral Training with Dr. Don Cleveland, she became Assistant Professor at the University of California San Diego in 2013, and moved to the Massachusetts General Hospital and Harvard Medical School In 2015. Clotilde Is an Associate Member of the Broad Institute of MIT and Harvard University. She received The Alphonse Laveran Prize, The Milton—Safenowitz Postdoctoral Fellowship, The Muscular Dystrophy Association Career Development Award, the Frick Foundation 2013 Award and the 6th International Medicine Paulo Gontijo Award.

WOLFE NEUROPATHY RESEARCH PRIZE

The Wolfe Research Prize was established in 2009 by Mr. Winston Wolfe and the ANA to honor outstanding investigators who identify a new cause or novel treatment of axonal peripheral neuropathy.

SUNDAY, OCTOBER 15

3:00 PM – 3:15 PM | *Grande Ballroom AB*

Stefanie Geisler, MD
Washington University in Saint Louis

Poster Number: *S297*

Category: *Neuromuscular Disease*

Abstract Title:
Targeting a Core Axonal Degeneration Program to Treat Vincristine and Bortezomib-Induced Axonal Degeneration

Abstract Authors:
Stefanie Geisler, Ryan A. Doan, Xin Huang, Jeffrey Milbrandt and Aaron DiAntonio

Dr. Geisler will make a presentation on her abstract at the Derek Denny-Brown Neurological Scholar Symposium on Sunday, October 15, 2017 from 1:15 PM – 3:15 PM in Grande Ballroom AB.

Dr. Geisler received her MD from the Charité, Medical School of the Humboldt University, Berlin, Germany. She pursued a residency in Neurology and subspecialty fellowship training in Neuromuscular Medicine at Washington University School of Medicine in Saint Louis where she currently works as Assistant Professor in the Department of Neurology.

Dr. Geisler's laboratory research focuses on elucidating and understanding molecular mechanisms of axonal degeneration and regeneration in neuropathies. The translational goal is to find treatments to prevent axonal degeneration and facilitate regeneration in both acquired and inherited neuropathies.

TRAVEL AWARDEES

Each year the ANA selects the top abstracts submitted by fellows, residents, students, or junior faculty to receive a travel award to attend the Annual Meeting and present their work. For more information, please visit the main ANA website.

Poster numbers listed with an **S** will be presented on **SUNDAY, OCTOBER 15**
Poster numbers with an **M** will be presented on **MONDAY, OCTOBER 16**.

Julia E. Thompson, MD, *University of Oxford*
S111 *Outcome of Early Immunotherapy in 103 Patients with Faciobrachial Dystonic Seizures*
Rafer Willenberg, MD, PhD, *University of California, San Diego*
S117 *Cyclic Symptoms of Narcolepsy with Cataplexy: An Unusual Presentation of Immune-Mediated Encephalitis*
Adila Abulhamail, MBBS, *University of California, San Diego*
S124 *Visual Spatial Function in a Lysosomal Storage Disease, Cystinosis*
Kalen Petersen, BS, *Vanderbilt University*
S127 *Ventral Striatal Blood Flow and Network Synchrony Reflect Reward Learning and Behavior in Patients with Parkinson's Disease*
Ryan Darby, MD, *Beth Israel Deaconess Medical Center/Harvard Medical School*
S130 *Network Localization of Free Will Perception*
Natasha Shroff, BS. *Mind Institute, UC Davis*
S140 *HDAC9 Polymorphisms Influence Leukocyte Gene Expression in Patients with Large Vessel Atherosclerotic Stroke*
Takuya Konno, MD, PhD, *Mayo Clinic Florida*
S142 *Partial Loss of Autophosphorylation of CSF1R in a Patient with Familial Ischemic Cerebrovascular Syndrome*
Gyanendra Kumar, MBBS, MD, Mayo Clinic
S147 *Machine Learning Approach to Automating Detection of Cerebral Vasospasm Using Transcranial Doppler Monitoring*
Andrew E, Arrant, PhD, *University of Alabama at Birmingham*
S167 *Restoration of Progranulin to Progranulin-Deficient Mice Corrects Lysosomal Abnormalities: Implications for Frontotemporal Dementia and Neuronal Ceroid Lipofuscinosis*
Srikant Rangaraju, MD MS, *Emory University*
S168 *Targeting Microglial and Macrophage Kv1.3 Potassium Channels as a Therapeutic Strategy in Alzheimer's Disease*
Giuseppe Tosto, MD PhD, *Columbia University*
S172 *Admixture Mapping of Late-Onset Alzheimer's Disease in Caribbean Hispanics*
Leonardino A. Digma, BA, *University of California, San Diego*
S173 *Polygenic Hazard Score Is Associated with In Vivo Imaging Biomarkers of Alzheimer's Disease*
Brendan P. Lucey, MD, *Washington University School of Medicine*
S176 *Sleep Loss Increases Risk of Alzheimer's Disease by Increasing CNS Aβ Production*
David J Irwin, MD, *University of Pennsylvania Perelman School of Medicine*
S182 *Antemortem CSF Tau and Aβ Biomarkers Are Predictive of Postmortem Alzheimer's Disease Pathology in Autopsy-Confirmed Lewy Body Disease*
Yu Wang, MD, PHD, *University of Michigan*
S193 *Modeling Focal Cortical Dysplasia with CRISPRs and Human Stem Cells*
Kyle C. Rossi, MD, *Icahn School of Medicine at Mount Sinai*
S196 *Increased Risk of Readmission for Schizophrenia or Psychosis Following an Admission for Epilepsy Compared to Stroke and Medical Admissions*
Shennan A. Weiss, MD, PhD, *Thomas Jefferson University*
S197 *Evaluating the Diagnostic Accuracy of High-Frequency Oscillations for Localizing Epileptogenic Brain Using Intra-Operative Recordings*
Joseph Glykys, MD, PhD, *Massachusetts General Hospital/Harvard Medical School*
S198 *Hyperosmolar Therapy Reduces Neocortical Epileptiform Activity In Vitro at a Clinically Relevant Dose*
Leah P Gershen, MD, NIMH, *Johns Hopkins University*
S199 *Neuroinflammation in Neocortical Epilepsy*
Peter N. Hadar, AB, *University of Pennsylvania*
S216 *Novel Multi-Slice Glutamate Imaging (GluCEST) of the Hippocampus in MRI-Negative Temporal Lobe Epilepsy*
Palash C. Banik, MPhil, *Bangladesh University of Health Sciences*
S223 *Prevalence and Determinants of Peripheral Neuropathy Among Urban and Rural Bangladeshi Type 2 Diabetic Subjects*
Jason J. Sico, MD, MHS, *Yale University School of Medicine*
S234 *Persistent Pain, Its Intensity, and Risk for Ischemic Stroke Among Persons with Musculoskeletal Disorders*
Christine Hessler, MD, *University of California, San Francisco*
S237 *Does Nighttime Enoxaparin Administration Improve Compliance with Pharmacologic DVT Prophylaxis?*
Sarah Y. Song, MD, MPH, *Rush University Medical Center*
S238 *"Worth the Walk" A Community-Partnered Intervention to Decrease Stroke Risk for Minority Seniors*
Jessica A. Karl, MS, PA-C, *Rush University Medical Center*
S245 *A Novel Deep Brain Stimulation Programming Paradigm for Parkinson's Disease*
Fatima Y. Ismail, MBBS, *The Kennedy Krieger Institute, Johns Hopkins Medical Institutions*
S249 *Using Diffusion Tensor Imaging Based Measurements to Predict Outcomes of Constraint Induced Movement Therapy in Children with Hemiplegic Cerebral Palsy*
Meagen Salinas, MD, *University of Texas Southwestern Medical Center*
S252 *Patient Perceptions and Knowledge of Parkinson Disease and Its Treatment*
Kathryn G. Cannard, *Vanderbilt University Medical Center*
S255 *Deep Brain Stimulation in Early Stage Parkinson's Disease: Ipsilateral, Contralateral, and Axial Motor Symptom Progression*
Mallory L. Hacker, PhD, *Vanderbilt University Medical Center*
S256 *Deep Brain Stimulation in Early Stage Parkinson's Disease May Prevent Rest Tremor Spread*
Danielle Feigenbaum, MDM, *University of Southern California*
S257 *Rytary for Patients with Parkinson's Disease and Intolerable Side Effects to Immediate Release Carbidopa-Levodopa*
Adeel A. Memon, MD, *University of Alabama at Birmingham*
S261 *The Influence of Exercise on Heart Rate Variability During REM Sleep in Parkinson's Disease*
Alana E. Kirby, MD, PhD, *Beth Israel Deaconess Medical Center*
S263 *Optogenetic Activation of the Dorsomedial Medulla Reveals a Role in Precise Timing of Gait*
Deborah Raymond, MS, *Icahn School of Medicine at Mount Sinai*
S264 *MAPT Variants in Two Afro-Caribbean Parkinsonism Patients*

Angela L. Hewitt, MD, PhD, *Mayo Clinic*
S266 *Deep Brain Stimulation for Orthostatic Tremor: 5 Cases from a Single Center*
Zachary D. Wallen, MS, *University of Alabama at Birmingham*
S268 *Interplay of Genetic Risk at SNCA Locus and Dysbiosis of Gut Microbiome in Parkinson's Disease*
Amy W. Amara, MD, PhD, *University of Alabama at Birmingham*
S272 *Slow-Wave Sleep Is Associated with Cognitive Performance in Patients with Parkinson's Disease*
Gregory F. Wu, MD, PhD, *Washington University in St. Louis*
S273 *Rapid Development of Neuroinflammation Associated with the Formation of Subarachnoid B Cell Clusters in a Model of Multiple Sclerosis*
Samantha N. Roman, BS, *Johns Hopkins University School of Medicine*
S276 *Suboptimal Lifestyle Characteristics and Fatigue Among People with Multiple Sclerosis*
Lynn V. Do, PharmD. *University of California, San Francisco*
S277 *Improving the Quality of Interprofessional Care in Multiple Sclerosis: Emerging Role of a Pharmacist at a Large Academic Multiple Sclerosis and Neuroinflammation Center*
Francesca Cignarella, PhD, *Washington University in St. Louis*
S281 *Effects of Intermittent Fasting in Experimental Autoimmune Encephalomyelitis and Multiple Sclerosis*
Zongqi Xia, MD, PhD, *University of Pittsburgh*
S282 *A Phenome-Wide Examination of the Comorbidity Burden Associated with Multiple*
Ariel L. Greenfield, MD, *University of California, San Francisco*
S284 *Clonal B Cell Persistence in Multiple Sclerosis: A Longitudinal Immune Repertoire Study*
David J. Lin, MD, *Massachusetts General Hospital*
S291 *Investigation of the Neural Dynamics of Human Motor Learning Using an Intracortical Brain Computer Interface*
Stefanie Geisler, MD, *Washington University Saint Louis*
S297 *Targeting a Core Axonal Degeneration Program to Treat Vincristine and Bortezomib-Induced Axonal Degeneration*
Christopher G Wier, BS, *The Ohio State University*
S301 *Post-Injury Delivery of AAV9-SMN Accelerates Behavioral and Electrophysiological Recovery Following Peripheral Nerve Injury*
Pranith H. Kumar, MD, *University of Maryland School of Medicine*
S309 *Nicotinamide Riboside Is a Potential Therapy for Diabetic Neuropathy*
Xilma R Ortiz-Gonzalez MD, PhD, *Children's Hospital of Philadelphia and University of Pennsylvania*
S316 *Homozygous Boricua TBCK Mutation Causes Neurodegeneration and Aberrant Autophagy*
Takayuki Fujii, MD, *Neurological Institute, Graduate School of Medical Sciences, Kyushu University*
M102 *An Anti-Plexin D1 Autoantibody Is Associated with Immunotherapy-Responsive Neuropathic Pain*
Jangsup Moon, MD, PhD, *Seoul National University Hospital*
M110 *Cerebrospinal Fluid TRAIL Can Differentiate Viral Encephalitis from Autoimmune Encephalitis at Early Phase*
Sarosh R. Irani, MRCP, DPhil, *University of Oxford*
M112 *Generation of Aquaporin-4 Autoantibodies from B Cells of Patients with Neuromyelitis Optica: Towards Precision Medicine*
Justin Long, MD, PhD, *Washington University School of Medicine*
M135 *Sensitivity and Specificity of CSF VZV Antibody and PCR Testing in Suspected VZV Vasculopathy*
Crystal Dixon, MD, *University of South Florida*
M138 *Spontaneous Intracerebral Hemorrhage Scores: Which Is the Most Predictive of 30-Day Mortality?*
Marina Yu Khodanovich, PhD, *Tomsk State University*
M141 *Macromolecular Proton Fraction (MPF) Mapping Correlates with Histologically Assessed Demyelination in the Rat Stroke Model*
Mona N. Bahouth, MD, *Johns Hopkins School of Medicine*
M143 *Lower Mean Arterial Pressure Impacts Stroke Severity in Patients Who Are in a Volume Contracted State*
Vahid Eslami, MD, *Johns Hopkins School of Medicine*
M145 *False Negative MRI-DWI and CT in Diagnosing Acute Posterior Fossa Ischemic Stroke: A Systematic Review*
Dongming Cai, MD, PhD, *Icahn School of Medicine at Mount Sinai*
M167 *Characterization of Molecular Mechanism(s) by Which ApoE4 Genotype Influences the Development of Alzheimer's Disease After Traumatic Brain Injury*
Tasneem F. Hasan, *University of Texas*
M172 *Combating Toxicity by Targeting Neurotoxic Tau Oligomers Through Intravenous Immunoglobulin (IVIG) Antibodies and the Anti-Inflammatory Role of Sialylated IVIG in Alzheimer's Disease*
Renaud La Joie, PhD, *University of California, San Francisco*
M183 *Does APOE ε4 Have an Aβ-Independent Effect on Tau Pathology? Neuroimaging Investigations in Cognitively Normal Elders and Patients with Alzheimer's Disease*
Jasmeer P. Chhatwal, MD, PhD, *Harvard Medical School - Massachusetts General Hospital*
M184 *Differential Genotypic Variance in PET and CSF Measures of Amyloid Burden in Autosomal Dominant AD: Findings from the DIAN Study*
Daniel Kenney-Jung, MD, Mayo Clinic
M193 *Automated Localization of Seizure Foci in SPM-SPECT*
Mark A. Gorenstein, BA, *Dartmouth-Hitchcock Medical Center*
M194 *Modulating Interictal Spiking Through Targeted Electrical Stimulation During a Word List Memory Task*
Kelsey M. Smith, MD, *Mayo Clinic*
M195 *The Natural History of Jeavons Syndrome*
Saud Alhusaini, MD, PhD, *Montreal Neurological Institute and Hospital*
M198 *Neuroanatomical Correlates of SCN1A Common Variant Linking Mesial Temporal Lobe Epilepsy, Hippocampal Sclerosis, and Febrile Seizures*
Louis T. Dang, MD, PhD, *University of Michigan*
M202 *Using Dravet Syndrome Patient-Specific Neurons to Screen for Effective Anti-Seizure Medications*
Tae-Joon Kim, BS, *Seoul National University Hospital*
M212 *Gene Network of Epilepsy Related Genes Using STRING Analysis*
Samuel D. Kampondeni, MD, *Blantyre Malaria Project*
M221 *MRI Brain Volume Measures as Proxy for Intracranial Pressure Predict Outcome in Pediatric Cerebral Malaria*
Melissa A. Elafros, MD, PhD, MA, *Johns Hopkins University*
M223 *Epilepsy-Associated Stigma in Zambia (EASZ): Determinants of Stigma and Effective Stigma-Reduction Interventions*
Sarah Mohajeri Moghaddam, MD, MPH, *University of Rochester Medical Center*
M224 *Posterior Reversible Encephalopathy Syndrome (PRES) in Cerebral Malaria: Clinical Risk Factors and Prognosis*
Altaf Saadi, MD, *National Clinical Scholars Program, University of California, Los Angeles*
M225 *Neurology in Humanitarian Emergencies: A Retrospective Analysis of Consults via the Médecins Sans Frontières Telemedicine Platform*
Jennifer M. Duringer, PhD, *College of Agricultural Sciences, Oregon State University*
M230 *Nodding Syndrome: Multimycotoxin Case-Control Study in Northern Uganda*
Anna Myburgh, APRN, CNP, *Mayo Clinic*
M233 *Headache in the Epilepsy Monitoring Unit: Prevalence and Classification of Postictal Phenomenon*
Adam K. Richards, MD, PhD, MPH, *University of California, Los Angeles*
M236 *Derivation and Application of a Quantitative Approach to Estimate Global Stroke Risk Reduction for Multi-Faceted Interventions to Prevent Recurrent Stroke*
Arvin R. Wali, BA, *University of California, San Diego*
M239 *Cost Effectiveness of Reconstructive Neurosurgery to Restore Elbow Flexion in Upper Brachial Plexus Injury*
Shuichi Suzuki, MD, *University of California, Irvine*
M241 *Mimics of Spinal Dural Arteriovenous Fistula and Spinal Arteriovenous Malformation*
Roberto A. Ortega, MS. *Icahn School of Medicine at Mount Sinai*
M244 *Possible Link Between Crohn's Disease and LRRK2 Mutation Parkinson's Disease*
Tritia R. Yamasaki, MD, PhD, *University of Kentucky*
M248 *Biochemical Differences in Pathologic alpha-Synuclein in Synucleinopathies*
Philip Laquer, BS, *Icahn School of Medicine at Mount Sinai*
M250 *Deep Brain Stimulation Surgery in N370S Glucocerebrosidse (GBA) Mutation Parkinson's Disease*
Angela B. Deutschlander, MD, *Mayo Clinic*
M254 *Genetic Characterization of PD-Related Genes in African American Patients Using Exome Sequencing*

Shivika Chandra, MD, *University of Texas Health Science Center, Houston*
M258 *Improved Atypical Tremor Control After DBS Directly Targeting the Dentato-Rubro-Thalamic Tract*
Rizwan S. Akhtar, MD, PhD, *University of Pennsylvania*
M261 *Detection of alpha-Synuclein Using Fibril Conformation-Selective Antibodies*
Autumn S. Ivy, MD, PhD,*Stanford University*
M264 *B6-Responsive Encephalopathy and Movement Disorder Caused by Mutation in PROSC Resembles AADC Deficiency*
Hye-Rim Shin, MD, *Seoul National University Hospital*
M288 *Respiratory Pathogens in Neurologic Patients: Trends in Etiology and Antibiotic Resistance over 11 Years*
Michael R. Wilson, MD, MAS, *University of California, San Francisco*
M290 *A Prospective, Multi-Center Trial of Metagenomic Next-Generation Sequencing for the Diagnosis of Infectious Causes of Acute Meningitis and Encephalitis*
Soneela Ramesh, PhD, *Mayo Clinic*
M297 *Patient iPSC-Derived Sensory Neuron Axonal Damage Quantification Using Microfluidic Chamber Techniques*
Nicolas N. Madigan, MB, BCh, BAO, PhD, *Mayo Clinic*
M301 *Regenerating Axons and Blood Vessels in Tissue Engineered Scaffolds Have Defined Spatial Relationships After Complete Spinal Cord Injury in Rats*
Eric C. Landsness, MD, PhD, *Washington University*
M329 *Mapping the Neural Basis of Functional Connectivity in Genetically-Encoded Calcium Indicator (GECI) Mice During Wakefulness, Sleep, and Under Anesthesia*
Miranda M. Lim, MD, PhD, *Veterans Affairs Portland Health Care System*
M332 *Disrupted Infradian Rhythms in Mild Cognitive Impairment*
Orit H. Lesman-Segev, MD, MMedSc, *University of California, San Francisco*
M335 *18F-AV1451 Tau PET in Patients at Risk for Chronic Traumatic Encephalopathy*

ACADEMIC NEUROLOGY REPRESENTATIVES FROM JAPAN

We are pleased to have four representatives from the Japanese Society of Neurology participating in sessions of the ANA 2017 Annual Meeting.

Susumu Kusunoki, MD, PhD, is Professor and Chairman of Department of Neurology, Kindai University Faculty of Medicine in Osaka, Japan. He graduated from University of Tokyo in 1978. He has been involved in research on anti-glycolipid antibodies in autoimmune neuropathies, such as anti-GQ1b antibodies in Fisher Syndrome. He is now President of the Japanese Society for Neuroimmunology, President of Japanese Peripheral Nerve Society, and Trustee and Chair of the Education Committee of the Japanese Society of Neurology.

Dr. Kusunoki will be presenting in the **Special Interest Group session on Autoimmune Neurology on "Chronic Immune Demyelinating Polyneuropathy (CIDP) and Associated Antibodies"** scheduled on **Monday, October 16** from **3:30 PM to 5:30 PM** in Nautilus 4.

Hidehiro Mizusawa, MD, PhD, has been President of National Center of Neurology and Psychiatry (2016-present) and Director General of the Hospital (2014-present). He was Professor and Chair of Department of Neurology, Tokyo Medical and Dental University (1996-2014). He graduated with MD in 1976 and later received PhD from Tokyo University. He was Assistant and then Associate Professor of Department of Neurology, Tsukuba University (1984-1996). He has contributed particularly to research of pathogeneses of ALS, PSP, SCA and Prion disease. He has been Chairman of Research Committees on Prion disease and on Ataxias. He served as President of Japanese Society of Neurology (2010-2014), Prion2016 and World Congress of Neurology 2017 (WCN2017).

Dr. Mizusawa will be presenting in the **Special Interest Group session on Neuromuscular Disease on "ALS-Top 43 May Be Cured with SCA31 Related RNA Repeats"** scheduled on **Monday, October 16** from **3:30 PM to 5:30 PM** in Marina 6.

Ryosuke Takahashi, MD, PhD, graduated from Kyoto University, Japan in 1983. He completed his neurology residency in Kyoto University Hospital and its affiliated hospitals. In 1989, he started basic research on neurodegenerative disorders and neuronal apoptosis as a staff scientist at Tokyo Metropolitan Institute for Neurosciences, and then he worked as a postdoctoral fellow at the Sanford-Burnham Institute, California, USA. He became Laboratory Head at RIKEN Brain Science Institute, Japan, in 1999. In 2005, he was appointed Professor and Chair of Neurology at Kyoto University Hospital and Kyoto University Graduate School of Medicine. He served as the chair of the task force for 2011 version of the treatment guidelines for Parkinson's disease in Japan. In 2014, he was elected the President of Japanese Society of Neurology. He also serves as the Vice President of Japanese Society for Neuroscience. He is on the editorial board of Movement Disorders, Journal of Neural Transmission, Molecular Brain and Neurology & Clinical Neuroscience. He has published more than 330 original and review articles in peer-reviewed international journals including Nature, Cell and Neuron. His major research interests are the molecular pathogenetic mechanisms underlying Parkinson's disease and its related disorders and development of disease-modifying therapies against neurodegenerative disorders.

Dr. Takahashi will be presenting in the **Special Interest Group session on Movement Disorders on "In Vitro Modeling of Oligodendroglial α-Synuclein Pathology in Multiple System Atrophy"** scheduled on **Sunday, October 15** from **3:30 PM to 5:30 PM** in Marina 6.

Yoshikazu Ugawa, MD, PhD, is now the Director and Professor, Department of Neurology, and Vice President, Fukushima Medical University, in Fukushima, Japan. He endured the disaster of the earthquake in Japan in 2011, and he still lives in Fukushima. He graduated from Tokyo University in 1978 and studied clinical neurophysiology under Professor Marsden in Queen Square, London in 1987-1900, and went back to Tokyo University in 1990. Dr. Ugawa has been at his present position in Fukushima since 2007. He is interested in clinical neurophysiology and is one of the pioneers of transcranial magnetic stimulation. He studies pathophysiological mechanisms underlying various involuntary movements, especially in Parkinson's disease.

Dr. Ugawa will be presenting in the **Interactive Lunch Workshop: Extranigral Parkinson Disease and Parkinsonism on "Eye Movements in Parkinsonism – Focus on Saccadic Intrusions"** scheduled for **Tuesday, October 17** from **11:00 AM to 12:00 PM** in Nautilus 2.

ANA 2017 ABSTRACT REVIEWERS

We want to thank the experts who reviewed the 484 abstracts submitted in 17 categories for selection for inclusion in this year's Poster Presentations. They performed an outstanding service for ANA. Based on these ratings and comments, authors of 57 impressive studies were selected to give short oral presentations of their abstracts, named "Data Blitz Presentations", during both plenary and special interest group sessions.

David Alexander, MD, *University of California, Los Angeles*
Hafeez Ullah, Amin, PhD, *Universiti Teknologi PETRONAS, Center for Intelligent Signal and Imaging Research Neural Signal Processing*
Beau Ances, MD, PhD, *Washington University in St. Louis*
Carmel Armon, MD, MSc, MHS, *Assaf Harofeh Medical Center*
Aaron Berkowitz, MD, PhD, *Brigham and Women's Harvard Medical School*
Kerstin Bettermann, MD, PhD, *Penn State*
Craig Blackstone, MD, PhD, *National Institute of Neurological Disorders and Stroke*
Robert Brown, MD, MPH, *Mayo Clinic*
Tracey A. Cho, MD, *Harvard University*
Kon Chu, MD, PhD, *Seoul National University Hospital*
Stacey Clardy, MD, PhD, *University of Utah*
William Dauer, MD, *University of Michigan*
Ramon Diaz-Arrastia, MD, PhD, *Penn Presbyterian Medical Center*
Exuperio Diez-Tejedor, MD, PhD, FAHA, FESO *La Paz University Hospital - Autónoma University of Madrid, Madrid, Spain*
Johanna Fifi, MD, *Icahn School of Medicine at Mount Sinai*
Denson Fujikawa, MD, *University of California, Los Angeles*
Aristea Galanopoulou, MD, PhD, *Albert Einstein College of Medicine*
Jeffrey Gelfand, MD, *University of California, San Francisco School of Medicine*
Elias Giraldo, MD, PhD, *University of Central Florida College of Medicine*
Christian Gericke, MD, *University of Queensland*
Chris Giza, MD, *University of California, Los Angeles, David Geffen School of Medicine*
Alicia Goldman, MD, PhD, MS, *Baylor College of Medicine*
Rebecca Gottesman, MD, PhD, *Johns Hopkins University*
Varan Govind, PhD, *University of Miami*
Glenn Graham, MD, PhD, *Department of Veterans Affairs*
Arthur Grant, MD PhD, *SUNY Downstate Medical Center*
Daniel Harrison, MD, *University of Maryland*
Anhar Hassan, MD, *Mayo Clinic*
Leigh Hochberg, MD, *Harvard University*
David Holtzman, MD, *Washington University in St. Louis*
Lawrence Honig, MD, PhD, FAAN, *Columbia University Medical Center*
David Hwang, MD, *Yale University*
Teresa Jacobs, MD, *University of Michigan*
Joanna C Jen, MD, PhD, *University of California, Los Angeles*
Nathalie Jette, MSc, MD, *Icahn School of Medicine at Mount Sinai*
Glen Jickling, MD, FRCPC, *University of California, Davis*
S. Andrew Josephson, MD, *University of California, San Francisco*
Ralph Jozefowicz, MD, *University of Rochester*
Loannis Karakis, MD, PhD, MSc, *Emory University*
Mohamed Kazamel, MD, *University of Alabama at Birmingham*
Kevin Kerber, MD, MS, *University of Michigan*
Nerissa Ko, MD, *University of California, San Francisco*
Joel Kramer, PsyD, *University of California, San Francisco*
Richard Leigh, MD, *National Institute of Neurological Disorders and Stroke*
Jun Li, MD, PhD, *Vanderbilt University*
Miranda Lim, MD, PhD, *Oregon Health and Science University and Portland VA*
Jenny Linnoila, MD, PhD, *Massachusetts General Hospital*
Irene Litvan, MD, *University of California, San Diego*
Elisabeth Marsh, MD, *Johns Hopkins University*
Steve Massa, MD, *University of California, San Francisco*
Andrew McKeon, MB, BCh, MD, *Mayo Clinic*
Elamaran Meibalan, PhD, *Harvard University*
Giovanni Meola, MD, *University of Milan, Italy*
Timothy Miller, MD, PhD, *Washington University in St. Louis*
Margherita Milone, MD, PhD, *Mayo Clinic*
Jonathan Mink, MD, *University of Rochester*
Biswapriya Misra, PhD, *Texas Biomedical Research Institute*
Maliheh Mohamadpour, MD, *SUNY Downstate Medical Center*
Gholam Motamedi, MD, *Georgetown University*
Ellen Mowry, MD, MCR, *Johns Hopkins University*
Tahseen Mozaffer, MD, *University of California, Irvine*
Susanne Muehlschlegel, MD, MPH, FNCS, FCCM *U Mass Memorial Medical Center*
Douglas Ney, MD, *University of Colorado*
Robin Novakovic, MD, *The University of Texas Southwestern Medical Center*
John Papatriantafyllou, MD, *National and Kapodistrian University of Athens, Greece*
Sandipan Pati, MD, *University of Alabama at Birmingham*
Craig Powell, MD, *The University of Texas Southwestern Medical Center*
William Powers, MD, *University of North Carolina at Chapel Hill*
Mary Quiceno, MD, *The University of Texas Southwestern Medical Center*
Meheroz Rabadi, MD, MRCPI, FAAN, FANA, *Veterans Affairs Medical Center*
Gil Rabinovici, MD, *University of California, San Francisco*
Michael Racke, MD, *The Ohio State University*
Laura P.W. Ranum, PhD, *University of Florida*
Erik Robertson, MD, PhD, *University of Alabama at Birmingham*
Tina Roostaei, MD, MPH, *Columbia University*
M. Elizabeth Ross, MD, PhD, *Weill Cornell Medical College*
Kinshuk Sahaya, MD, *University of Arkansas*
Vicenta Salanova, MD, *Indiana University*
Rachel Saunders-Pullman, MD, MPH, MS, *Icahn School of Medicine at Mount Sinai*
David Schiff, MD, *University of Virginia*
Duygun Selcen, MD, *Mayo Clinic*
Johann Sellner, MD, *Paracelsus Medical University, Austria*
Zaeem Siddiqi, MD, *University of Alberta, Canada*
Lesli Skolarus, MD, MS, *University of Michigan*
John Stern, MD, *University of California, Los Angeles*
David Thaler, MD, PhD, FAHA, *Tufts Medical Center*
Michel Torbey, MD, MPH, *The Ohio State University*
Barbara Vickrey, MD, MPH, *Icahn School of Medicine at Mount Sinai*
Angela Vincent, MBBS, *University of Oxford*
Conrad Chris Weihl, MD, PhD, *Washington University in St. Louis*
Jennifer Whitwell, PhD, *Mayo Clinic*
Joshua Willey, MD, MS, *Columbia University*
Allison Willis, MD, MS, *University of Pennsylvania*
Guangbin Xia, MD, PhD, *University of Florida*
Phyllis Zee, MD, PhD, *Northwestern University*

ANA 2017 BOARD OF DIRECTORS

EXECUTIVE COMMITTEE/OFFICERS

PRESIDENT | **Barbara G. Vickrey, MD, MPH** — 2015–2017
Icahn School of Medicine at Mount Sinai

PRESIDENT ELECT | **David M. Holtzman, MD** — 2015–2017
Washington University in St. Louis

PAST PRESIDENT | **Robert H. Brown, Jr, DPhil, MD** — 2015–2017
University of Massachusetts

VICE PRESIDENT | **Craig D. Blackstone, MD, PhD** — 2016–2018
National Institute of Neurological Disorders and Stroke

TREASURER | **Kenneth L. Tyler, MD** — 2014–2018
University of Colorado

SECRETARY | **Jack M. Parent, MD** — 2013–2017
University of Michigan

DIRECTORS

David J. Fink, MD — 2014–2017
University of Michigan

Clifton L. Gooch, MD — 2015–2018
University of South Florida

Rebecca F. Gottesman, MD, PhD — 2014–2017
Johns Hopkins University

Frances E. Jensen, MD — 2016–2019
University of Pennsylvania

Jaideep Kapur, MD, PhD — 2016–2019
University of Virginia

Beth Ann Malow, MD, MS — 2016–2019
Vanderbilt University

Craig M. Powell, MD, PhD — 2015–2018
UT Southwestern Medical Center

M. Elizabeth Ross, MD, PhD — 2014–2017
Weill Cornell Medical College

David G. Standaert, MD, PhD — 2014–2017
University of Alabama at Birmingham

Allison W. Willis, MD, MS — 2015–2018
University of Pennsylvania

ANA 2017 COMMITTEES, SUBCOMMITTEE & TASK FORCES

Scientific Program Advisory Committee

The overall educational focus of the Annual Meeting has been planned by the following dedicated and accomplished ANA committee members:

CHAIR | **Laura P.W. Ranum, PhD** | 2013 – 2017 | *University of Florida*
William T. Dauer, MD | 2015 – 2018 | *University of Michigan*
Alica Goldman, M.D, PhD, MS | 2015 – 2018 | *Baylor University*
Rebecca F. Gottesman, MD, PhD | 2014 – 2017 | *Johns Hopkins University*
Leigh R. Hochberg, MD, PhD | 2014 – 2017 | *Harvard University*
Kevin Kerber, MD, MS | 2015 – 2018 | *University of Michigan*
Timothy Miller, MD, PhD | 2016 – 2019 | *Washington University in St. Louis*
Ellen Mowry, MD, MCR | 2016 – 2019 | *Johns Hopkins University*
Craig M. Powell, MD, PhD | 2014 – 2017 | *University of Texas, Southwestern*
Gil Rabinovici, MD | 2016 – 2019 | *University of California, San Francisco*
Michael Racke, MD | 2015 – 2018 | *The Ohio State University*
M. Elizabeth Ross, MD, PhD | 2015 – 2018 | *Weill Cornell Medical College*
Rachel Saunders-Pullman, MD, MPH, MS | 2016 – 2019 | *Icahn School of Medicine at Mount Sinai*
Conrad Weihl, MD, PhD | 2016 – 2018 | *Washington University in St. Louis*
David Holtzman, MD *(Ex-Officio)* | 2016 – 2018 | *Washington University in St. Louis*
Barbara G. Vickrey, MD, MPH *(Ex-Officio)* | 2016 – 2018 | *Icahn School of Medicine at Mount Sinai*

2017 Local Arrangements Subcommittee

Our thanks to the 2017 Local Arrangements Subcommittee for their ideas, energy and assistance to staff.

CHAIR | **James Brewer, MD, PhD** | *University of California, San Diego*
Joshua Alexander, DO, MPH | *Scripps Clinic*
Jerold Chun, MD, PhD | *Sanford Burnham Prebys Medical Discovery Institut*
Irene Litvan, MD | *University of California, San Diego*
Huaxi Xu, PhD | *Sanford Burnham Prebys Medical Discovery Institute*
William Mobley, MD, PhD, FRCP | *University of California, San Diego*

Career Development Workshops Task Force

Thank you to the Career Development Workshops Task Force chair and members for your hard work on this year's program. Your assistance planning the career development workshops was invaluable.

CHAIR | **Amy Ann Pruitt, MD** | 2016 – 2018 | *University of Pennsylvania*
David J. Fink, MD | 2016 – 2018 | *University of Michigan*
Roy Hamilton, MD, MS | 2014 - 2017 | *University of Pennsylvania*
Frances E. Jensen, MD | 2016 – 2019 | *Rush University (Ex-Officio)*
Christina Marra, MD 2016 – 2018 | *University of Washington, Seattle*
Lauren Sansing, MD | 2016 – 2018 | *University of Michigan*
David Standaert, MD, PhD | 2016 – 2018 | *Rush University, Board Liasion*

Interactive Lunch Workshops Task Force

Thank you to the Interactive Lunch Workshops Task Force co-chairs and members for your help in planning the 14 Interactive Lunch Workshops. Your assistance and guidance was invaluable and greatly appreciated.

Co-CHAIR | **Allison Willis, MD, MS** | 2016 – 2018 | *University of Pennsylvania*
Co-CHAIR | **Pedro Gonzalez-Alegre, MD, PhD** | 2016 – 2018 | *University of Pennsylvania*

Members

Beau Ances, MD, PhD, MSc | 2016 – 2018 | *Washington University in St. Louis*
Neeraj Badjatia, MD, MS | 2016 – 2018 | *University of Maryland*
Brent Fogel, MD, PhD | 2016 – 2018 | *University of California, Los Angeles*
Jennifer Goldman, MD, MS | 2016 – 2018 | *Rush University*
Chadwick Hales, MD | 2016 – 2018 | *Emory University*
Teresa Jacobs, MD | 2016 – 2018 | *University of Michigan*
Joshua Levine, MD | 2016 – 2018 | *University of Pennsylvania*
Shyam Prabhakaran, MD, MS | 2016 – 2018 | *Northwestern University*
Binit Shah, MD | 2016 – 2018 | *University of Virginia*
Tanya Simuni, MD | 2016 – 2018 | *Northwestern University*
Mark Wainwright, MD, PhD | 2016 – 2018 | *Northwestern University*

American Neurological Association since 1875
www.myana.org

1120 Route 73 | Suite 200 | Mount Laurel, NJ 08054
T (856) 380-6892 | F (856) 439-0525 | info@myana.org | www.myana.org

UPDATES IN DIAGNOSING AND TREATING ALZHEIMER DISEASE

WHERE DO WE STAND? CME

MONDAY, OCTOBER 16, 2017

REGISTRATION AND BREAKFAST: 5:45 AM – 6:10 AM | **PRESENTATION:** 6:10 AM – 7:30 AM

VENUE: SHERATON SAN DIEGO HOTEL AND MARINA | **ROOM:** GRANDE BALLROOM C

AGENDA

5:45 AM – 6:10 AM
Registration and Breakfast

6:10 AM – 6:20 AM
Welcome and Introduction
Marwan N. Sabbagh, MD

6:20 AM – 6:35 AM
Defining the Relationship Between MCI and AD in Clinical Practice
Howard Feldman, MD

6:35 AM – 6:50 AM
Tools for the Early Identification of AD
R. Scott Turner, MD, PhD

6:50 AM – 7:05 AM
Evaluating the Amyloid Hypothesis of AD: Are We on the Right Path?
Marwan N. Sabbagh, MD

7:05 AM – 7:20 AM
Evaluating the Current Status of Investigational Therapies Targeting Amyloid Beta and Tau
Paul S. Aisen, MD

7:20 AM – 7:30 AM
Question-and-Answer Session
All faculty

Medscape® LIVE!

Supported by an independent educational grant from Eli Lilly and Company

To learn more please visit: **www.medscape.org/sites/townhall/public/alzheimer-2017**