91ST ANNUAL MEETING

June 11-14, 2015
Grand Hyatt Denver

American Association of Neuropathologists

MEETING PROGRAM

AANP

AMERICAN ASSOCIATION OF NEUROPATHOLOGISTS

June 11 - 14, 2015

THE GRAND HYATT DENVER HOTEL

Denver, Colorado

This activity is sponsored by the American Association of Neuropathologists.

Save the Date!

92nd Annual Meeting

AANP

AMERICAN ASSOCIATION OF NEUROPATHOLOGISTS

June 16th – 19th 2016

The Hyatt Regency Baltimore
On The Inner Harbor
300 Light Street
Baltimore, MD 21202

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OFFICIAL JOURNAL

Journal of Neuropathology and Experimental Neurology
Raymond A. Sobel, MD, Editor
Eileen S. Healy, Managing Editor
E-mail: jnen@pathology.wisc.edu
Home page: http://www.jneuropath.com

DIAGNOSTIC SLIDE SESSION

Caterina Giannini, MD, PhD and Rebecca Folkerth, MD, *Managers*

COMMITTEES

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Sriram Venneti, MBBS
Thomas Beach, MD, PhD

CME INFORMATION

TARGET AUDIENCE

The educational design of AANP's Annual Meeting addresses the needs of physicians and scientists in the field of neuropathology who are involved in the diagnosis and/or treatment of patients with neurological disorders.

STATEMENT OF NEED

The purpose of this activity shall be to advance medical and scientific knowledge, understanding, and competence in the practice of neuropathology. The practice of neuropathology is understood to include diagnosis of diseases of the nervous system, scientific investigation into their causes, and teaching of neuropathology principles to colleagues and trainees.

LEARNING OBJECTIVES

Upon completion of this activity, participants should be able to:

- Cite new information on the underlying causes and mechanisms of neurologic diseases
- Discuss research findings related to genetics and molecular mechanisms to better understand disorders of brain neoplasia and neurodegeneration
- Incorporate new knowledge into improving everyday clinical practice and teaching of neuropathology

DISCLAIMER

Participants have an implied responsibility to use the newly acquired information to enhance patient outcomes and their own professional development. The information presented is this activity is not meant to serve as a guideline for patient management. Any procedures, medications, or other courses of diagnosis or treatment discussed in this activity should not be used by clinicians without evaluation of patient conditions and possible contraindications on dangers in use, review of any applicable manufacturer's product information, and comparison with recommendations of other authorities.

CME INFORMATION (Continued)

CME CREDIT

Physician Accreditation Statement

The American Association of Neuropathologists is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

Physician Credit Designations

The American Association of Neuropathologists designates this live educational activity for a maximum of 25.0 *AMA PRA Category 1 Credits™* . Physicians should only claim credit commensurate with the extent of their participation in the activity.

Instructions to Receive Credit

In order to receive credit for this activity, the participant must complete the CME evaluations and credit applications for sessions attended, which are made available through the AANP Meeting App (http://eventmobi.com/aanp2015). Evaluations can also be accessed at the following links:

- ***Special Course:*** https://www.surveymonkey.com/s/RGD9NZ5
- ***Presidential Symposium:*** https://www.surveymonkey.com/s/RGGFRVL
- ***Overall Annual Meeting and Special Lectures:*** https://www.surveymonkey.com/s/RBYMM5Y

The chart below outlines which sessions are offered for CME credit and the maximum number of credit hours a physician can earn for each educational activity being certified for *AMA PRA Category 1 Credit™* at this year's Annual Conference.

Activity	CME Credit Hours
Special Course	6.75
Scientific Sessions	8
Korey Lecture	1
DeArmond Lecture	1
Parisi Lecture	1
Moore Lecture	1
Diagnostic Slide Session	3
Presidential Symposium	3.25
Total	**25**

For any questions regarding the accreditation of this meeting, please contact AANP's CME Coordinator, Krista Carrothers, via e-mail at: kcarrothers@aoeconsulting.com, or via phone at: 303-557-0859 x86.

DISCLOSURE INFORMATION

Disclosure of Commercial Support:
"In-kind" support through the donation of microscopes is being provided by Nikon.

Disclosure of Unlabeled Use:
This educational activity may contain discussion of published and/or investigational uses of agents that are not indicated by the FDA. The American Association of Neuropathologists does not recommend the use of any agent outside of the labeled indications.

The opinions expressed in this educational activity are those of the faculty and do not necessarily represent the views of any organization associated with this activity. Please refer to the official prescribing information for each product for discussion of approved indications, contraindications and warnings.

Disclosure of Conflict of Interest:
The American Association of Neuropathologists requires instructors, planners, managers and other individuals who are in a position to control the content of this activity to disclose any real or apparent conflict of interest they may have as related to the content of this activity. All identified conflicts of interest are thoroughly vetted by AANP for fair balance, scientific objectivity of studies mentioned in the materials or used as the basis for content, and appropriateness of patient care recommendations. Complete disclosure information will be provided to learners on-site.

Planners and Managers

*The following planners and managers have **nothing to disclose**:*

Thomas **Beach**, Eileen **Bigio**, Daniel **Brat**, Mark **Cohen**, Ivana **Delalle**, Steven **Dubner**, Matthew **Frosch**, Kar-Ming **Fung**, Miguel **Guzman**, William **Hickey**, Edward **Lee**, David **Louis**, Maria **Martinez-Lage**, Maria Beatriz **Lopes**, Thomas **Montine**, Brian **Moore**, Robert **Mrak**, Kathy **Newell**, Suzanne **Powell**, Robert Ross **Reichard**, Marie **Rivera-Zengotita**, Fausto **Rodriguez**, Mariarita **Santi-Vicini**, Julie **Schneider**, Raymond **Sobel**, Charles **Specht**, Jane **Uyehara-Lock**, Sriram **Venneti**, Cindy **Welsh**, Charles **White III**, Anthony **Yachnis**, William **Yong**.

The following **planners/managers** reported the following financial relationships or relationships to products or devices they or their spouse/ partner have with commercial interests related to the content of this CME Activity.

Michael **Lawlor**	**Consultant/Independent Contractor:** Sarepta Therapeutics **Grant/Research Support & Honoraria:** Audentes Therapeutics
John M. **Lee**	**Consultant/Independent Contractor:** Up-to-date Reviewer/consultant on Prion disease articles
Julie **Schneider**	**Consultant/Independent Contractor:** AVID Radiopharmaceuticals, Eli Lilly, Inc., Navidea Biopharmaceuticals
William H. **Yong**	**Consultant/Independent Contractor:** Amgen **Grant/Research Support**: Amgen

DISCLOSURE INFORMATION (Continued)

Faculty

*The following faculty have **nothing to disclose:***

Marwah **Abdulkader**, Malak **Abedalthagafi**, Stephanie **Adams**, Sanda **Alexandrescu**, Safa **Al-Sarraj**, Murad **Alturkustani**, Thomas **Beach**, W. Robert **Bell**, Adle-**Biassette**, Eileen H. **Bigio**, Andrew **Bollen**, Steven L. **Carroll**, Jason Cheng-Hsuan **Chiang**, Elizabeth **Cochran**, Jennifer **Cotter**, Matthew **Cykowski**, Armine **Darbinyan**, Marc R. **Del Bigio**, Ivana **Delalle**, Phadias **Diamandis**, Dennis **Dickson**, Eleanor **Drummond**, Emma **Du**, Brittany N. **Dugger**, Charles **Eberhart**, Arline **Faustin**, Amanda **Fisher-Hubbard**, Margaret **Flanagan**, Matthew **Frosch**, Maria Magdalena **Georgescu**, Caterina **Giannini**, Jeffrey **Golden**, Francoise **Gray**, Kimmo **Hatanpaa**, E. Tessa **Hedley-Whyte**, Eric **Holland**, Craig Michael **Horbinski**, Cristiane **Ida**, Hatanpaa **Kimmo**, Julia **Kofler**, Edward B. **Lee**, Li **Lei**, Jian-Qiang **Lu**, Hansen **Lui**, Qinwen **Mao**, Maria **Martinez-Lage**, David **Meredith**, Michael **Miller**, Thomas **Montine**, Brian **Moore**, Steven **Moore**, David G. **Munoz**, David **Nauen**, Peter **Nelson**, Kathy **Newell**, Hilary **Nickols**, James **Nix**, Amber **Nolan**, Derek **Oakley**, Brent **Orr**, Richard Justin **Perrin**, Arie **Perry**, Suzanne **Powell**, Ravi **Raghavan**, Eric **Reiman**, Gerald **Reis**, Elizabeth **Rinehart**, Marie **Rivera-Zengotita**, Fausto **Rodriguez**, Subhojit **Roy**, Mariarita **Santi-Vicini**, Harvey **Sarnat**, Gerard **Schellenberg**, Fatma **Scerif**, Bill **Seeley**, Matija **Snuderl**, David **Solomon**, Charles **Specht**, Abeer **Tabbarah**, Randy **Tashjian**, Cheddhi **Thomas**, Elisabeth **Tournier-Lasserve,** Nadejda **Tsankova**, Rachael **Vaubel**, Sriram **Venneti**, Adelita **Vizcaino**, Charles **White**, III, Clayton **Wiley**, Christopher **William**, Matthew D. **Wood**, Jennifer **Ziskin**

The following **faculty** reported the following financial relationships or relationships to products or devices they or their spouse/ partner have with commercial interests related to the content of this CME Activity.

Lea Tenenholz Grinberg	**Research Support:** AVID Radiopharmaceutics
Bruce Lamb	**Grant/Research Support:** Teva Pharmaceuticals
Julie Schneider	**Consultant/Independent Contractor:** AVID Radiopharmaceuticals, Eli Lilly, Inc., Navidea Biopharmaceuticals

GENERAL INFORMATION

LOCATION

Grand Hyatt Denver Hotel
1750 Welton Street
Denver, CO 80202
Phone: (303) 295-1234

ALL meeting sessions will be held at the Grand Hyatt Denver

All platform presentations and general sessions (Special Lectures, Korey Lecture, DeArmond Lecture, Parisi Lecture, Moore Lecture, Business Meetings, Diagnostic Slide Session, and Presidential Symposium) will be held in the **Imperial Ballroom and Grand Ballroom** of the hotel on the second floor.

All poster sessions will be held in the **Grand Ballroom, Grand Ballroom Foyer and Imperial Ballroom Foyer** on the second floor.

REGISTRATION DESK

Imperial Ballroom Foyer	
Wednesday, June 10	12:00 noon – 9:00 pm
Thursday, June 11	6:30 am - 6:00 pm
Friday, June 12	6:30 am - 6:00 pm
Saturday, June 13	6:30 am - 6:00 pm

PRE-REGISTRATION PICK-UP

Attendees pre-registered and pre-paid for the Meeting will have their name badge, program booklet, and June 2015 issue of *JNEN* with abstracts, reception ticket, and registration receipt ready for pick-up at the AANP Registration Desk, located in the foyer area outside of the Imperial Ballroom on the second floor. On-site registration and additional tickets for the Annual Reception will be available at the registration desk.

NAME BADGE REQUIREMENT

Your name badge is required for admittance to any function of the Association, including the Special Course, all Friday, Saturday and Sunday sessions, and the Friday evening reception.

MICROSCOPE VIEWING ROOM

Multi-headed microscopes will be available in the **Blanca Peak Room** on the second floor of the hotel.

Location	**Blanca Peak Room**	
Day/Date/Time	Thursday, June 11	8:00 am – 7:00 pm
	Friday, June 12	8:00 am – 7:00 pm
	Saturday June 13	8:00 am – 7:00 pm

GENERAL INFORMATION (Continued)

BUSINESS MEETINGS

Location	Imperial Ballroom	
Time	Friday, June 12	11:15 am - 12:15 pm
	Saturday, June 13 ***Followed by Meritorious Awards**	11:15 am – 12:15 pm

The awards for **Meritorious Contributions to Neuropathology** will be presented on Saturday June 13, 2015.

SPECIAL MEETINGS BY INVITATION

Day/Date	Meeting	Time/Location
Wednesday, June 10	**NP Program Directors Meeting**	4:00 pm – 6:00 pm Maroon Peak, 2nd Floor
	Education Committee Meeting	6:30 pm – 8:30 pm Mt. Harvard, 3rd Floor
Thursday, June 11	**Awards Committee Meeting #1**	5:30 pm – 6:00 pm Mt. Harvard, 3rd Floor
	Executive Council Meeting	6:00 pm – 11:00 pm Maroon Peak, 2nd Floor
Friday, June 12	**Trainee Luncheon**	11:45 am – 2:00 pm Mt. Columbia, 3rd Floor
	Web Committee Meeting	12:15 – 1:30 pm Maroon Peak, 2nd Floor
	Awards Committee Meeting #2	5:30 pm – 6:30 pm Maroon Peak, 2nd Floor
Saturday, June 13	***JNEN* Editorial Board Meeting**	7:00 am – 8:00 am Capitol Peak B, 38th Floor – Adjacent Tower
	Professional Affairs	12:15 pm – 1:30 pm Maroon Peak, 2nd Floor
	Awards Committee Meeting #3	6:00 pm – 8:00 pm Maroon Peak, 2nd Floor
	Presidential Reception	6:00 pm – 9:00 pm Mt. Columbia
Sunday, June 14	**Founders Breakfast**	7:00 am – 8:00 am Crystal Peak C, 38th Floor – Adjacent Tower

ABSTRACTS

Abstracts of the papers presented in the program are published in the June 2015 issue of the *Journal of Neuropathology and Experimental Neurology*.

ANNUAL RECEPTION

The annual reception will be held 6:30 to 8:30 pm, Friday in the Capital Peak Ballroom in the Pinnacle Club on the 38th floor of the adjacent tower to the Grand Hyatt Hotel. Registrants and guests of the AANP are welcome to attend. Each attendee will receive one drink ticket. For those who would like additional beverages, a cash bar will be available. Heavy hors d'oeuvres will be served. Additional tickets are $20 each for guests of AANP attendees, and may be purchased at the time of registration or at the door. Several "prizes" will be awarded to trainees.

Location	Capitol Peak Ballroom – 38th Floor (Adjacent tower to the Grand Hyatt Hotel)	
Time	Friday, June 12	6:30 pm – 8:30 pm

NOTES TO PRESENTERS

All platform presentations will be held in either the **Grand or Imperial Ballrooms** on the second floor of the hotel.

- Platform Presentations 1, 3, 5, 7 will be held in the **Grand Ballroom**
- Platform Presentations 2, 4, 6, 8 will be held in the **Imperial Ballroom**

All general sessions (Special Course, Korey Lecture, DeArmond Lecture, Parisi Lecture, Moore Lecture, Business Meetings, Diagnostic Slide Session, and Presidential Symposium) will be held in the **Imperial Ballroom**.

Presenters should use PowerPoint for their presentation. All PowerPoint presentations will be transferred onto a show computer prior to the start time of each session. Each room will be equipped with a lectern, audience microphones, central computer (loaded with MS Office XP), LCD/Data projector, screens and a laser pointer.

Special Notes for PowerPoint presenters:

- Each speaker must bring his/her PowerPoint presentation on a USB memory stick.
- Please title the presentation with your name (name.ppt).
- Macintosh users, be sure to save your presentation as .ppt (your name.ppt). If the ".ppt" extension is not present in the file name, the file will not be recognized by the PC computer.
- Your presentation will be transferred onto the show computer for each session by the technician. Please make sure your presentation is in its final form, since once loaded onto the show computer, no changes can be made.
- Please take your memory stick to the room in which you will be presenting, Grand or Imperial Ballrooms, at one of the times indicated below. **It is your responsibility to get your file to the AV staff prior to your presentation.**
- The AV staff will be available to load your file onto the computer during scheduled evening and morning times, or during session breaks. **These will be the only times available to you to load and test your presentation.**

Please review the following schedule for loading PowerPoint presentations. Please load your slides in the *Grand* or *Imperial* Ballroom, depending upon where your presentation takes place.

Please load in Imperial or Grand Ballroom, depending on our presentation location	
Thursday, June 11	7:00 am - 7:45 am 10:20 am – 10:50 am 5:00 pm – 5:30 pm
Friday, June 12	7:00 am - 7:45 am 10:00 am – 10:15 am 5:30 pm – 6:00 pm
Saturday, June 13	7:00 am – 7:45 am 10:00 am – 10:15 am 5:30 pm – 6:00 pm
Sunday, June 14	7:00 am - 7:45 am

- **If you are presenting in a morning session, it is requested you check in the previous day**. Same-day presentations may be loaded in the morning prior to session start time, but since this time necessarily is limited, you are encouraged to have your presentation loaded on the evening preceding your talk. Presenters at the evening Diagnostic Slide Session also will be able to submit their files on Saturday evening in the Imperial Ballroom from 6:00 pm -7:15 pm.
- To avoid time delays and potential problems with your presentation, you will **not** be allowed to use your own computer, although you may bring your laptop as a backup.

SPEAKER READY ROOM

We have a designated room for speakers to prepare for their presentations and review their slides. We encourage you to utilize this space during the listed hours.

Location	Torreys Peak, 2nd floor	
Dates and Times:	Thursday, June 11 – Saturday, June 13 Sunday, June 14	7:30 am – 5:30 pm 7:30 am – 10:00 am

SPONSORS & DONORS

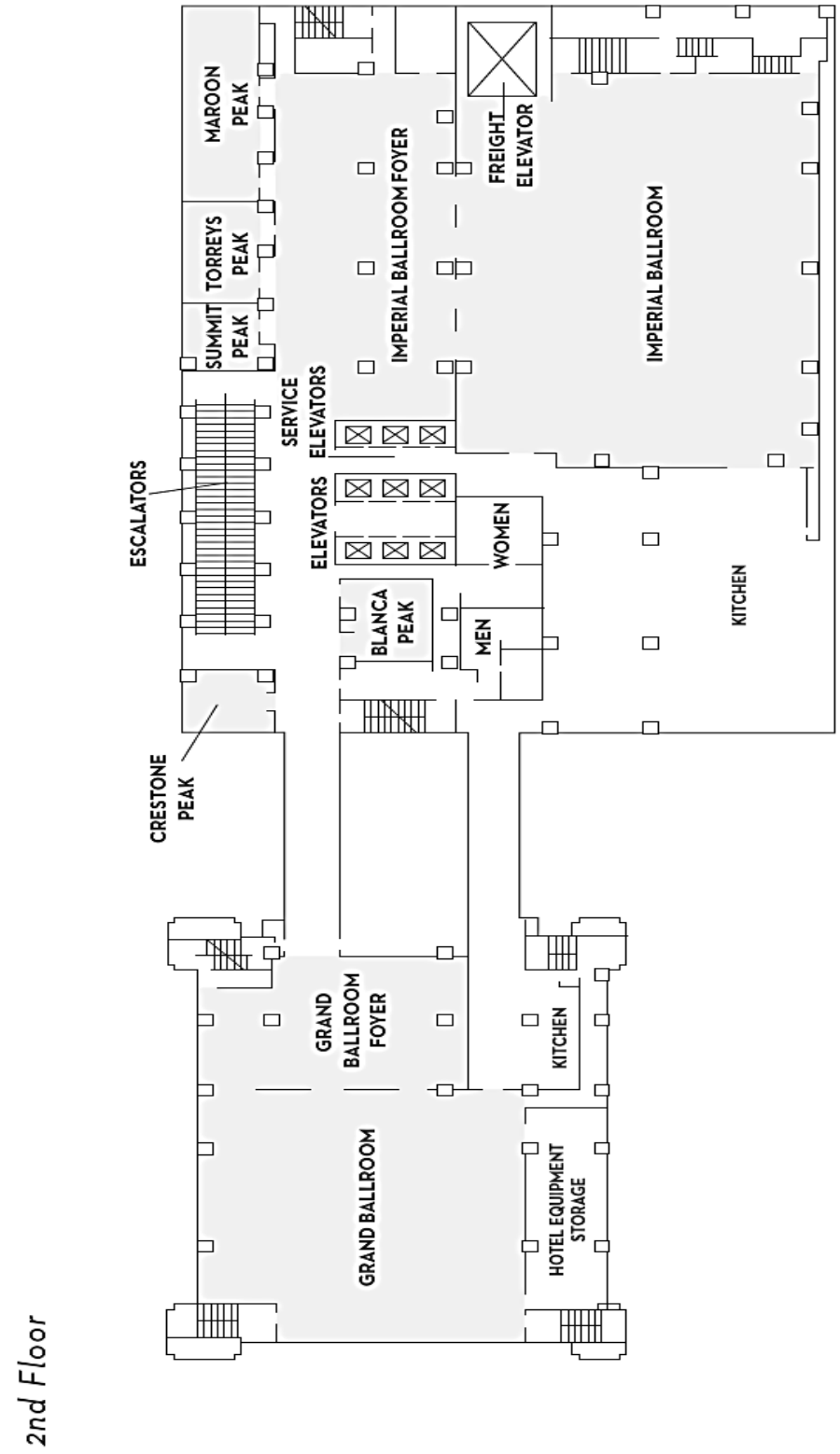
This meeting is sponsored in part by generous contributions from several sponsors and donors. Please visit their displays and exhibits in the Imperial Foyer.

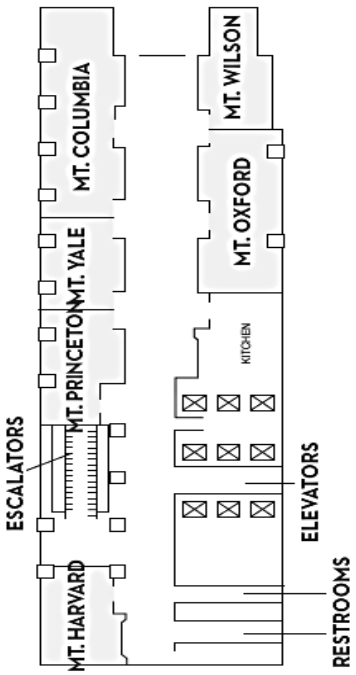
Location	Imperial Foyer	
Time	Thursday, June 11	12:00 pm – 5:30 pm
	Friday, June 12	7:00 am - 5:30 pm
	Saturday, June 13	7:00 am - 5:30 pm

MEETING EXHIBITORS

- AOE Consulting
- Elsevier Inc.
- Milestone Medical
- Taylor & Francis
- Wolters Kluwer Health

THE GRAND HYATT FLOOR PLANS





*Please note that the Annual Reception will be taking place at the Capitol Peak Ballroom in the adjacent tower of the Grand Hyatt Hotel on the 38th floor

MEETING AT A GLANCE

Thursday, June 11, 2015	
Time:	**Imperial Ballroom**
8:00 am - 5:00 pm	**SPECIAL COURSE** Morning: *Surgical Neuropathology: Reviews and Updates* Afternoon: *Recruiting and Training Neuropathologists: Are We Doing a Good Job?* Directors: M. Beatriz S. Lopes, MD, and Thomas J. Montine, MD, PhD

Friday, June 12, 2015			
Time:	**Grand Ballroom**	**Imperial Ballroom**	**Grand Ballroom Foyer**
8:00 am - 10:00 am	**PLATFORM 1** Developmental, Pediatric, Infectious Abstracts 1-8	**PLATFORM 2** Tumors: Adult Abstracts 9-16	
10:00 am - 10:15 am	**REFRESHMENT BREAK** **Grand Ballroom Foyer**		
10:15 am- 11:15 am	**PARISI LECTURE** Imperial Ballroom *The Role of Innate Immunity in Neurodegenerative Disease Pathogenesis* Bruce T. Lamb, PhD Cleveland Clinic Foundation, Cleveland, OH		
11:15 am - 12:15 pm	**BUSINESS MEETING** I Imperial Ballroom		**Posters #33-94** Friday, June 12 8:00 am – 4:30 pm
12:15 pm - 1:30 pm	**LUNCH ON OWN**		
	Grand Ballroom	**Imperial Ballroom**	
1:30 pm - 3:30 pm	**PLATFORM 3** Neurodegeneration: Alzheimer's Disease Abstracts 17 - 24	**PLATFORM 4** Tumors: Technology & Other Abstracts 25 - 32	
3:30 pm – 4:30 pm	**POSTER VIEWING &** **REFRESHMENT BREAK** **Imperial Foyer, Grand Ballroom Foyer**		
4:30 pm – 5:30 pm	**DEARMOND LECTURE** Imperial Ballroom *Frontotemporal Dementia: Onset and Spread* William Seeley, MD University of California San Francisco, San Francisco, CA		
Annual Reception	**Capitol Peak Ballroom – 38th Floor (Adjacent tower to the Grand Hyatt Hotel)**		
Time	Friday, June 12		6:30 pm – 8:30 pm

MEETING AT A GLANCE

<table>
<tr><th colspan="4">Saturday, June 13, 2015</th></tr>
<tr><th>Time:</th><th>Grand Ballroom</th><th>Imperial Ballroom</th><th>Grand Ballroom Foyer</th></tr>
<tr><td>8:00 am - 10:00 am</td><td>PLATFORM 5

Neurodegeneration: Synucleinopathies, Trauma, Prions

Abstracts 95 – 102</td><td>PLATFORM 6

Nerve, Muscle, Other

Abstracts 103 - 110</td><td rowspan="15">Posters #127-188

Saturday June 13
8:00 am – 4:30 pm</td></tr>
<tr><td>10:00 am - 10:15 am</td><td colspan="2">REFRESHMENT BREAK

Imperial Foyer, Grand Ballroom Foyer</td></tr>
<tr><td>10:15 am - 11:15 am</td><td colspan="2">SAUL R. KOREY LECTURE
Imperial Ballroom

Working at the Crossroads of Neurodegeneration and Cerebrovascular Disease

Matthew Frosch, MD
Massachusetts General Hospital, Boston, MA</td></tr>
<tr><td>11:15am - 12:15 pm</td><td colspan="2">BUSINESS MEETING II & MERITORIOUS AWARDS
Imperial Ballroom</td></tr>
<tr><td>12:15 pm- 1:30 pm</td><td colspan="2">LUNCH ON OWN</td></tr>
<tr><td></td><td>Grand Ballroom</td><td>Imperial Ballroom</td></tr>
<tr><td>1:30 pm - 3:30 pm</td><td>PLATFORM 7

Neurodegeneration: FTLD, Aging, WM Disease

Abstracts 111 - 118</td><td>PLATFORM 8

Tumors: Pediatric

Abstracts 119 - 126</td></tr>
<tr><td>3:30 pm - 4:30 pm</td><td colspan="2">POSTER VIEWING & REFRESHMENT BREAK

Imperial Foyer, Grand Ballroom Foyer</td></tr>
<tr><td>4:30 pm - 5:30 pm</td><td colspan="2">MATTHEW T. MOORE LECTURE
Imperial Ballroom

Brain Tumors in Mouse and Man

Eric Holland, MD, PhD
University of Washington, Seattle, WA</td></tr>
<tr><td>8:00 pm - 11:00 pm</td><td colspan="2">DIAGNOSTIC SLIDE SESSION
Imperial Ballroom</td></tr>
</table>

<table>
<tr><th colspan="2">Sunday, June 14, 2015</th></tr>
<tr><th>Time:</th><th>Imperial Ballroom</th></tr>
<tr><td>8:00 am – 11:45 am</td><td>PRESIDENTIAL SYMPOSIUM
Precision Medicine for Dementia</td></tr>
</table>

91ST ANNUAL MEETING

AANP

AMERICAN ASSOCIATION OF NEUROPATHOLOGISTS

Overview: Scientific Sessions

THURSDAY SESSION: SPECIAL COURSE

Thursday, June 11, 2015

SPECIAL COURSE

Morning: ***Surgical Neuropatholgy: Reviews and Updates***
Afternoon: ***Recruiting and Training Neuropathologists: Are We Doing a Good Job?***
Directors: Thomas J. Montine, MD, PhD and Maria Beatriz S. Lopes, MD, PhD

Imperial Ballroom	
8:00 am	Welcome and CME Pre-test M. Beatriz S. Lopes, MD, University of Virginia, Charlottesville, VA
8:05 am – 8:50 am	*Primary CNS Lymphoma and the So-Called "Pre-Lymphomatous" Conditions* Caterina Giannini, MD, PhD Mayo Clinic, Rochester, MN
8:50 am – 10:20 am	*Hereditary Non-Amyloid Small Vessel Diseases of the Brain* I. Small vessel diseases of the brain: pathological definition and classification • Francoise Gray (15 minutes) II. Hereditary non amyloid small vessel diseases of the brain: genetic classification and main clinico-radiological features • Elisabeth Tournier-Lasserve (45 minutes) III. Hereditary non amyloid small vessel diseases of the brain: pathological data • Francoise Gray (30 minutes) Francoise Gray, MD, PhD and Elisabeth Tournier-Lasserve, MD University of Paris, Paris, France
10:20 – 10:50 am	**REFRESHMENT BREAK**
10:50 am – 11:35 am	What Every Neuropathologist Needs to Know: *An Overview of Ophthalmic Pathology for Neuropathologists* Charles G. Eberhart, MD, PhD Johns Hopkins University, Baltimore, MD
11:35 am – 12:20 pm	What Every Neuropathologist Needs to Know: *New Immunomarkers for Practical Diagnosis in Surgical Neuropathology* Arie Perry, MD University of California, San Francisco, CA
12:20 pm - 1:30 pm	**LUNCH ON OWN**
1:30 pm – 2:00 pm	*How Neuropathologists are Trained – the World View* Marc Del Bigio, MD, PhD University of Manitoba, Winnipeg, MB, Canada
2:00 pm – 3:00 pm	*The Future of the Workforce: Can We Make Predictions?* Suzanne Z. Powell, MD The Methodist Hospital, Houston, TX
3:00 pm - 3:30 pm	**REFRESHMENT BREAK**
3:30 pm – 5:00 pm	*The Professional Market for Neuropathology Trainees – Round Table* Jeffrey A. Golden, MD Brigham and Women's Hospital, Boston, MA Dennis W. Dickson, MD Mayo Clinic, Jacksonville, FL Elizabeth J. Cochran, MD Medical College of Wisconsin, Milwaukee, WI Brian E. Moore, MD Southern Illinois University School of Medicine, Springfield, IL

FRIDAY SESSIONS

Friday, June 12, 2015

PLATFORM PRESENTATIONS 1 & 3

Grand Ballroom	
Platform Session 1 - Developmental, Pediatric, Infectious	8:00 am – 10:00 am
Platform Session 3 - Neurodegeneration: Alzheimer's Disease	1:30 pm – 3:30 pm

PLATFORM PRESENTATIONS 2 & 4

Imperial Ballroom	
Platform Session 2 - Tumors: Adult	8:00 am – 10:00 am
Platform Session 4 - Tumors: Technology & Other	1:30 pm – 3:30 pm

PARISI LECTURE

Imperial Ballroom	
Friday, June 12	10:15 am - 11:15 am
The Role of Innate Immunity in Neurodegenerative Disease Pathogenesis Bruce T. Lamb, PhD Cleveland Clinic Foundation, Cleveland, OH	

TRAINEE LUNCHEON*

Mt. Columbia	
Friday, June 12	11:45 am – 2:00 pm
Trainee Luncheon Kathy Newell, MD and Bette DeMasters, MD	

***by invitation only**

DEARMOND LECTURE

Imperial Ballroom	
Friday, June 12	4:30 pm – 5:30 pm
Frontotemporal Dementia: Onset and Spread William W. Seeley, MD University of California San Francisco, San Francisco, CA	

ANNUAL RECEPTION

Annual Reception – Capitol Peak Ballroom, Pinnacle Club – 38th Floor of the Adjacent Tower to the Grand Hyatt Hotel	
Friday, June 12	6:30 pm – 8:30 pm
Annual Reception – Appetizers provided	

FRIDAY PLATFORMS 1 & 2

		Platform Session 1: *Developmental, Pediatric, Infectious* Grand Ballroom Chairs: Brain Harding, Children's Hospital of Philadelphia and Marc Del Bigio, University of Manitoba		Platform Session 2: *Tumors: Adult* Imperial Ballroom Chairs: Joanna Phillips, University of San Francisco and Sandra Camelo- Piragua, University of Michigan
8:00 am – 8:15 am	1	***Differential Mitochondrial Requirements for Radially and Non-Radially Migrating Cortical Neurons*** Jeffrey Golden, Erika Lin-Hendel, Meagan McManus, Douglas Wallace, Stewart Anderson	9	***Mutant IDH1 Prevents Thrombosis in Gliomas*** Craig Horbinski, Steven Schwarze, Laith Khoury, Cheddhi Thomas, Carolina Benjamin, Rui Chen, Caleb Dawson, Yinxing Liu, Kristine Song, Donato Pacione, David Zagzag, Thomas McIntyre, Matija Snuderl
8:15 am – 8:30 am	2	***Pathways of Interneuron Migration in Human Fetal Brain*** Jennifer Cotter, Vivian Tang, Mercedes Paredes, Eric Huang	10	***EGFR Expression in Human Germinal Matrix and Gliomas is Regulated by ASH2L and P300/CBP-Mediated Histone Remodeling*** Nadejda Tsankova, Parsa Erfani, Jessica Tome-Garcia, Peter Canoll, Fiona Doetsch
8:30 am – 8:45 am	3	***Pontine Tegmental Cap Dysplasia: Neuropathologic Confirmation of a Rare Clinical/Radiologic Syndrome*** Brian Harding, Arastoo Vossough, Ethan Goldberg, Mariarita Santi	11	***Factors Affecting Survival of Young Adults with WHO Grade III-IV Gliomas in the United States Population*** Kimmo Hatanpaa, Nga Tran, Toral Patel, Jennifer Kasten, Jack Raisanen, Hao Tang
8:45 am – 9:00 am	4	***Olfactory Bulb Dysgeneses*** Harvey Sarnat, Weiming Yu	12	***The Biological Behaviour and Prognosis of Anaplastic Oligodendroglioma with Necrosis*** Safa Al-Sarraj, Ross Laxton, Miren Aizpurua, Lawrence Doey, Andrew King, Istvan Bodi, Ranj Bhangoo, Chris Chandler, Ron Beany, Lucy Brazil, Keyoumars Ashkan
9:00 am – 9:15 am	5	***Identification of a Novel Cell Population in Paediatric Focal Cortical Dysplasia*** Fatma Scerif, Simon Picker, Shireena Yasin, Abdulghani Alahdal, Alex Virasami, William Harkness, Martin Tisdall, François Guillemot, Simon Paine, Helen Cross, Thomas Jacques	13	***Genomic Characterization of Anaplastic Oligodendrogliomas*** David Meredith, Rebecca Folkerth, Sandro Santagata, Azra Ligon, Keith Ligon, Shakti Ramkissoon
9:15 am – 9:30 am	6	***Genomic and Epigenetic Landscape of Sudden Unexpected Death in Epilepsy*** Arline Faustin, Kasthuri Kannan, Daniel Friedman, Seema Shroff, Cheddhi Thomas, Matthias Karajannis, Adriana Heguy, Jonathan Serrano, Thomas Wisniewski, David Zagzag, Orrin Devinsky, Matija Snuderl	14	***Meningiomas with Focal Rhabdoid Features Lacking Other Histologic Features of Malignancy: a Study of 37 Cases*** Rachael Vaubel, Selby Chen, David Raleigh, Michael Link, Michael Chicoine, Igor Barani, Sonika Dahiya, Arie Perry, Caterina Giannini
9:30 am – 9:45 am	7	***Post-Viral Encephalopathies in Children - A Preventable Complication?*** Li Lei, Achiriloaie Adina, David Michelson, Laura Denham, Kerby Oberg, Ravi Raghavan	15	***Assessment of Borderline Atypical Meningioma Pathology*** James Nix and Murat Gokden
9:45 am – 10:00 am	8	***A Cluster of CNS Infections due to Bacillus cereus in the Setting of Acute Myeloid Leukemia: Neuropathology in 5 Patients*** Elizabeth Rinehart, Ivana Vodopivec, Gabriel Griffin, Melanie Johncilla, Nicole Pecora, Deborah Yokoe, Michael Klompas, Steven Feske, Danny Milner, Rebecca Folkerth	16	***A Prognostic Molecular Scoring System to Guide the Adjuvant Management of Patients with Gross Totally Resected Atypical Meningioma*** Malak Abedalthagafi, Ayal Aizer, Wenya Linda Bi, Margaret Horvath, Nils Arvold, Ossama Al-Mefty, Eudocia Lee, Lakshmi Nayak, Mikael Rinne, Andrew Norden, David Reardon, Patrick Wen, Keith Ligon, Azra Ligon, Rameen Beroukhim, Iann Dunn, Brian Alexander, Sandro Santagata

FRIDAY PLATFORMS 3 & 4

		Platform Session 3 *Neurodegeneration: Alzheimer's Disease* Grand Ballroom Chairs: Brent Orr, St. Jude's and Fausto Rodriguez, Johns Hopkins University		Platform Session 4 *Tumors: Technology & Other* Imperial Ballroom Chairs: Maria Martinez-Lage, University of Pennsylvania and Craig Horbinski, University of Kentucky
1:30 pm – 1:45 pm	17	***BIN1 Expression In Human Hippocampus During Alzheimer's Disease Progression*** Stephanie Adams, Kathy Tilton, Sudha Seshadri, Ivana Delalle	25	***MGMT Promoter Methylation Testing in Glioblastoma: Detection of a Heterogeneous Methylation Process*** Cristiane Ida, Malinda Butz, Robert Jenkins, Jann Sarkaria, Gaspar Kitange, Caterina Giannini, Benjamin Kipp
1:45 pm – 2:00 pm	18	***Neuropathological Comparisons of Amnestic and Non-Amnestic Mild Cognitive Impairment*** Brittany Dugger, Kathryn Davis, Michael Malek-Ahmadi, Joseph Hentz, Shawn Sandhu, Thomas Beach, Charles Adler, Travis Johnson, Geidy Serrano, Holly Shill, Christine Belden, Lucia Sue, Sandra Jacobson, Jessica Powell, John Caviness, Erika Driver-Dunckley, Marwan Sabbagh	26	***Central Pathology Review by Whole Slide Imaging in Glioblastoma Clinical Trials*** Caterina Giannini, Keith Ligon, Ryan Miller, Helen Tollefson, Mark Korinek, David Holmes, Sarah Jenkiins, Evanthia Galanis, Jan Buckner
2:00 pm – 2:15 pm	19	***Alternative Practical Strategies for Implementing NIA-AA Guidelines for Assessment of AD and Related Diseases*** Margaret Flanagan, Desiree Marshall, Thomas Montine, Peter Nelson, C. Keene	27	***Use of Stimulated Raman Scattering Microscopy for Quantitative Brain Tumor Imaging*** Spencer Lewis, Minbiao Ji, Sandra Camelo-Piragua, Sriram Venneti, Amanda Fisher-Hubbard, Mia Garrard, Anthony Wang, Jason Heth, Cormac Maher, Timothy Johnson, Oren Sagher, Xiaoliang Xie, Daniel Orringer
2:15 pm – 2:30 pm	20	***Low Molecular Weight Heparin C3 as a Potential BACE Inhibitor for the Treatment of Alzheimer's Disease*** John Lee, Mattew Hejna, Jawed Fareed, Umberto Cornelli	28	***Implementing 450k Methylation Array in Neuropathology: Implications for Diagnosis and Clinical Management*** Matija Snuderl, Jonathan Serrano, Lynn Forrester, Kasthuri Kannan, Arline Faustin, Cheddhi Thomas, David Capper, Volker Hovestadt, Stefan Pfister, David Jones, Martin Sill, Daniel Schrimpf, Andreas von Deimling, Adriana Heguy, Sharon Gardner, Jeffrey Allen, Cyrus Hedvat, Aristotelis Tsirigos, David Zagzag, Matthias Karajannis
2:30 pm – 2:45 pm	21	***Novel Diagnostic and Prognostic Fluid Biomarkers for Preclinical Alzheimer Disease*** Richard Perrin, Weng Hua, Kelly Bales, John Morris, Tammie Benzinger, Anne Fagan, Chengjie Xiong, David Holtzman	29	***Early Experience with FFPE-Based Commercial Cancer Genomic Profiling of Gliomas*** Maryam Shabihkhani, Maryam Shabihkhani, Seyed Amin Hojat, Gregory Lucey, Bowen Wei, Sergey Mareninov, Denise Ng, Randy Tashjian, Negar Khanlou, Harry Vinters, Linda Liau, Phioanh Nghiemphu, Albert Lai, Timothy Cloughesy, William Yong
2:45 pm – 3:00 pm	22	***Localized Proteomics of Microdissected Neurons in Alzheimer's Disease*** Eleanor Drummond, Shruti Nayak, Beatrix Ueberheide, Thomas Wisniewski	30	***Whole Exome Sequencing Identifies Candidate Driver Mutations in a Mouse Model of Malignant Peripheral Nerve Sheath Tumors*** Steven Carroll, Jody Longo, Amanda Prechtl, Gerard Hardiman, E. Hazard, Sean Courtney
3:00 pm – 3:15 pm	23	***Applying Quantitative Biology to Neurodegenerative Mechanisms: a 'Bottom-Up' approach*** Subhojit Roy	31	***Prognostic and Therapeutic Markers in Chordomas: A Study of 287 Tumors*** Homa Adle-Biassette, Marc Polivka, Francois Labrousse, Eleonora Aronica, Annie Laquerriere, Sebastien Froelich, Arnault Tauziede-Espariat
3:15 pm – 3:30 pm	24	***Amyloid-Beta-Mediated Blockade of Visual System Plasticity in Transgenic Mice in vivo*** Christopher William, Lubna Saqran, Matthew Stern, Matthew Frosch, Bradley Hyman	32	***Ovarian Teratomas Associated with Anti-NMDAR encephalitis are Distinguished by Lack of Mature Neurons and Hypercellular Glial Tissue*** Amber Nolan, Natalia Buza, Marta Margeta, Joseph Rabban

FRIDAY POSTERS

Friday, June 12, 2015		
Time:	**Poster #:**	**Imperial Ballroom Foyer, Grand Ballroom Foyer, Grand Ballroom**
8:00 am – 4:30 pm	33	***Nigral Dopaminergic Neuron Changes in Spinocerebellar Ataxia Patients: A Semi-Quantitative Analysis of Tyrosine Hydroxylase Staining*** Margaret Flanagan, Katherine Turk, Thomas Bird, Suman Jayadev, C. Keene
	34	***Colonic Expression of Alpha-Synuclein in Parkinson's Disease*** Marco Hefti, Jeffrey Goldsmith, Rolf Pfannl
	35	***Endothelin-Converting Enzymes: Novel Roles in Homeostasis of α-Synuclein and Pathogenesis of Lewy body Disease*** Seth Love and Scott Miners
	36	***Neuropathology and Whole Genome Sequencing in a Case of Adult Onset Niemann Pick Disease Type C*** Desiree Marshall, Max Dougherty, Jason Klein, John Lazar, Karina Diaz, Theodore Gobillot, Eli Grunblatt, Nicholas Hasle, Daniel Lawrence, Megan Maurano, Maria Nelson, Gregory Olson, Sanjay Srivatsan, C. Keene, Marshall Horwitz, Thomas Bird
	37	***A Niemann-Pick Disease Type C Patient with Compound Heterozygous Mutations in NPC1*** Hemant Varma, Chiraag Patel, Alejandro Iglesias, Peter Nagy, Mahesh Mansukhani, James Goldman
	38	***Frontotemporal MAPT G389R Tauopathy Presenting In A Teenager*** Jeffrey Joseph, Dawn Pearson, Aneal Khan, Bernardino Ghetti
	39	***Multiple Pathologies in a bvFTD Patient: Combined High ADNC, FTLD-TDP, and FTLD-tau-PSP*** Derick Aranda, Mustafa Seckin, Sandra Weintraub, Qinwen Mao, James Sbarboro, Eric Yi-Kay Kao, Eileen Bigio
	40	***Behavioral Variant-Frontotemporal Dementia And Parkinson Disease Associated With Tau, Alpha-Synuclein, And TDP43 Neuropathology*** Kathy Newell, Jill Murrell, Russell Swerdlow, Bernardino Ghetti
	41	***Dipeptide-Repeat Protein Pathology in the Diagnosis of C9ORF72 Mutation Carriers*** Adrian Oblak, Jill Murrell, Frederick Unverzagt, Dieter Edbauer, Neil Cashman, Eddie Pokrishevsky, Brandy Matthews, Ian Mackenzie, Bernardino Ghetti
	42	***A9D Mutation in Progranulin Gene May be Associated with Primary Progressive Aphasia*** Marwah Abdulkader, Adrian Oblak, Jill Murrell, Thomas Ravenscroft, Brandy Matthews, Rosa Rademakers, Bernardino Ghetti
	43	***TDP-43 Accumulation in the Aging Human Brain*** Akiko Uchino, Masaki Takao, Hiroyuki Hatsuta, Hiroyuki Sumikura, Yuta Nakano, Yuko Saito, Kazutoshi Nishiyama, Shigeo Murayama
	44	***Neuropathologic and Neurobiologic Characterization of Early Onset Amyotrophic Lateral Sclerosis Associated with a Novel TDP43 S375G Variant*** Kathy Newell, Bernardino Ghetti, Jill Murrell, Cristiana Stuani, Emanuele Buratti
	45	***Microscopy Based Biopanning for Isolation of Morphology Specific Nanobodies against TDP-43 Variants in ALS and FTLD from Human Brain Tissues.*** Galam Khan, Stephanie Williams, Lalitha Venkataraman, Huilai Tian, Michael Sierks, Brent Harris

Posters are not offered for CME credit

FRIDAY POSTERS (Continued)

Friday, June 13, 2015		
Time:	**Poster #:**	**Imperial Ballroom Foyer, Grand Ballroom Foyer, Grand Ballroom**
8:00 am – 4:30 pm	46	***Atypical Frontotemporal Lobar Degeneration with and without Striatal Atrophy and Fused in Sarcoma Immunoreactivity*** Kevin Bieniek, Wen-Lang Lin, Keith Josephs, Dennis Dickson
	47	***Prion Disease Induces Aβ42 Plaques, Aβ42 Peptides and Tau Hyperphosphorylation*** Stephen DeArmond and Krystyna Bajsarowicz
	48	***The Tau Signature in Hereditary Prion Diseases*** Bernardino Ghetti, Adrian Oblak, Francine Epperson, Jill Murrell
	49	***A Rare form of Sporadic Jakob-Creutzfeldt Disease Presenting as PSP: A Public Health Issue*** Lea Grinberg, Mireya Fernandez-Fournier, David Perry, Maria Tartaglia, Mary DeMay, Adam Boxer, Giovanni Coppola, Chadwick Christine, Perluigi Gambetti, Ignazio Cali, William Seeley, Bruce Miller, Steven deArmond, Michael Geschwind
	50	***Full Length PrP Deposits Accumulate in the Retina of PRNP F198S Mutation Carriers*** Bernardino Ghetti, Andrea Weins, Marwah Abdulkader, Martin Farlow, Jill Murrell, Francine Epperson, Rose Richardson, Jose Bonnin
	51	***Phospho-Tau and Beta-Amyloid Neuropathology in TBI vs. Controls in the Adult Changes in Thought Study*** Desiree Marshall, Laura Gibbons, Angela Guillozet-Bongaarts, Samantha Rice, Kim Howard, Eric Larson, Richard Ellenbogen, Ed Lein, Paul Crane, C. Keene
	52	***A Case of Chronic Traumatic Encephalomyelopathy without Trauma*** Andrew Gao, Shirin Karimi, Lili-Naz Hazrati
	53	***The Role of ATP and P2X Purinoreceptor 7 in the Pathogenesis of Chronic Traumatic Encephalopathy*** Andrew Gao, Shirin Karimi, Lili-Naz Hazrati
	54	***Glial Pathology in HDLS Lesions*** Liam Kempthorne, Masataka Nakamura, Dennis Dickson
	55	***Hereditary Diffuse Leukoencephalopathy with Spheroids Associated with the Novel P901R mutation in CSF1R*** Adrian Oblak, Brandy Matthews, Fred Unverzagt, Jill Murrell, Bernardino Ghetti
	56	***Hereditary Diffuse Leukoencephalopathy with Spheroids (HDLS) without CSF1R Gene Mutations*** Shih-Hsiu Wang, Armistead Williams, James Goldman
	57	***Marijuana Brain*** Keyla Kleyser-Sugrue and Suzanne de la Monte
	58	***A 55-year-old Female with Worsening Headaches and Acute Onset Confusion: A Case of Leukoencephalopathy with Cerebral Calcifications and Cysts*** Jorge Novo, Diana Murro, Leonidas Arvanitis
	59	***Neuropathology of Experimental Capsular Infarct: Histopathologic Changes Related to Motor Deficit*** Min-Cheol Lee, Chang-Woo Han, Kyung-Wha Lee, Hyoung-Ihl Kim
	60	***Decoding the Risk Factors and Cognitive Consequences of a Common Vascular Pathology: Brain Arteriolosclerosis*** Eseosa Ighodaro, Erin Abner, Sarah Monsell, Walter Kukull, Peter Nelson
	61	***Early Changes in Encephalodurosynangiosis: A Unique Autopsy Case*** Denise Ng, Crystella Suos, Hamid Hoveida, Spencer Tung, Nestor Gonzalez, Harry Vinters

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FRIDAY POSTERS (Continued)

Friday, June 12, 2015		
Time:	**Poster #:**	**Imperial Ballroom Foyer, Grand Ballroom Foyer, Grand Ballroom**
8:00 am – 4:30 pm	62	***Inhibition of the Sur1-Trpm4 Channel Mitigates Blood-Brain Barrier Disruption and Cerebral Edema Formation in Rat Stroke*** Rupal Mehta, Svetlana Ivanova, Cigdem Tosun, Min Kwon, Rudy Castellani, Seung Woo, Volodymyr Gerzanich, J Marc Simard
	63	***Congenital Muscular Dystrophy: Hospital Based Study in Egyptian Pediatric Patients*** Somia Soliman, Lubna Elfarouk, Laila Selim, Amr Abouzaid, Gina Nakhla
	64	***Inflammatory Infiltration in a Case of Nemaline Myopathy*** Amanda Kan
	65	***Eosinophilic Polymyositis: Clinicopathological Findings in a Pediatric Case with Literature Review*** Bartholomew White, Lisabeth Scalzi, Charles Specht
	66	***Multiple Skeletal Muscle Biopsies as Primary Evaluation of Myositis with Skipped Lesions: Report of 4 Cases*** Negar Khanlou, Denise Ng, William Yong, Harry Vinters
	67	***Neutral Lipid Storage Disease as a Rare Cause of Myopathy with a High Risk of Associated Cardiomyopathy*** Caitlin Latimer, Adam Reynolds, C. Keene, Benjamin Podemski, Leo Wang, Luis Gonzalez-Cuyar
	68	***Providing Centralized Human Tissue Access Through The Congenital Muscle Disease Tissue Repository (CMD-TR)*** Michael Lawlor, Stacy Cossette, Hui Meng, Rachel Alvarez, Anne Rutkowski
	69	***Intraretinal Calcium Oxalate Deposition: Histology and Etiologic Differential Diagnosis, with Review of the Literature*** Bartholomew White, Michael Wilkinson, Charles Specht
	70	***Genetic Profiling of Copy Number Alterations in Intraocular Medulloepithelioma*** W. Robert Bell, Qundeel Rafiq, Denise Batista, Christopher Gocke, Deepak Edward, Charles Eberhart
	71	***Combined IDH1-R132H Mutant "Infiltrating Astrocytoma/ Pleomorphic Xanthoastrocytoma" with Concurrent BRAF V600E Mutation*** Seiji Yamada, Benjamin Kipp, Jesse Voss, Caterina Giannini, Aditya Raghunathan
	72	***Differential MicroRNA-125 Family Expression in Low Grade Glioma and Glioneuronal Tumors*** Ana Cristina Araújo Lemos, Heather Ames, Fausto Rodriguez
	73	***Diffuse Intrinsic Pontine Gliomas Presenting with Leptomeningeal Dissemination*** Amanda Krausert, Michael Handler, Kathleen Dorris, Seth Lummus, Bette Kleinschmidt-DeMasters
	74	***Disseminated Intraventricular Glioneuronal Tumors: New Entity or Variation of a Theme?*** Marie Rivera-Zengotita, Jesse Kresak, Amy Smith, David Pincus, Anthony Yachnis
	75	***Desmoplastic Infantile Gangliogliomas*** Shanedelle Norford and Arash Naziripour
	76	***Dysembryoplastic Neuroepithelial Tumor Associated with TP53 Germline Mutation (Li-Fraumeni Syndrome)*** Osama Elkadi, Humayun Gultekin, Christopher Corless

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FRIDAY POSTERS (Continued)

Friday, June 12, 2015		
Time:	**Poster #:**	**Imperial Ballroom Foyer, Grand Ballroom Foyer, Grand Ballroom**
8:00 am – 4:30 pm	77	***Recurrent DNET is Frequently Associated with Piloid Component and Changes in Imaging*** Osama Elkadi, Marjorie Grafe, Randall Woltjer, Humayun Gultekin
	78	***Dedifferentiation in Choroid Plexus Tumors and Ependymoma*** Malak Abedalthagafi, Michael Wu, Parker Merrill, Terri Woo, Shu-Hsien Sheu, Keith Ligon, Sandro Santagata
	79	***Phospho -S6 Ribosomal Protein Expression in Atypical Teratoid/Rhabdoid Tumors*** Veena Rajaram, Jack Raisanen, Dinesh Rakheja
	80	***Sellar Atypical Teratoid Rhabdoid Tumor (AT/RT) in an Adult Female*** Drew Pratt, Gautam Mehta, Hao-Wei Wang, Prashant Chittiboina, Martha Quezado
	81	***Radiation-Associated Sarcoma of the Sella after Radiotherapy for Pituitary Adenoma Arising Adjacent To Residual/Recurrent Adenoma.*** Ewa Borys, Matthew Wood, Arie Perry
	82	***Pituitary Adenoma Immunohistochemical Characterization: Validating a Novel Subtyping Algorithm*** William McDonald, Nilanjana Banerji, Kelsey McDonald, Bridget Ho, Virgilia Macias, Andre Kajdacsy-Balla
	83	***MAPK Activation and HRAS Mutations Identified in Pituitary Spindle Cell Oncocytoma*** Michael Miller, Wenya Linda Bi, Lori Ramkissoon, Malak Abedalthagafi, Yun Jee Kang, David Knoff, Ian Dunn, Patrick Wen, David Reardon, Brian Alexander, Edward Laws, Jr., Rameen Beroukhim, Keith Ligon, Shakti Ramkissoon
	84	***Renal Cell Carcinoma Metastatic to a Pituitary Adenoma - Diagnostic and Therapeutic Dilemma*** Anna Mathew, Roberto Rey-Dios, Varsha Manucha
	85	***Tumor to Tumor Metastasis in the Central Nervous System*** Alexander Feldman, James Hackney, James Markert, Michael Vaphiades, L. Nabors, J. Fiveash
	86	***Olfactory Neuroepithelioma Following Multiple Meningiomas and Radiation*** Marwah Abdulkader, Don-John Summerlin, Eyas Hattab
	87	***Coexistent Intracranial Langerhans Cell Histiocytosis and Erheim-Chester Disease*** Yeon-Lim Suh and Seokhwi kim
	88	***An Unusual Case of Central Nervous System Rosai-Dorfman Disease*** Jennifer Chu, Jerry Goodman, Navid Jalali, Joseph Kass
	89	***The Immune Escape Mechanism of Primary Central Nervous System Lymphomas: The role of Chemokines and Endothelin B Receptor*** Yasuo Sugita, Hiroko Muta, Koichi Ohshima, Hideyuki Abe
	90	***Primary CNS/Intracraial Lymphomatoid Granulomatosis (LYG). Report of Two Cases*** Jiang Qian, Janne Rand, Susan Weaver, Xiaohe Yang, Bernard Ng, Jiang Qian
	91	***Orbital and Periorbital Plexiform Neurofibromas, Uveal Ganglioneuroma and Frontoethmoidal Encephalocele in Neurofibromatosis Type 1*** Jose Bonnin, Marwah Abdulkader, Mark Dalesandro, Mitesh Shah
	92	***MIB-1 Revisited: Comparison of Mean and Hot Spot Labeling Indices in Crainial Nerve Schwannomas*** Stephen Coons, Kelly Milton, Christopher Dardis, Phillip Stafford
	93	***Meningocele Associated with a Congenital Melanocytic Nevus: A Case Report and Future Implications*** Amanda Fisher-Hubbard, Douglas Fullen, Sandra Camelo-Piragua
	94	***Intracranial Extension of a Ganglion Cyst of the Temporomandibular Joint. Report of a Case in a Patient Presenting with Seizures*** Jose Bonnin, Aaron Kamer, Eyas Hattab, Aaron Cohen-Gadol

Posters are not offered for CME credit

SATURDAY SESSIONS

Saturday, June 13, 2015

PLATFORM PRESENTATIONS 5 & 7

Grand Ballroom	
Platform Session 5 - Neurodegeneration: Synucleinopathies, Trauma, Prions	8:00 am – 10:00 am
Platform Session 7 - Neurodegeneration: FTLD, Aging, WM Disease	1:30 pm – 3:30 pm

PLATFORM PRESENTATIONS 6 & 8

Imperial Ballroom	
Platform Session 6 - Nerve, Muscle, Other	8:00 am – 10:00 am
Platform Session 8 - Tumors: Pediatric	1:30 pm – 3:30 pm

SAUL R. KOREY LECTURE

Imperial Ballroom	
Saturday, June 13	10:15 am - 11:15 am
Working at the Crossroads of Neurodegeneration and Cerebrovascular Disease Matthew Frosch, MD, PhD Massachusetts General Hospital, Boston, MA	

MATTHEW T. MOORE LECTURE

Imperial Ballroom	
Saturday, June 13	4:30 pm - 5:30 pm
Brain Tumors in Mouse and Man Eric Holland, MD, PhD University of Washington, Seattle, WA	

DIAGNOSTIC SLIDE SESSION

Imperial Ballroom	
Saturday, June 13	8:00 pm -11:00 pm

SATURDAY PLATFORMS 5 & 6

		Platform Session 5 *Neurodegeneration: Synucleinopathies, Trauma, Prions* Grand Ballroom Chairs: Negar Khanlou, UCLA and Anne Buckley, Duke University		Platform Session 6 *Nerve, Muscle, Other* Imperial Ballroom Chairs: Rick Perrin, Washington University and Kathy Newell, University of Kansas
8:00 am – 8:15 am	95	***Multiple System Atrophy: Clinico-pathologic Correlations of Archival Cases*** Marwah Abdulkader, Adrian Oblak, Jordan Grafman, Edward Huey, Francine Epperson, Alberto Espay, Joanne Wojcieszek, Bernardino Ghetti	103	***Polyglucosan Bodies in Intramuscular Nerves: Association with Muscle Fiber Denervation Atrophy*** Jian-Qiang Lu, Cecile Phan, Douglas Zochodne, Chuanzhu Yan
8:15 am – 8:30 am	96	***Neuronal Pathology in Multiple System Atrophy—an Under-Appreciated Characteristic*** Matthew Cykowski[1], Elizabeth Coon[2], Suzanne Powell[1], Sarah Jenkins[2], Eduardo Benarroch[2], Phillip Low[2], Ann Schmeichel[2]	104	***Muscle Biopsy Evaluation Continues to be an Important Component of Dystrophinopathy Diagnostic Testing*** Steven Moore
8:30 am – 8:45 am	97	***Prevalence of Submandibular Gland Synucleinopathy in Parkinson's Disease, Dementia with Lewy Bodies, and other Lewy Body Disorders*** Thomas Beach, Charles Adler, Geidy Serrano, Lucia Sue, Douglas Walker, Brittany Dugger, Holly Shill, Erika Driver-Dunckley, John Caviness, Anthony Intorcia, Megan Saxon-LaBelle, Jessica Filon, Joel Pullen, Alex Scroggins, Sarah Scott, Angelica Garcia, Brittany Hoffman, Sandra Jacobson, Christine Belden, Kathryn Davis, Marwan Sabbagh	105	***Dystroglycanopathy Diagnostic Testing Enhanced by the use of Muscle Biopsies and Fibroblast Cultures*** Tobias Willer, Jamie Eskuri, Mary Cox, Katherine Mathews, Steven Moore, Kevin Campbell
8:45 am – 9:00 am	98	***Vessel-Associated Neurites Contain Phosphorylated α-Synuclein In Young And Old Appendices*** David Munoz, Madison Gray, John Woulfe	106	***Dystroglycanopathy Due to GMPPB Mutations: Case Series and Review of the Literature*** Braden Jensen, Dimah Saade, Tobias Willer, Mary Cox, Tahseen Mozaffar, Mena Scavina, Vikki Stefans, Thomas Winder, Kevin Campbell, Steven Moore, Katherine Mathews
9:00 am – 9:15 am	99	***Sensitivity of Mitochondrial Respiratory Chain Complex I to Toxin Inhibition is Activity-Dependent in Neurons*** Jason Chiang, Laurie Sanders, Jason Callio, Evan Howlett, Charleen Chu	107	***AAV8-MTM1 Results in Long-Term Survival and Correction of Severe Muscle Pathology in a Canine Model of X-Linked Myotubular Myopathy*** Michael Lawlor, David Mack, Karine Poulard, Melissa Goddard, Jessica Snyder, R. Grange, Jon Doering, Jennifer Strande, V. Latournerie, Philippe Veron, Hui Meng, Lin Yang, Fujun Liu, L. Buscara, Christine Le Bec, S. Martin, M. O'Callaghan, Federico Mingozzi, A. Beggs, F. Mavilio, Anna Buj-Bello, M. Childers
9:15 am – 9:30 am	100	***Detection of CTE in Autopsy Cohorts using Restricted Cortical Sampling*** Adam Darby, Jason Adams, Katharine Babcock, Victor Avarez, Thor Stein, Ann McKee	108	***Treatment with ActRIIB-mFc Produces Myofiber Growth and Improves Lifespan in the Acta1 H40Y Murine Model of Nemaline Myopathy*** Michael Lawlor, Jennifer Tinklenberg, Hui Meng, Lin Yang, Fujun Liu, Edna Hardeman, Scott Pearsall, Robert Fitts
9:30 am – 9:45 am	101	***Ultrastructural Characterization of Diaschisis Lesions Following Traumatic Brain Injury*** Clayton Wiley, Guoji Wang, Ming Sun, Jonathan Franks, Donna Stolz, C. Dixon, Stephanie Bissel, Patrick Kochanek	109	***The Defining Cerebral Vascular Pathology of the New Clinical and Histopathologic Entity ACTA2-Related Cerebrovascular Disease (ARCD)*** Maria-Magdalena Georgescu, Timothy Richardson, Marco Pinho, Dianna Milewicz, L. Maximilian Buja, Dennis Burns
9:45 am – 10:00 am	102	***Non-Protein Cofactor Molecules are Essential for Infectious Prion Formation, Inducing Protein Structural Transformation*** Michael Miller, Geoffrey Noble, Daphne Wang, Fei Wang, Daniel Walsh, Jiyan Ma, Virgil Woods, Jr., Sheng Li, Surachai Supattapone	110	***VU0477573: Partial Negative Allosteric Modulator of the Subtype 5 Metabotropic Glutamate Receptor with in vivo Efficacy*** Hilary Nickols, Karen Gregory, Ryan Morrison, Brittney Bates, Shaun Stauffer, Kyle Emmitte, Michael Bubser, Weimin Peng, Michael Nedelcovych, Analisa Thompson, J Daniels, Niswender Colleen, Carrie Jones, Craig Lindsley, P Conn

SATURDAY PLATFORMS 7 & 8

		Platform Session 7 *Neurodegeneration: FTLD, Aging, WM disease* Grand Ballroom Chairs: Julia Kofler, University of Pittsburgh and Brittney Dugger, Banner Health		Platform Session 8 *Tumors: Pediatric* Imperial Ballroom Chairs: Eric Huang, UCSF and Eddie Lee, University of Pennsylvania
1:30 pm – 1:45 pm	111	***ABCC9: Novel Human Brain Transcripts and an eQTL Relevant to Hippocampal Sclerosis of Aging*** Peter Nelson, Wang-Xia Wang, David Fardo	119	***BRAF (V600E) Analysis by Immunohistochemistry in 204 Low-grade Glial and Glioneuronal Tumors*** M. Adelita Vizcaino, Caterina Giannini, Fausto Rodriguez
1:45 pm – 2:00 pm	112	***Argyrophilic Grain Disease may Delay Cognitive Decline in AD: An Autopsy Study*** Lea Grinberg, Roberta Rodriguez, Claudia Suemoto, Mariana Molina, Camila Nascimento, Renata Leite, Renata Ferretti-Rebustini, Jose Farfel, Helmut Heinsen, Ricardo Nitrini, Carlos Pasquallucci, Wilson Jacob-Filho, Kristine Yaffe	120	***Malignant Gliomas with Histone H3-K27M Mutation: The Spectrum of Morphologic* Variation and Associated Genetic Alterations** David Solomon, Matthew Wood, Tarik Tihan, Andrew Bollen, Nalin Gupta, Joanna Phillips, Arie Perry
2:00 pm – 2:15 pm	113	***Primary Age-Related Tauopathy (PART) in Autopsies of the Baltimore Longitudinal Study of Aging (BLSA)*** W. Robert Bell, Olga Pletnikova, Barbara Crain, Gay Rudow, Abhay Moghekar, Modhav Thambisetty, Peter Rabins, Marilyn Albert, Susan Resnick, Juan Troncoso	121	***Molecular Cytogenetic Analysis of Pediatric Oligodendrogliomas*** David Nauen, Lisa Haley, Ming-Tseh Lin, Arie Perry, Caterina Giannini, Peter Burger`, Fausto Rodriguez
2:15 pm – 2:30 pm	114	***Brain Expression of FAM76B, a Novel PGRN Interacting Protein, in GRN-Associated Frontotemporal Lobar Degeneration*** Qinwen Mao, Derick Aranda, Sandra Weintraub, Missia Kohler-Skinner, James Sbarboro, Eric Yi-Kay Kao, M-Marsel Mesulam, Haibin Xia, Eileen Bigio	122	***Epithelioid Glioblastomas and Transformed Pleomorphic Xanthoastrocytomas– How Related are They?*** Sanda Alexandrescu, Andrey Korshunov, Lai Siang Hui, Salma Dabiri, Chie-Shin Shih, Rong Li, Chie-Shin Shih, Emma Du, Arie Perry
2:30 pm – 2:45 pm	115	***Complement Activation in Progranulin-Deficient Models of Frontotemporal Dementia*** Hansen Lui, Jiasheng Zhang, Lauren Martens, Yulei Shang, Alan Hwang, Robert Farese, Eric Huang	123	***Desmoplastic Infantile Astrocytoma/Desmoplastic Infantile Ganglioglioma and Pleomorphic Astrocytoma Show Distinct Epigenetic Profiles*** Cheddhi Thomas, Jonathan Serrano, Lynn Ann Forrester, Kasthuri Kannan, Arline Faustin, David Capper, Volker Hovestadt, Stefan Pfister, David Jones, Martin Sill, Daniel Schrimpf, Andreas von Deimling, Adriana Heguy, Sharon Gardner, Jeffrey Allen, David Zagzag, Matthias Karajannis, Matija Snuderl
2:45 pm – 3:00 pm	116	***Neuropathology of Sleep in Individuals Carrying an Intronic MAPT Mutation*** Bernardino Ghetti, Adrian Oblak, Francine Epperson, Jill Murrell, Angelo Gemignani	124	***Molecular Subgroups of CNS-PNET Show Distinct Morphologies and Molecular Characteristics*** Brent Orr, Sariah Allen, Ji Wen, James Dalton, Bret Mobley, Matthew Schniederjan, Mariarita Santi, Sonika Dahiya, Anna Buccoliero, Arie Perry, Giles Robinson, Amar Gajjar, David Ellison
3:00 pm – 3:15 pm	117	***Alteration of Microglial Phenotype in Hereditary Diffuse Leukoencephalopathy with Spheroids (HDLS)*** Julia Kofler, Nathan Kong, Mark Stauffer, John Trojanowski, Vivianna Van Deerlin, Edward Lee, Jill Murrell, Geoffrey Murdoch	125	***Novel Candidate Oncogenic Drivers in Pineoblastoma*** Matija Snuderl, Kasthuri Kannan, Olga Aminova, Igor Dolgalev, Adriana Heguy, Arline Faustin, David Zagzag, Sharon Gardner, Jeffrey Allen, Jeffrey Wisoff, David Capper, Volker Hovestadt[2], Sama Ahsan, Charles Eberhart, Stefan Pfister, David Jones, Matthias Karajannis
3:15 pm – 3:30 pm	118	***Axonal Loss is the Predominant Cause of Leucoencephalopathy Associated with Illicit Drug Use*** Murad Alturkustani, Lee-Cyn Ang, David Ramsay	126	***NHERF1/EBP50 and NF2 Emerge as New Markers for the Differential Diagnosis of Choroid Plexus Tumors*** Maria-Magdalena Georgescu, Bret Mobley, Ping Shang, Charles White 3rd, Kimmo Hatanpaa, Veena Rajaram, Jack Raisanen

SATURDAY POSTERS

Saturday, June 13, 2015		
Time:	**Poster #:**	**Imperial Ballroom Foyer, Grand Ballroom Foyer, Grand Ballroom**
8:00 am – 4:00 pm	127	***White Matter Injury and the Orphan c2orf40 Gene Encoding Ecrg4 in Alzheimer's Disease*** John Donahue, Sonia Podvin, Miles Miller, Ryan Rossi, Jasmine Chukwueke, Ji Lee, Conrad Johanson, Brian Eliceiri, Andrew Baird, Edward Stopa
	128	***Neuropathologic Features of Two Supercentenarians: An Autopsy Study*** Masaki Takao, Nobuyoshi Hirose, Yuta Nakano, Hiroaki Kimura, Ban Mihara, Michiyasu Arai, Masaru Mimura, Satoko Mizuno, Yuito Nagamine, Hiroyasu Sano, Yousuke Horiuchi, Hajime Maruyama, Ichiro Deguchi, Takuya Fukuoka, Yuji Kato, Takeshi Hayashi, Norio Tanahashi
	129	***Tau and Aß Lesions in the Brain of Young Subjects from the Lieber Institute and Johns Hopkins Brain Resource Center*** Olga Pletnikova, Gay Rudow, Thomas Hyde, Joel Kleinman, Sabeen Ali, Rahul Bharadwaj, Barbara Crain, Ana Rubio, Juan Troncoso
	130	***Senile Changes in Aging Patients with HIV/AIDS*** Piotr Kozlowski, Elyse Singer, Miguel Valdes-Sueiras, Anish Mirchandani, Paulina Coots, Sadaf Jahed, Hillary Allan, Phuong Nguyen, James Yu, Kurt Degenhardt
	131	***Characterization of the Link between Tau Expression, Amyloid Plaque Burden, and Neuronal Loss in Alzheimer Disease*** Abeer Tabbarah, Liam Chen, Tong Li
	132	***Difficulties in Identifying Individuals with Alzheimer Disease in a Cohort of Patients Presenting as Corticobasal Syndrome*** Adrian Oblak, Francine Epperson, Edward Huey, Eric Wassermann, Jordan Grafman, Bernardino Ghetti
	133	***Withdrawn***
	134	***Feasibility of Peripheral Tau Detection to Determine Braak Neurofibrillary Tanglestage*** Brittany Dugger, Charisse Whiteside, Chera Maarouf, Thomas Beach, Travis Dunckley, Bessie Meechoovet, Alex Roher
	135	***Characterization of a Novel Monoclonal Antibody Targeting Pathological Proteins in Alzheimer's Disease*** Krystal Herline, Fernando Goni, Eleanor Drummond, Mitchell Marta-Ariza, Frances Prelli, Thomas Wisniewski
	136	***Withdrawn***
	137	***Unique Neuropathologic Features in Familial Alzheimer's Disease*** Denise Ng, Beatrice Nguy, Darrick Lo, Michael Han, John Ringman, Harry Vinters
	138	***Processing Bodies Implicated in Aß-dysregulation of Neuronal mRNA*** Celia Williams, Chiara Ferrari, Mackenzie Roof, Sarah Hermann, Stefanie Marquez, Carol Miller
	139	***A Study of the Role of ZCCHC17 in Alzheimer's Disease*** Andrew Teich, Mitesh Patel, Ottavio Arancio

Posters are not offered for CME credit

SATURDAY POSTERS (Continued)

Saturday, June 13, 2015		
Time:	**Poster #:**	**Imperial Ballroom Foyer, Grand Ballroom Foyer, Grand Ballroom**
8:00 am – 4:00 pm	140	***Reduced Vascular Amyloid Through Non-Myeloablative Bone Marrow Transplantation in Experimental Cerebral Amyloid Angiopathy*** C. Dirk Keene, Yue Yang, Eiron Cudaback, Samantha Rice, Nikolas Jorstad, Jake Hemingway, Abharika Sapru, Thomas Montine
	141	***A Novel Mutation (p.N58fs) of C12orf65 Gene: Clinical and Radiological Findings as well as First Neuropathologic Studies at Autopsy*** Masaki Takao, Ryota Sato, Hideaki Nishihara, Masatoshi Omoto, Yujiro Higuchi, Hiroshi Takashima, HIroo Kawano, Eiji Ikeda, Takashi Kanda
	142	***Neuropathology of DYT1 Dystonia: Supplementary Findings*** Drew Pratt, Nancy Edwards, Mark Hallett, Abhik Ray-Chaudhury
	143	***Post-Polio Syndrome Revisited*** Michael Punsoni, George Sachs, Suzanne de la Monte
	144	***Epilepsy, Hippocampal Sclerosis and Amygdalar Atrophy as Remote Complications of H1N1-Influenza-Associated Encephalopathy in an Adult*** Shirin Karimi, Taufik A. Valiante, Tim-Rasmus Kiehl
	145	***Asymptomatic Diffuse "Encephalitic" Cerebral Toxoplasmosis In A Patient With Systemic Lupus Erythematosus*** Diana Murro, Jorge Novo, Leonidas Arvanitis
	146	***West Nile Virus Infection-Associated Immune Reconstitution Inflammatory Syndrome of the Central Nervous System*** Kymberly Gyure
	147	***A Case Report of Balamuthia mandrillaris and Discussion of Molecular Diagnosis by Nondirected High-throughput Sequencing.*** Matthew Wood, Niraj Shanbhag, Joseph DeRisi, Michael Wilson, Andrew Bollen
	148	***Cladophialophora bantiana Mass-Forming Infection of the Right Frontal Lobe of Brain with Unusual Imaging in an Immunocompromised Patient*** MacLean Nasrallah, Laurel Glaser, Kristy Reinert, H. Isaac Chen, Alexander Mamourian, Maria Martinez-Lage
	149	***Neoplastic, Inflammatory or Demyelinating, a Persistent Diagnostic Dilemma*** Michael Punsoni, Jeffrey Rogg, Edward Stopa
	150	***Cerebrospinal Fluid Cytokine and Chemokine Patterns in Central Nervous System Infections, Hemorrhage and Neoplasms*** Danielle Fortuna, Larry Harshyne, D. Craig Hooper, Amity Roberts, Danielle Hutchings, Mark Curtis
	151	***Granulomatous CNS Inflammation (GCI): What does it Mean if Your Infectious Work up is Negative?*** Ewa Borys and Stefan Pambuccian
	152	***Intracerebral Granulomas after Pipeline Embolization Device Procedure for Intracranial Aneurysms; Two Case Reports*** Manoj Gadara, Martin Ollenschleger, Xianyuan Song
	153	***A Case of Toxic Leukoencephalopathy Following Paradichlorobenzene Ingestion*** Christina Appin and Matthew Schniederjan
	154	***Delayed Axonal Inflammatory Encephalopathy after Gastric Bypass Surgery*** Boleslaw Lach, Suzan Goodwin, Andrew Duncan, Allison Edgecombe, Ian Maffet

Posters are not offered for CME credit

SATURDAY POSTERS (Continued)

Saturday, June 13, 2015		
Time:	**Poster #:**	**Imperial Ballroom Foyer, Grand Ballroom Foyer, Grand Ballroom**
8:00 am – 4:00 pm	155	***IgG4-Associated Meningeal Disease*** Robin Dietz, Matthew Wood, Vikram Chakravarthy, Kenneth De Los-Reyes, Arie Perry, Ravi Raghavan
	156	***Central Nervous System (CNS) Presentation of Relapsing Polychondritis – a Diagnostic Challenge*** Michael Paolini, Joseph Parisi, William MacDonald, Richard Rison, Mark Jentoft
	157	***A Case of Fulminant CNS Graft vs. Host Disease. Are Astrocytes the Target?*** Diana Thomas and Geoffrey Murdoch
	158	***Decreased Cortical Microglial Engraftment is Primarily Associated with Bone Marrow Transplant Recipient, but not Donor, APOE Genotype*** C. Dirk Keene, Yue Yang, Eiron Cudaback, Samantha Rice, Sam Josephson, Abharika Sapru, Nicholas Tolley, Thomas Montine
	159	***Central Nervous System Deposition of Gadolinium Following Contrast Enhanced*** Mark Jentoft, Robert McDonald, Jennifer McDonald, David Murray, Michael Paolini, Kent Thielen[2], David Kallmes, Eric Williamson, Laurence Eckel
	160	***IgLon5: Between Neuroinflammation and Neurodegeneration*** Sara Mariotto, Sergio Ferrari, Tiziana Cavallaro, Annachiara Cagnin, Salvatore Monaco
	161	***Unusual Presentations of ILAE Type II Focal Cortical Dysplasias In Adults*** Douglas Miller, Kushal Shah, Roukoz Chamoun, N Litofsky, Kathy Newell
	162	***Hemimegalencephaly in an Infant with Tuberous Sclerosis Complex*** Raina Flores, Sumit Pruthi, Kevin Ess, Robert Naftel, Ty Abel, Bret Mobley
	163	***Pontine Tegmental Cap Dysplasia: Neuropathologic Confirmation of a Rare Clinical/Radiologic Syndrome*** Brian Harding, Arastoo Vossough, Ethan Goldberg, Mariarita Santi
	164	***A Case of Malformations of Cortical Development with Detailed EEG Correlation*** Jianying Zeng, Katherine Mortati, Jiancong Liang, Jenny Libien
	165	***Neuropathology of Jeune Syndrome: A Case Report*** Bret Evers, Anita Sengupta, Veena Rajaram
	166	***Intracranial Glioneuronal Heterotopia with Parapharyngeal Extension*** Cynthia Fleming, Stephen Kralik, Harvey Cramer, Eyas Hattab, Jose Bonnin
	167	***Massive Intratumoral Hemorrhage as an Initial Presentation in a Case of Anaplastic Ganglioglioma with Subarachnoid Invasion and Dural Adhesion*** Hajime Miyata, Takuro Endo, Masaki Maeda, Kentaro Hikichi, Hiroshi Nanjo, Junta Moroi
	168	***Massive Subventricular, Leptomeningeal, and Bone Marrow Spread of Adult Glioblastomas*** Nicholas Willard and Bette Kleinschmidt-DeMasters
	169	***Metachronous Glioblastoma and Gliosarcoma Arising in Separate Cerebral Lobes. A Case Report*** Jose Bonnin, Melissa Gener, Mark Dalesandro, Mark Arvin, Randy Gehring
	170	***Anaplastic Pleomorphic Xanthoastrocytoma Versus Glioblastoma: A Histopathologic and Molecular Case Study*** Deirdre Amaro, Christopher Wixom, Karra Jones
	171	***Disseminated Oligodendroglioma-Like Leptomeningeal Neoplasm in a 31 Year-Old Patient*** Stewart Neill, Kenneth Hill, Dare Adewumi, Chad Holder, Michael Rossi, Matthew Schniederjan

Posters are not offered for CME credit

SATURDAY POSTERS (Continued)

Saturday, June 13, 2015		
Time:	**Poster #:**	**Imperial Ballroom Foyer, Grand Ballroom Foyer, Grand Ballroom**
8:00 am – 4:00 pm	172	***Case Report: A 21 Year Old Female with a History of NF2 who Presented with an Unusual Aggressive Brain Tumor*** Fahad Bafakih, Gayle Suzuki, Robin LeGallo, M. Beatriz Lopes
	173	***Biphasic IDH1 Phenotype in a Diffusely Infiltrating Glioma: Implications for Pathogenesis, Treatment and Prognosis*** Nadejda Tsankova, Yazmin Odia, Hemant Varma
	174	***WT-1 Protein Expression is Associated with Decreased Survival in Human Gliomas*** Hope Richard, Jason Harrison, William Broaddus, Christine Fuller
	175	***Features of the Cellular and Extracellular Microenvironment Correlate with Glioblastoma Patient Survival*** Fahad Bafakih, Jessica Yuan, James Mandell, Jennifer Munson
	176	***Recent Decline in Mortality among Young Adults with WHO Grade III-IV Gliomas in the United States Population*** Kimmo Hatanpaa, Chandrasekhar Sundarrajan, Reza Amanipour, Nga Tran, Jack Raisanen, Chan Foong, Hao Tang
	177	***Analysis of TCGA Gene Expression Data Set in Glioblastoma Tumors that Harbor Mutation of EGFR or BRAF*** Cole Ferguson, Katherine Schwetye, Jingqin Luo, Sonika Dahiya
	178	***Wnt5a, Ryk and Ror2 Expression in Glioblastoma Subgroups*** Yeon-Lim Suh and Yuil Kim
	179	***PLAG1 Expression is Enriched in Glioblastoma with MGMT Promoter Methylation*** Tejus Bale, Rebecca Folkerth, Sandro Santagata, Jason Hornick, Azra Ligon, Keith Ligon, Shakti Ramkissoon
	180	***No 1p/19q Co-deletion Identified in Oligodendroglial Component within Glioblastomas*** Zhe Piao, Vaninder Chhabra, Eric Stiner, Todd Goldenberg
	181	***Atypical Central Neurocytoma Harboring the 1p/19q Co-deletion*** Kathy Allen-Proctor and Joseph Fullmer
	182	***Astroblastic Pattern: Side by Side Comparison Between a Radiated Anaplastic Astrocytoma and a True Astroblastoma*** Areli Cuevas-Ocampo
	183	***Differenti---al Macrophage and Microglial Infiltration across Glioblastoma Subtypes*** Aivi Nguyen, Timothy Lynch, Sharmistha Pal, Ramana Davuluri, Donald O'Rourke, Nadia Dahmane, Maria Martinez-Lage
	184	***Dual use of E-cadherin and D2-40 Immunostaining in Unusual Meningioma Subtypes*** Kelly Mrachek, David Davis, Bette Kleinschmidt-DeMasters
	185	***Meningioma Arising in Meningioangiomatosis Presenting with Seizures and Mimicking Brain Invasion*** Suash Sharma, June Yowtak, Cole Giller
	186	***Meningeal Solitary Fibrous Tumors with Delayed Extracranial Metastases*** Sung-Hye Park, Nayoung Han, Soo Kee Kim, Sun-Ha Paek, Seung-Hong Choi
	187	***Assessment of Technical, Financial and Diagnostic Aspects of Meningioma Diagnosis*** James Nix and Murat Gokden
	188	***Utility of Targeted Next Generation Sequencing on Routine Neuropathology Service at Weill Cornell Medical College*** David Pisapia and Ehud Lavi

Posters are not offered for CME credit

SUNDAY SESSION:
PRESIDENTIAL SYMPOSIUM

Sunday, June 14, 2015

PRESIDENTIAL SYMPOSIUM

Precision Medicine for Dementia

Imperial Ballroom	
8:00 am – 8:05 am	*Introduction and CME Pre-test* Thomas J. Montine, MD, PhD University of Washington, Seattle, WA
8:05 am - 8:55 am	*Precision Medicine for Dementia* Thomas J. Montine, MD, PhD University of Washington, Seattle, WA
8:55 am – 9:45 am	*Clinical and Pathologic Complexity* Julie A. Schneider, MD Rush University Medical Center, Chicago, IL
9:45 am – 10:15 am	**AANP AWARD PRESENTATIONS AND REFRESHMENT BREAK**
10:15 am – 11:00 am	*Alzheimer's Disease Genetics: Progress and Promise* Gerard D. Schellenberg, PhD University of Pennsylvania, Philadelphia, PA
11:00 am – 11:45 am	*Alzheimer's Prevention Initiative* Eric M. Reiman, MD Banner Health, Phoenix, AZ
11:45 am – 12:00 pm	**INSTALLATION OF NEW OFFICERS AND ADJOURNMENT**

91ST ANNUAL MEETING

AANP

AMERICAN ASSOCIATION OF NEUROPATHOLOGISTS

Special Course

Learning Objectives:

1. Discuss surgical neuropathology for the practicing neuropathologist, including:

- *News on CNS lymphoproliferative disorders*
- *News on immunohistochemical markers for tumor pathology*
- *News on ophthalmic pathology*
- *News on classification and genetics of small vessel diseases*

2. Discuss mentoring and training of the next generation of neuropathologists

SPECIAL COURSE

Primary CNS Lymphoma and the So-Called "Pre-Lymphomatous" Conditions

Caterina Giannini, MD, PhD
Mayo Clinic, Rochester, MN

Speaker Biography

Native of Italy, Caterina Giannini received her MD degree (1984) and completed a Neurology residency (1988) at the University of Pisa, followed by a PhD in Neuroscience (1992) at the University of Verona. She completed postgraduate clinical training in Anatomic Pathology and Neuropathology at the Mayo Clinic, Rochester, MN (1996). After spending 3 years in Treviso Italy, practicing as a surgical pathologist and neuropathologist, Dr. Giannini joined the staff of Anatomic Pathology at the Mayo Clinic in 1999, where she has remained since. Dr. Giannini is a Professor of Pathology and Neurosurgery, Mayo Medical School, Rochester. She is the Head of the Neuropathology Working Group and Co-director of the Tissue Registry Clinical Archive of the Division of Anatomic Pathology. She has actively participated in the Cooperative groups including NCCTG, RTOG, ECOG and is at present the cadre leader for Neurooncology in the Pathology Committee of the Alliance for Clinical Trials in Oncology. Her research interests have focused primarily on diffuse gliomas as well as other primary CNS tumors. She has published over 200 original articles on diseases of the central and peripheral nervous system.

Learning Objectives

At the end of this activity, learners should be able to:

1. Recognize morphological and immunohistochemical of primary CNS lymphoma
2. Recognize PCNSL changes secondary to treatment (corticosteroid effect)
3. Describe the features of sentinel lesions and chronic lymphocytic inflammation with pontine perivascular enhancement responsive to steroids
4. Describe characteristic features of CNS lymphoproliferative disorders related to immunosuppression

Abstract and Relevant References

Lymphoma of the CNS is a rare tumor, accounting for 2.1 % of all primary CNS tumors, that occurs both in immunocompetent and immunodeficient patients. Primary CNS lymphoma (PCNSL) is a distinct diffuse large B-cell lymphoma, that is confined to the nervous system and/or to the eye and occurs in immunocompetent patients . Lymphoproliferative disorders occurring in a background of immunodeficiency, such as those due to iatrogenic immunosuppression (following solid organ/bone marrow transplant or drug related) frequently involve primarily or exclusively the CNS. Although classic cases of CNS lymphoma can be easily classified, the diagnosis of PCNSL can be challenging, especially in those patients who have received treatment before biopsy. This talk will review the salient diagnostic features of PCNSL and concentrate on diagnostic challenges especially as related to corticosteroid effect. Although no true prelymphomatous conditions are known, some inflammatory lesions have been described as preceding/heralding PCNSL, including so-called sentinel lesions and some cases of chronic lymphocytic inflammation with pontine perivascular enhancement responsive to steroids (CLIPPERS). The

concept of “sentinel lesions” for contrast enhancing focal lesions, which precede by several months the histopathological diagnosis of PCNSL will be discussed. Features of CLIPPERS as originally described will be presented. Characteristics of lymphoproliferative disorders occurring in a background of immunodeficiency will be discussed and the concept of lymphomatoid granulomatosis reviewed in light of our present understanding.

1. Alderson L, Fetell MR, Sisti M, Hochberg F, Cohen M, Louis DN. Sentinel lesions of primary CNS lymphoma. J Neurol Neurosurg Psychiatry. 1996 Jan;60(1):102-5.
2. O’Neill BP, Schiff D. Post-transplant lymphoproliferative disorders of the central nervous system. Continuum 2004; 10: 48–60
3. Kluin PC, Deckert M, Ferry JA. Primary diffuse large B-cell lymphoma of the CNS. In: Swerdlow S, Campo E, Harris NL, et al. eds. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissue (IARC WHO Classification of Tumours). Lyon, France: IARC, 2008; 240–41
4. Pittaluga S, Wilson WH, Jaffe ES Lymphomatoid granulomatosis In: Swerdlow S, Campo E, Harris NL, et al. eds. WHO Classification of Tumours of Haematopoietic and Lymphoid Tissue (IARC WHO Classification of Tumours). Lyon, France: IARC, 2008; 240–41
5. Pittock SJ, Debruyne J, Krecke KN, Giannini C, van den Ameele J, De Herdt V, McKeon A, Fealey RD, Weinshenker BG, Aksamit AJ, Krueger BR, Shuster EA, Keegan BM. Chronic lymphocytic inflammation with pontine perivascular enhancement responsive to steroids (CLIPPERS).Brain. 2010 Sep;133(9):2626-34
6. Kraan W, Horlings HM, van Keimpema M, Schilder-Tol EJ, Oud ME, Scheepstra C, Kluin PM, Kersten MJ, Spaargaren M, Pals ST. High prevalence of oncogenic MYD88 and CD79B mutations in diffuse large B-cell lymphomas presenting at immune-privileged sites. Blood Cancer J. 2013 Sep 6;3:e139
7. Giannini C, Dogan A, Salomão DR CNS lymphoma: a practical diagnostic approach. J Neuropathol Exp Neurol. 2014 Jun;73(6):478-94.
8. Deckert M, Montesinos-Rongen M, Brunn A, et al. Systems biology of primary CNS lymphoma: From genetic aberrations to modeling in mice. Acta Neuropathol 2014; 127: 175–88
9. Ostrom QT et al CBTRUS statistical report: primary brain and central nervous system tumors diagnosed in the United States in 2007-2011. Neuro Oncol. 2014 Oct;16 Suppl 4:iv1-63.

SPECIAL COURSE

Hereditary Non-Amyloid Small Vessel Diseases of the Brain
A Three-Part Lecture

Françoise Gray, MD, PhD and Elisabeth Tournier-Lasserve, MD
University of Paris, Paris, France

Speaker Biographies

Françoise Gray, MD, PhD

Dr. Gray was born in Normandy and obtained her MD degree from the University of Paris (graduating with the "silver medal"). In 1964 and 1965 she was an Externe/Interne des Hôpitaux at the University of Paris (post- graduate training in Internal Medicine) and then was a resident in Neurology and Pathology (Neuropathology) at the Salpêtrière. In 1983 she earned a PhD in Biology form the University of Paris.
After completion of training, Dr. Gray worked at principally at four University Hospitals in central Paris, first at the Salpêtrière under Professor Raymond Escourolle and then at the Hôpital Henri Mondor and the Hôpital Poincaré. For the past twenty years she has been affiliated with the Hôpital Lariboisière, where she recently retired as Chair of the Pathology Department. At the University of Paris, she rose through the ranks to Full Professor, with a particularly keen interest in the teaching of vascular, degenerative and infectious disease of the nervous system.

Dr. Gray's primary research interests have been in the area of the neuropathology of AIDS, prion diseases, and degenerative diseases, and in medico-legal Neuropathology, where she was appointed as expert witness to the Versailles courthouse. To support her research she has had continuous research funding from the INSERM (French equivalent to the NIH) and other granting agencies for the past thirty-five years. She was " project leader of two consecutive European Concerted Actions (1993-1996) on the Neuropathology of AIDS which allowed for research collaboration in this field with specialists around the World.

She has had numerous leadership administrative appointments locally, nationally and internationally. To name a few, at Lariboisière she was the administrative director of a large hospital unit (Pole) which comprised four other departments, besides Pathology). Also she was representative to the French National University Council, President of the French Society of Neuropathology, and President of the International Society of Neuropathology (2003-2006).

Dr Gray has been an active member of several neurologic professional societies, including the AANP, where she has been a faithful attendee (over the years missing only very few meetings) and continues active on the editorial board of 12 journals (presently serves on the "Advisory Board" of the *JNEN*).
Professor Gray's *Curriculum Vitae* is 101 pages long. The list of publications encompasses the full range of research inquiry in neurologic disease, particularly emphasizing "medical" Neuropathology of degenerative, hereditary/acquired metabolic, prion, infectious and vascular diseases.
One of us (Umberto De Girolami) has be privileged to twice participate with Dr Gray as a contributing editor to the classic monograph *Manual of Basic Neuropathology*, by Professors Raymond Escourolle and Jacques Poirier first published in French in 1971 (translated into English By Lucien Rubinstein, in 1978).

Elisabeth Tournier-Lasserve, MD

Dr. Elisabeth Tournier-Lasserve obtained her MD from the University of Paris in 1984. After her residency, she worked as a "chef de clinique" in neurology at Pitié-Salpêtrière hospital for 2 years and then moved for 3 years to the National Institute of Health in Bethesda in the Molecular Biology research lab head by Pr RA Lazzarini. She is currently Professor of Medical Genetics University Paris7 Denis Diderot, Director of the National French Reference Genetics diagnostic lab for Neurovascular Disorders in Lariboisière hospital in Paris, and Director of INSERM U1161 Research lab on Genetics and pathophysiological mechanisms of Neuro-Vascular disorders

Her main resarch interest in the past 25 years was focused on hereditary neurovascular disorders. She characterized the clinical features of several hereditary neurovascular disorders, revealed their molecular mechanisms and developed diagnostic tools for these conditions to improve clinical care and genetic counseling for patients and families. Her first achievement was the identification in 1993 in collaboration with MG Bousser of CADASIL, a so far unknown cerebral small vessel disease which is now now considered as a paradigm for common cerebral small vessel disorders which are responsible for 30 % of stroke and a major cause of vascular dementia. She showed that this disease is caused by highly stereotyped mutations of the Notch3 receptor which cause aggregation of the protein via its extracellular domain, setting the ground work to understand CADASIL pathophysiology. Dr. Tournier-Lasserve's achievements include also the identification of several genes causing cerebral vascular dysplasia including moyamoya angiopathies and Familial Cerebral Cavernous Malformations (FCCM). Dr. Tournier-Lasserve's team generated also highly relevant mouse models for FCCM, which showed the essential role of endothelial CCM proteins in venous beds and are currently used for preclinical trials. In addition to our contribution to these three neurovascular disorders, Dr. Tournier-Lasserve has also had important contributions to the deciphering of several other cerebral small vessel diseases such as COL4A1/COL4A2 angiopathies and the molecular basis of two channelopathies affecting the central nervous system, namely Familial Hemiplegic Migraine and paroxysmal ataxia. Thus Dr. Tournier-Lasserve had a major contribution in elucidating the genetic basis of neurovascular diseases of previously unknown pathogenesis. She published 187 articles including several papers in Nature, Nature Genetics and the NEJM.

She has had numerous scientific responsibilities including the direction of the French National Institute for Rare diseases and is involved in a number of European and International research networks.

Part I: Hereditary Non Amyloid Small Vessel Diseases of the Brain: Pathological Definition and Classification

Françoise Gray, MD, PhD, University of Paris, Paris, France

Learning Objectives

At the end of this activity learners should be able to:

1. Identify the definition and histological characteristics of: "cerebral microcirculation" and "cerebral small arteries and arterioles"
2. Identify the neuropathological markers of "cerebral small vessel diseases"
3. Identify the main groups of diseases affecting the small cerebral blood vessels and their main pathological characteristics.

Abstract & Relevant References:

Small vessel diseases of the brain primarily involve "small arteries" or arterioles, i.e. perforators with diameters from 40 to 400 m, and various components of the microcirculation. These are diseases of the

vessel wall and must be separated from the different hematological diseases compromising the vascular content.

Diseases of cerebral small vessels are associated with a variety of ischemic and/or hemorrhagic manifestations resulting in variable clinical neurologic syndromes including stroke-like sudden onset of focal signs, progressive, multifocal disease, or diffuse, non-focal, gradually progressive disease with cognitive and/or psychiatric manifestations. Some of these diseases affect predominantly or exclusively the CNS, whereas others are systemic vascular disorders. The development of new radiologic imaging methods has enhanced awareness of these important causes of neurologic morbidity and radio-pathologocical correlation is important and may identify characteristic pattern of abnormality. Neuropathologically, these conditions present with a variable association of infarcts, mostly lacunar, hemorrhages, mainly micro-bleeds, *status cribrosus* or "état criblé", and vascular leukoencephalopathy, which are the markers of cerebral small vessel diseases.

Diseases of cerebral small vessels may be separated in four main groups:

- Probably the most common disorder in this category is arteriosclerotic cerebrovascular disease also named "Small Vessel Disease (SVD)" in the English litterature or formerly "hypertensive cerebrovascular disease" although it is multifactorial (hypertension but also aging or diabetes) and commonly seen in autopsy brain specimens, especially in the elderly . It is a frequent cause of lacunar infarcts, cerebral hemorrhage and Binswanger arteriopathic subcortical encephalopathy.
- Another important condition is cerebral amyloid angiopathy (CAA). Its common form is associated with deposition of A□□protein and has a strong association with aging, and Alzheimer disease. Relatively rare, familial forms of CAA with deposition of different types of amyloid in the vessel wall have also been described in various countries around the world. CAA is the main cause of lobar hemorrhage. Less frequent manifestations include subarachnoid hemorrhage, leukoencephalopathy, granulomatous angiitis and microinfarcts and/or miliary hemorrhages in the cerebral cortex.
- CNS vasculitis is also a relatively frequent cause of small cerebral vessel disease. One can separate infectious vasculitides and non-infectious CNS vasculitides. The latter may arbitrarily be divided into primary angiitis of the CNS occurring predominantly in the CNS in the absence of systemic inflammatory diseases, infections, neoplasms or exposure to drugs, and forms secondary to these later conditions.
- This update will focus on hereditary non amyloid small cerebral vessel diseases. This group of disorders has gained great interest and different types of hereditary small vessel diseases have been identified with variable mode of transmission. The diagnosis of hereditary diseases of cerebral small vessels is becoming an important issue in patients presenting with vascular or degenerative neurological diseases. In many instances the gene has been identified and in some cases, neuropathological data are available.

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Part II: Hereditary Non Amyloid Small Vessel Diseases of the Brain: Genetic Classification and Main Clinico-Radiological Features

Elisabeth Tournier-Lasserve, MD

Learning Objectives

At the end of this activity, learners should be able to:

1. Identify the main clinical and neuroradiological features of hereditary small vessel disease
2. Identify the patterns of inheritance and the genes involved in mendelian SVD
3. Describe the 2015 challenges and opportunities in SVD genetics research field

Abstract and Relevant References

Cerebral small vessel disease (SVD) is a heterogeneous group of disorders affecting small arteries, arterioles, veins, and/or capillaries of the brain. Their two main clinical consequences are stroke and cognitive impairment. Typical neuroimaging features include white matter lesions associated with small infarctions, microbleeds, and macrobleeds. In most cases, SVD is sporadic, with age and hypertension representing the prevailing risk factors. However, several early-onset monogenic forms of SVD have been reported in adult patients, the majority of them with a dominant inheritance pattern. They include CADASIL (Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy), inherited cerebral amyloid angiopathies (CAA) and angiopathies associated with mutations of *COL4A1* and *COL4A2* genes CADASIL is caused by *NOTCH3* mutations and is the most common hereditary SVD with more than 500 families reported so far, the second one being *COL4A1/COL4A2* angiopathies. By contrast, CARASIL (Cerebral Autosomal Recessive Arteriopathy with Subcortical Infarcts and Leukoencephalopathy) is a very rare autosomal recessive SVD caused by biallelic mutations of the *HTRA1* gene. Several additional SVD whose causative mutations have not been identified have also been reported, including PADMAL (Pontine Autosomal Dominant Microangiopathy with Leukoencephalopathy) and LCC (Leukoencephalopathy with Calcifications and Cysts). While the identification of mutated genes has provided invaluable tools for diagnosing monogenic SVD forms, molecular screening of those genes in routine diagnosis identifies the causative mutation in less than 20 % of patients referred for a familial SVD, which strongly suggests that other genes may be involved. Tremendous progress in high throughput technologies provide very exciting new opportunities in this field.

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Part III: Hereditary Non Amyloid Small Vessel Diseases of the Brain: Pathological Data

Françoise Gray, MD, PhD, University of Paris, Paris, France

Learning Objectives

At the end of this activity, learners should be able to:

1. Identify which are the specific diagnostic small vessel changes in CADASIL and know that they can be observed on systemic biopsies, particularly skin, biopsies.
2. Identify the main cerebral parenchymal changes in CADASIL and which ones are particularly suggestive of the disease
3. Identify the main neuropathological changes in the more frequently encountered non amyloid hereditary cerebral small vessel diseases and whether these changes are diagnostic, non-diagnostic but suggestive of a particular aetiology, or non-specific.

Abstract and Relevant References

If one excludes amyloid angiopathies which represent a specific and very different group, one can classify hereditary diseases of cerebral small vessels (CSV) according to the pattern of transmission. Neuropathological data, mostly postmortem, are available only in a few cases. In some diseases, pathological examination of the cerebral vessels may reveal very specific, diagnostic, changes. In other instances vascular changes, although non-specific, may be suggestive of a particular disease, and so guiding genetic testing. Most often, the vascular changes have been described only in rare instances and, are not considered sufficiently specific to be diagnostic. Finally, there remains the larger group of cases, for which no genetic data or pathological study is available.

Among dominant hereditary diseases of CSV, CADASIL is prototypic. Its neuropathology has been established by numerous reports. Changes in CSV are diffuse and include specific alterations: granular basophilic deposits presenting at e.m. as granular osmiophilic material and accumulation of the extracellular domain of Notch 3 (ECDN3) which can be identified by immmunohistochemistry. These diagnostic changes are systemic and can be observed on skin biopsies. Parenchymal brain changes are considered the consequence of ischemia due to vascular stenosis which is a feature of CADASIL. Subcortical lacunar infarcts and arteriopathic leukoencephalopathy are characteristics features. Frequent, less classical changes include status cribrosus, particularly at the corticosubcortical junction in the temporal lobe, and involvement of the cerebral cortex which may result from different mechanisms.

Retinal vasculopathy with cerebral leukodystrophy is characterized by involvement of small vessels of the brain and retina. Neuropathological features include fibrinoid vascular necrosis or thickened hyalinized vessels associated with white matter ischemia, necrosis and often dystrophic calcifications. Distinctive multilaminated vascular basement membranes in systemic organs have also been been found at e.m.

COL 4A1 & COL 4A2 mutations cause systemic small vessels disease. Involvement of the vascular basal membrane in systemic organs has been shown at e.m. but neuropathology has only been performed in fetuses. It showed cavitary necrotic lesion (porencephaly) and hemorrhages old or recent, with abnormalities of small vessel walls.

In a single case of Hereditary Extensive Vascular Leukoencephalopathy mapping to chromosome 20q13 neuropathological study showed very distinctive changes of small terminal arterioles and vasa vasorum, more severe in the cortico-subcortical areas, basal ganglia and subependymal regions.

In Swedish hereditary multi-infarct dementia as in Pontine Autosomal Dominant Microangiopathy & Leukoencephalopathy (PADMAL) the gene mutation has not been identified. Neuropathological changes

are comparable and include multiple lacunar infarcts with severe involvement of the pons. Cerebral small vessel changes include concentric intimal proliferation with hyperelastosis and atrophy of the tunica media.

Recessive hereditary diseases of cerebral small vessels include CARASIL in which the gene mutation has been identified and neuropathological studies have revealed variable, usually non-specific, changes of cerebral small vessels, and Leukoencephalopathy, Cerebral Calcifications and Cysts the responsible gene mutation of which is not identified but the hereditary character of which is likely given its very suggestive pathology and a notion of consanguinity in some families.

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SPECIAL COURSE

WHAT EVERY NEUROPATHOLOGIST NEEDS TO KNOW

An Overview of Ophthalmic Pathology for Neuropathologists

Charles G. Eberhart MD, PhD
Johns Hopkins University School of Medicine

Speaker Biography

Dr. Eberhart, Professor of Pathology, Ophthalmology and Oncology, has been a member of the Johns Hopkins University School of Medicine faculty since 2001. He has directed the division of Ophthalmic Pathology since 2006 and Neuropathology since 2009. He is on the editorial boards of the *Journal of Neuropathology and Experimental Neurology* and *Brain Pathology*, and is a member of the Eastern Ophthalmic Pathology Society and the Verhoeff Zimmerman Society. Dr. Eberhart has published over 250 original research articles on diseases of the brain and eye.

Learning Objectives

At the end of this activity, learners should be able to:

1. Cite new information on the diagnosis and classification of ocular disease
2. Discuss common entities and potential pitfalls in ocular pathology
3. Incorporate new knowledge on ocular tumor markers and genetics into improving everyday clinical practice and teaching

Abstract and Relevant References

Many critical components of the eye develop from central nervous system tissue, and ocular pathology can sometimes resemble that seen in the brain. However, other diseases have distinct appearances when they occur in the eye, or only arise in an ocular setting. The goal of this presentation is to review common and clinically problematic lesions arising in the eye and to discuss recent developments in nomenclature and molecular testing. Lesions to be discussed include squamous, melanocytic[1,2] and sebaceous[3] tumors involving the ocular surface, infectious and degenerative corneal diseases as well as common corneal graft pathologies, and intraocular melanoma[4] and retinoblastoma[5]. The focus will be on a practical approach to diagnosis, and how pitfalls with the potential to affect patient care can be avoided.

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SPECIAL COURSE

WHAT EVERY NEUROPATHOLOGIST NEEDS TO KNOW

New Immunomarkers for Practical Diagnosis in Surgical Neuropathology

Arie Perry, MD
Professor of Pathology and Neurological Surgery, Director of Neuropathology and Neuropathology Fellowship Program, University of California, San Francisco (UCSF)

Speaker Biography

Arie Perry is a Professor of Pathology and Neurosurgery at the University of California in San Francisco, where he also serves as Director of the Neuropathology Division and the Neuropathology Fellowship training program. He received his medical degree and residency training at the University of Texas Southwestern Medical Center in Dallas, Texas, followed by fellowships in surgical pathology, neuropathology, and molecular cytogenetics research at the Mayo Clinic in Rochester, MN, where he worked closely with his mentor, the late Dr. Bernd Scheithauer. His interests have focused mostly on classification, grading, and molecular characterization of adult and pediatric brain tumors, with some of his most notable contributions relating to oligodendroglial neoplasms, glioblastoma variants, meningiomas, and embryonal tumors. He is currently serving as a senior advisor for the WHO 2016 brain tumor classification update and has over 350 publications. He has also served as a chief editor for *Brain Pathology* (official journal for the International Society of Neuropathology), the 2010 *Practical Surgical Neuropathology* textbook, and the 2015 9th edition of *Greenfield's Neuropathology*. Dr. Perry maintains an active surgical neuropathology consult service and is a frequently invited lecturer. He has also been featured in several media stories for his innovative use of "neuropathology songs" as an educational tool.

Learning Objectives

At the end of this activity, learners should be able to:

1. Identify immunohistochemical stains that can be utilized as surrogates for molecular subtypes of diffuse gliomas in adults and children.
2. Recognize immunohistochemical stains that can be utilized as molecular surrogates for the diagnosis and subtyping of embryonal neoplasms.
3. Discuss immunohistochemical stains that are useful in common differential diagnoses for meningeal, pituitary, and nerve sheath tumors.

Abstract and Relevant References

Immunohistochemistry is a critical diagnostic tool in surgical neuropathology, with the panel of useful biomarkers ever expanding. In particular, several surrogate immunostains can partially replace molecular techniques with considerably longer turnaround times, such as sequencing, LOH, and FISH. As such, a practical approach can still be adopted in centers with more limited resources. Most adult diffuse gliomas can be stratified into three diagnostic categories (molecular astrocytoma, oligodendroglioma, and glioblastoma) based on IDH1-R132H, ATRX, and p53 immunoprofiles, with additional confirmatory molecular studies needed in only a subset. Moreover, consensus guidelines and WHO criteria now require such studies for accurate diagnosis. For pediatric, especially midline examples, the H3 K27M antibody can

replace IDH1-R132H, although both may be applied simultaneously, given overlapping ages of onset. The BRAF V600E stain is also valuable, but serves as a predictive, rather than diagnostic biomarker. In terms of the four established molecular variants of medulloblastoma, immunostains for beta catenin and GAB-1 help identify the WNT and SHH subtypes respectively, but no reliable surrogates distinguish group 3 and 4 subsets currently. Strong p53 positivity along with GAB-1 expression may identify a more aggressive SHH variant. Other useful immunostains in the workup of embryonal neoplasms include INI1 and BRG1 (atypical teratoid/rhabdoid tumor), LIN28A (embryonal tumor with multilayered rosettes), and OLIG2 (CNS PNET with intermediate prognosis). For meningeal neoplasms, nuclear STAT6 expression is pathognomonic of the hemangiopericytoma/solitary fibrous tumor spectrum, whereas somatostatin receptor 2A is a sensitive meningioma marker. Lastly, nerve sheath and pituitary tumor immunoprofiles will be discussed briefly.

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SPECIAL COURSE

How Neuropathologists are Trained – the World View

Marc Del Bigio MD, PhD, FRCPCm,
University of Manitoba, Winnipeg, Canada

Speaker Biography

Dr. Del Bigio obtained his MD in 1982 and PhD in 1987 from the University of Manitoba, and completed residency training in neuropathology at the University of Toronto in 1993. He has worked as a neuropathologist at the Winnipeg Health Sciences Centre since 1994, is professor in the Department of Pathology at the University of Manitoba in Winnipeg Canada, and holds the Tier 1 Canada Research Chair in Developmental Neuropathology (2004-2017). His clinical and research interests are in pediatric neuropathology (complications of premature birth, fetal alcohol spectrum disorder) and forensic neuropathology. He served nationally as chair of the Specialty Committee in Neuropathology for the Royal College of Physicians and Surgeons of Canada (2008-14), during which time his interest in education and training of neuropathologists bloomed.

Learning Objectives

At the end of this activity, learners should be able to:

1. Describe different pathways for training neuropathologists
2. Describe how the medical service delivery environment puts demands on training requirements
3. Describe how web-based (distance learning) methods can be used to homogenize and improve training across sites and across borders

Abstract and Relevant References

Training of neuropathologists varies worldwide. Systems range from highly organized specialist and subspecialist education with national certification, to regulated training with diploma recognition, to informal apprenticeships in neurological hospitals and no formal recognition. Anecdotal evidence suggests that countries with regulated systems of neuropathology training and an active professional organization are more likely to have an adequate supply of diagnostic specialists and a vibrant research community. The different training systems reflect the style of medical services delivery in the respective countries. In general, the existence of formal neuropathology training systems occurs only in countries with relatively high levels of per capita health expenditures, reflecting the development of medical specialization overall. Despite different systems of training, the common goal of producing capable and competent neuropathologists suggests that cross jurisdictional education might be helpful.

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SPECIAL COURSE

The Future of the Workforce: Can We Make Predictions?

Suzanne Z. Powell, MD
Houston Methodist Hospital, Department of Pathology

Speaker Biography

Dr. Suzanne Powell is a graduate of West Virginia University and completed her pathology residency at the University of Florida, Jacksonville and a Neuropathology Fellowship at the University of Florida, Gainesville. Dr. Powell has been a faculty member in the departments of Pathology at the University of Florida, Jacksonville, Baylor College of Medicine, Houston, TX and is currently a professor of Pathology at Houston Methodist Hospital and Weill Medical College of Cornell University. Dr. Powell has served as the AP/CP Program Director at Baylor College of Medicine and Houston Methodist Hospital for more than 10 years. She has been an active member of the USCAP since entering residency and has been a sustaining member since 1997 and served on the Abstract Review Subcommittee 2011-2014, Resident Advisory Subcommittee 2010-2014 and as an Ambassador 2002-2015. Dr. Powell has also co-chaired the House Staff Specialty Conference for the USCAP Annual Meeting and served multiple times as a speaker for the Neuropathology Evening Specialty Conference for USCAP.

Dr. Powell served on the Residency Review Committee for Pathology of the ACGME, and was the Chair of that Committee and Chair of the subcommittees for Molecular Genetic Pathology and a Vice-Chair for Dermatopathology. Dr. Powell served as the Chair of the Hospital-Based Specialties section of the Council of Review Committees (CRC) and in that capacity served on the ACGME Board Committee for Requirements. Dr. Powell is also a past chair of the Program Directors of Pathology (PRODS) section of the Association of Pathology Chairs, and Chair of the Graduate Medical Education Committee of the College of American Pathologists. She is a newly elected member of the Board of the United States and Canadian Academy of Pathologists (USCAP) and President-Elect of the American Association of Neuropathologists.

Learning Objectives

At the end of this activity, learners should be able to:

1. Identify a demand for Pathologists and AAMC Presentation on Supply
2. Discuss a survey of recently boarded through Maintenance of Certification American Board of Pathology
3. Discuss a survey of Neuropathology Program Directors on placement of graduates

Abstract and Relevant References

This presentation will focus on the issues surrounding the pathology workforce and its supply and demand. Review of the Workforce summit, convened in Washington DC in December 2013 and the subsequent American Board of Pathology sponsored “new in practice” survey associated with the reporting of information with Maintenance of Certification will be discussed. Finally, a survey of the Neuropathology Program Directors focused on changes in the fellowship candidate “pool”, practice opportunities and practice types entered by recent graduates will be discussed.

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2. Robboy SJ, Weintraub S,Horvath AE, Jensen BW, Alexander CB, Fody EB, Crawford JM, Clark JR, Cantor-Weinberg J, Joshi MG, Cohen MB, Prystowsky MB, Bean SM, Gupta S, Powell SZ, Speights Jr VO, Gross DJ, Black-Schaffer WS and additional members of the Workforce Project Work Group. Pathologist Workforce in the United States: Part II. Accepted March 2015 (in press) Archives of Pathology and Lab Med

SPECIAL COURSE

The Professional Market for Neuropathology Trainees – Round Table

Jeffrey A. Golden, MD, Brigham and Women's Hospital, Boston, MA
Dennis W. Dickson, MD, Mayo Clinic, Jacksonville, FL
Elizabeth J. Cochran, MD, Medical College of Wisconsin, Milwaukee, WI
Brian E. Moore, MD, Southern Illinois University School of Medicine, Springfield, IL

Speaker Biographies

Jeffrey A. Golden, MD

Jeffrey Golden is the Ramzi S. Cotran Professor of Pathology at Harvard Medical School and the Chair of Pathology at the Brigham and Women's Hospital. He received his BA from the University of California, San Diego and his MD from the University of Pennsylvania. He trained in anatomic pathology and neuropathology at the Massachusetts General Hospital followed by postdoctoral training in the Department of Genetics at Harvard Medical School. He returned to the University of Pennsylvania School of Medicine and the Children's Hospital of Philadelphia as an Assistant Professor of Pathology and Laboratory Medicine in 1996 rising to the rank of Professor in 2008. In 2003 he established the division of Developmental Biology for Pediatric Disorders at the Children's Hospital of Philadelphia and in 2008 was appointed Pathologist-in-Chief at the Children's Hospital of Philadelphia. In 2012 he moved back to Boston to assume the Chairmanship of the Department of Pathology at the Brigham and Women's Hospital. His research has focused on developmental disorders of the nervous system and the molecular embryology underlying these disorders in both humans and animal models. In particular he has been interested in disorders related to patterning and cell migration in cerebral cortical development. He has published over 120 articles, chapters and reviews and co-edited a textbook on *Pediatric Neuropathology*. He is a past president of the American Association of Neuropathologists, an Associate Editor for the *Journal of Neuropathology and Experimental Neurology*, and a member of many editorial boards. Finally, his work has been recognized with a number of awards including the Litchfield Lectureship at Oxford College, the Dorothy Russell Memorial Lectureship from the British Neuropathology Society, and twice the Weil Award from the American Association of Neuropathologists.

Elizabeth J. Cochran, MD

Dr. Cochran obtained her MD degree from Rush Medical College in Chicago, Illinois in 1982. She completed residency training in anatomic pathology at Northwestern University in Chicago, Illinois, followed by a neuropathology fellowship with Drs. Pierluigi Gambetti and Uros Roessmann at Case Western Reserve University Institute of Pathology in Cleveland, Ohio. She joined the faculty of Rush University Medical Center in 1989 as an assistant professor, and she helped to establish the Alzheimer's disease brain bank at Rush. She was neuropathology core leader in the Rush NIH-funded Alzheimer's disease center and Religious Order Study grants, participating in research on Alzheimer's disease and aging. Over the last several years she has focused on education of medical students and residents, directing the Rush pathology residency program, medical student pathology course, and autopsy service at Rush, while continuing to run the diagnostic neuropathology service. In 2010, she joined the faculty of the Medical College of Wisconsin in Milwaukee, Wisconsin as Professor of Pathology and is currently director of the autopsy and neuropathology services and of medical student education in pathology.

Brian E. Moore, MD, MEd

Brian E. Moore, MD, MEd, is an associate professor of Pathology, Neurology, Neurosurgery, and Education at the Southern Illinois University School of Medicine in Springfield, Illinois. Dr. Moore has practiced surgical neuropathology for nine years and has directed the second year neurology medical school curriculum at SIU for the past eight years. Dr. Moore is board certified in anatomic pathology and neuropathology, having received his residency and fellowship training at Brown University Hospitals in Providence, Rhode Island. Dr. Moore is a member of the College of American Pathologists Neuropathology Committee and a member of the American Association of Neuropathologists' Professional Affairs and Web Development Committees.

Dennis W. Dickson, MD

The primary research focus of Dennis W. Dickson, MD, is the neuropathologic characterization of brains from prospective and longitudinal research studies sponsored by the National Institute on Aging. His focus areas are: genetic studies, non-Alzheimer's degenerative diseases, disorders in tau pathology, and ALS and frontotemporal degeneration with TDP-43 pathology. In addition to providing a final neuropathology diagnosis for brains in the brain bank, which provides closure to the family and feedback to the physicians involved in antemortem care of the patient, these studies aim to understand the molecular pathology of neurodegenerative disorders that will lead to better diagnosis, treatment and eventually prevention of these devastating disorders. His professional highlights include the Potamkin Prize for Research in Pick's, Alzheimer's and Related Diseases, American Academy of Neurology, 2011 and the Award for Medical Research, Metropolitan Life, 2001.

Learning Objectives

At the end of this activity, learners should be able to:

1. Discuss the different pathways that neuropathologists are placed in current job market.
2. Recognize the nuances of the current job marker for neuropathologists and the vanishing of a "traditional" model.
3. Recognize the need for adjustment of neuropathologists training in face of changes of the job market.

Abstract

Neuropathology is among the smallest subspecialties in the field of medicine. In the 2012-13 academic year, there was a total of 42 fellows enrolled in neuropathology programs in the United States. Meanwhile, there are only approximately 15 academic surgical neuropathology positions in this country open at any one time. Although the number of fellowship-trained job-seekers is small, there are nevertheless more neuropathologists entering the job market than there are academic institutions to accommodate them. The remainder of those seeking positions will enter research-only positions or, more commonly, become dual-trained and enter the job market with additional certifications such as forensic, general surgical or clinical pathology. In this second group, clinical neuropathology typically constitutes a minority of time spent on the job. As such, neuropathology job seekers must be prepared for the fact that their two-year neuropathology fellowship may matter less to potential employers than does the one-year second certification. Finally, the less flexible a candidate is willing to be in terms of job duties, the more flexible they must be in terms of geographic location if they expect to be successful in this small, but competitive, niche job market.

91ST ANNUAL MEETING

AANP

AMERICAN ASSOCIATION OF NEUROPATHOLOGISTS

Endowed Lectureships

- ***Parisi Lecture***
- ***DeArmond Lecture***
- ***Saul R. Korey Lecture***
- ***Matthew T. Moore Lecture***

ENDOWED LECTURESHIP

PARISI LECTURE

The *Parisi Lecture* was established in 2007. The lecture was named the *Parisi Lectureship* in honor of one of the American Association of Neuropathologists' exceptional members, Dr. Joseph E. Parisi. He has published seminal neuropathological studies on a wide range of diseases affecting the nervous system, with particular focus on neurodegenerative diseases and multiple sclerosis. He has held virtually every office of the Society, including President, and has served on several AANP committees. In 2006, his dedication and generosity were recognized with the Award for Meritorious Contributions to Neuropathology. He is considered by many the heart and soul of the association and a man worth emulating.

We are pleased to have Bruce T. Lamb, MD, PhD join our list of distinguished speakers.

2008	Claudia Lucchinetti	The Spectrum of CNS Inflammatory Demyelinating Diseases: *From Pathology to Pathogenesis*
2009	Hans Lassmann	Inflammation Induced Mitochondrial Injury: A Major Mechanism of Neurodegeneration
2010	Joseph Dalmau	Autoimmune Synaptic Encephalitis
2011	Steven S. Scherer	Molecular Pathologies at the Nodes of Ranvier
2012	Bruce D. Trapp	Neuronal Damage in Multiple Sclerosis
2013	Albee Messing	GFAP: Friend or Foe
2014	Clayton Wiley	Human Parechovirus Encephalitis
2015	Bruce T. Lamb	The Role of Innate Immunity in Neurodegenerative Disease Pathogenesis

PARISI LECTURE

The Role of Innate Immunity in Neurodegenerative Disease Pathogenesis

Bruce T. Lamb, PhD Staff, Department of Neurosciences,
The Lerner Research Institute, The Cleveland Clinic

Speaker Biography

Bruce T. Lamb, PhD is Staff in the Department of Neurosciences in the Lerner Research Institute at the Cleveland Clinic.After receiving a bachelor's degree from Swarthmore College in Swarthmore, Pennsylvania, Dr. Lamb earned a PhD from the University of Pennsylvania in Philadelphia and completed a post-doctoral fellowship at Johns Hopkins University in Baltimore. In 1996, he joined the faculty at Case Western Reserve University in Cleveland. There he advanced from Assistant to Associate Professor before accepting a position at the Cleveland Clinic in 2005.

Dr. Lamb's laboratory focuses on the basic science of Alzheimer's disease, concentrating on both the role of genetics and the role of various types of brain cells in the development and progression of Alzheimer's, as well as on understanding the biological mechanisms that underlies traumatic brain injury as a significant environmental risk factor for the disease.

An established Alzheimer's researcher and staunch advocate for increased funding for Alzheimer's and dementia research, Dr. Lamb's honors and awards include the Alzheimer's Association National Civic Award, the Zaven Khachaturian Lifetime Achievement Award, and the Jennifer B. Langston Award from the Alzheimer's Association Cleveland Chapter. Additionally, he is a Fellow in the American Association for the Advancement of Science. In addition, Dr. Lamb joined the Alzheimer's Association Medical and Scientific Advisory Council in 2014.

Learning Objectives

At the end of this activity, learners should be able to:

1. Describe the evidence in support of the role of innate immune pathways in Alzheimer's disease and related neurodegenerative diseases.
2. Identify key innate immune pathways that regulate both amyloid and tau pathology.
3. Identify the role of the novel AD risk gene TREM2, in regulating both amyloid and tau pathology.

Abstract and Relevant References

Alzheimer's disease (AD) is a major cause of dementia, disability and death in the elderly. Neuropathological characteristics of AD include: extracellular deposits of the β-amyloid (Aβ) peptide in senile plaques, intracellular aggregates of hyperphosphorylated microtubule associated protein tau (MAPT) in neurofibrillary tangles (NFTs), and neuroinflammation. This inflammation includes activation of microglia, the local innate immune cell of the brain. In addition, there is increasing evidence that peripheral inflammatory monocytes can also enter the brain where they may also contribute to disease pathogenesis. The exact relationship between microglia, monocytes, neuroinflammatory processes and Aβ and MAPT pathologies remains unclear. Recent genetic studies of AD and other neurodegenerative diseases have implicated inflammatory genes and pathways in disease etiology. First, genome-wide association studies (GWAS) of human AD have revealed several polymorphisms in genes involved in innate

immune pathways that modestly increase disease risk. Second, structural polymorphisms in *Triggering Receptor Expressed in Myeloid Cells 2* (*TREM2*), a gene exclusively expressed by microglia and other mononuclear phagocytes, were demonstrated to be genetically associated with AD. Third, system biology analyses of transcripts from the human AD brain, revealed that *TREM2* and its intracellular adaptor, *TYROBP*, are hub genes that regulate key inflammatory pathways and likely contribute to disease pathogenesis.

Our recent studies demonstrate that TREM2 deficiency in AD mouse models ameliorates β-amyloid (Aβ) pathology, reduces phosphorylation of microtubule-associated protein tau (MAPT), and lowers expression of inflammatory mediators. Notably, TREM2 is strongly expressed on myeloid cells around Aβ deposits in both AD-autopsy brain sections and mouse models of amyloid deposition. Interestingly, $TREM2^+$ plaque-associated macrophages express markers consistent with cells originating from peripheral monocytes rather than brain-resident microglia. Preliminary studies with bone marrow chimeras suggests that indeed TREM2 expressing myeloid cells are derived from the peripheral immune system. In addition, studies of TREM2 expression in peripheral blood demonstrates increased expression of TREM2 in white blood cells in both mouse models of AD and in human AD. Remarkably, TREM2 deficiency virtually abrogates association of these macrophages with Aβ deposits. These provocative findings suggests that TREM2 is essential for accumulation of peripherally-derived $TREM2^+$ myeloid cells around Aβ deposits, and that $TREM2^+$ cells may promote AD-related inflammatory pathologies accounting for the relationship of TREM2 genetic variants to AD risk. These studies also have important implications for both the role of the peripheral immune system in AD pathogenesis and also for therapeutic strategies targeting TREM2.

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4. Lee, S., Xu, G., Jay, T.R., Bhatta, S., Kim, K.W., Jung, S., Landreth, G.E., Ransohoff, R.M., and B.T. Lamb. Opposing effects of membrane-anchored CX3CL1 on amyloid and tau pathologies via the p38 MAPK pathway. *J. Neurosci.*, 34:12538-12546, 2014.
5. Jay, T.J., Miller, C.M., Cheng, P.J., Graham, L.C., Bemiller, S., Broihier, M.L., Xu, G., Margevicius, D., Karlo, J.C., Sousa, G.L., Cotleur, A.C., Butovsky, O., Bekris, L., Staugaitis, S.M., Leverenz, J.B., Pimplikar, S.W., Landreth, G.E., Howell, G.R., Ransohoff, R.M., and B.T. Lamb. TREM2 deficiency eliminates $TREM2^+$ inflammatory macrophages and ameliorates pathology in Alzheimer's disease mouse models. *J. Exp. Med.*, 212:287-295, 2015.

ENDOWED LECTURESHIP

DEARMOND LECTURE

The *DeArmond Lecture* was established in recognition of Stephen J. DeArmond's excellent leadership and organization of the scientific program for the 2006 International Congress of Neuropathology. This successful meeting garnered significant support intended for the future advancement of the mission of the American Association of Neuropathologists. To continue these intended goals and recognize Dr. DeArmond's contributions, the American Association of Neuropathologists has honored him by establishing the *DeArmond Lecture*. Dr. DeArmond is a leading authority on prion disease, where his work has been fundamental in demonstrating mechanisms of transmission and routes to therapeutics. The DeArmond Lecture focuses on honoring those making major advances in the field of neurodegeneration and aging with a particular emphasis on translating these findings to patient care.

We are pleased to have William W. Seeley, MD join our list of distinguished speakers.

2008	Virginia M. –Y. Lee	TDP-43, A New Class of Proteinopathies in Neurodegenerative Diseases
2009	Rudy Tanzi	Decoding Alzheimer's Disease Gene by Gene
2010	Todd Golde	Alzheimer's Disease: Models and Therapeutics
2011	Beverley L. Davidson	Emerging Therapies for Neurogenetic Diseases
2012	Krystof Bankiewicz	New Therapies for Parkinson Disease
2013	Stanley Prusiner	A Unifying Role for Prions in Neurodegenerative Diseases
2014	Dale Bredesen	Prionic Loops, Dependence Receptors, and a New Approach to Alzheimer's Disease
2015	William W. Seeley	Frontotemporal Dementia: Onset and Spread

DEARMOND LECTURE

Frontotemporal Dementia: Onset and Spread

William W. Seeley, MD
Associate Professor of Neurology and Pathology
Director, UCSF Neurodegenerative Disease Brain Bank
UCSF Memory & Aging Center

Speaker Biography

Dr. Seeley graduated magna cum laude from Brown University in 1994 with a degree in Psychology. He attended medical school at the University of California at San Francisco (UCSF), where he first encountered patients with frontotemporal dementia (FTD), the disease that would become his primary research focus. He then completed a neurology residency at Harvard Medical School, training at the Massachusetts General and Brigham & Women's Hospitals, before returning to UCSF for a Behavioral Neurology fellowship, with Bruce Miller. During fellowship, Dr. Seeley received training in neuropathology, focusing on neurodegenerative disease, with Dr. Stephen DeArmond. Dr. Seeley's research has two primary goals. The first goal is to clarify pathogenic mechanisms of selective vulnerability by blending anatomy, neuroimaging, and pathology with molecular-genetic analyses. The second goal is to accelerate drug discovery by developing network-based neuroimaging biomarkers for monitoring disease progression. Dr. Seeley's work was recognized in 2011 with a MacArthur Foundation Fellowship. He is currently Associate Professor of Neurology and Pathology at UCSF and Director of the UCSF Neurodegenerative Disease Brain Bank.

Learning Objectives

At the end of this activity, learners should be able to:

1. Summarize the clinical and pathological heterogeneity of the frontotemporal dementias
2. Discuss a working model for the onset and spread of neurodegenerative disease
3. State the challenges faced in determining where and how frontotemporal dementia syndromes begin
4. Describe the pattern of neuronal, regional, and network vulnerability in behavioral variant frontotemporal dementia

Abstract and Relevant References

The biology of neurodegenerative diseases can be understood in terms of two key aspects: onset and progression. Concerning progression, emerging models have coalesced around the notion of network-based disease protein spread. Brain imaging network mapping techniques have revealed that each neurodegenerative syndrome reflects degeneration of a specific large-scale network. Furthermore, each clinical syndrome is associated with a key "epicenter", an early-affected region whose connections govern the vulnerability of other brain regions, perhaps because prion-like corruptive templating induces transsynaptic disease protein spread. In behavioral variant frontotemporal dementia (bvFTD), the anterior cingulate and frontoinsular cortices represent vulnerable epicenters within a "salience network" specialized for social-emotional-autonomic processing. After an initial phase in which degeneration is restricted to this network, disease spreads into closely interconnected systems.

Mechanisms controlling the timing, cell-specificity, and mechanisms of disease onset remain much more mysterious, especially for FTD. This mystery is deepened by the syndromic diversity expressed by each

histopathological entity. For less common diseases, like FTLD, few methods can faithfully capture the preclinical stages. For bvFTD, we have taken on these challenges by investigating the cellular anatomy of vulnerable anterior cingulate and frontoinsular cortex epicenters in the healthy brain.

Patients with bvFTD due to TDP-43 proteinopathy (FTLD-TDP) often develop a staggered or simultaneous second site of onset in motor neurons, giving rise to an FTD-ALS picture. Likewise, patients with ALS may develop or begin with symptoms and signs of bvFTD. What factors drive multifocal disease onset within the pyramidal skeletomotor and social-emotional systems? The most parsimonious explanation would be shared vulnerability mechanisms among neurons that reside only in and anchor the two systems. In the pyramidal motor system, vulnerable corticospinal motor neurons reside in Layer 5b of the primary motor cortex, express transcription factors CTIP2 and FEZF2, and project large, long-range axons to the spinal cord anterior horn. In the social-emotional system, von Economo neurons (VENs) reside in Layer 5b of the anterior cingulate and frontoinsular cortex, regions that may represent the major efferent and afferent hubs of the social-emotional-autonomic system. VENs express CTIP2 and FEZF2, suggesting that they are long-range subcerebral projection neurons, perhaps with connections to brainstem autonomic integration centers. By studying patients with bvFTD who died during early stages due to motor neuron disease, we have shown that VENs and related neurons show striking vulnerability to TDP-43 inclusion formation, with associated neuronal atrophy. Understanding the kinship between the corticospinal motor neurons and VENs could reveal mechanisms of disease onset and new targets for therapeutic intervention in FTLD and motor neuron disease.

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3. Zhou J, Greicius MD, Gennatas ED, Growdon ME, Jang JY, Rabinovici GD, Kramer JH, Weiner M, Miller BL, Seeley WW. Divergent network connectivity changes in behavioural variant frontotemporal dementia and Alzheimer's disease. Brain. 2010 May; 133(Pt 5):1352-67. PMCID: PMC4257842.
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6. Cobos I, Seeley WW. Human von economo neurons express transcription factors associated with layer v subcerebral projection neurons. Cereb Cortex. 2015 Jan; 25(1):213-20. PMCID: PMC3219874.
7. Seeley WW, Zhou J, Kim EJ. Frontotemporal dementia: what can the behavioral variant teach us about human brain organization? Neuroscientist. 2012 Aug; 18(4):373-85. PMCID: PMC3902758.
8. Lee SE, Khazenzon AM, Trujillo AJ, Guo CC, Yokoyama JS, Sha SJ, Takada LT, Karydas AM, Block NR, Coppola G, Pribadi M, Geschwind DH, Rademakers R, Fong JC, Weiner MW, Boxer AL, Kramer JH, Rosen HJ, Miller BL, Seeley WW. Altered network connectivity in frontotemporal dementia with C9orf72 hexanucleotide repeat expansion. Brain. 2014 Nov; 137(Pt 11):3047-60. PMCID: PMC2443736

ENDOWED LECTURESHIP

SAUL R. KOREY LECTURE

The *Korey Lecture* was established by Dr. Robert D. Terry in honor of Dr. Saul R. Korey, the founder and first Chair of the Department of Neurology at Albert Einstein College of Medicine. Dr. Korey's vision of an interdisciplinary approach to the study of neurological diseases by basic and clinical scientists has inspired generations of colleagues and trainees. Dr. Terry, a close collaborator and colleague of Dr. Korey, was the first recipient of the prestigious *Potamkin Prize for Pick's and Alzheimer's Disease* in 1988, in recognition of his seminal observations of the pathological changes in Alzheimer disease. Dr. Terry generously contributed a portion of the prize funds to endow the *Korey Lectureship*, to be administered by the American Association of Neuropathologists, with the lecturer to be chosen annually by the President in conjunction with the Nominating Committee and the Chair of the Program Committee. Dr. Terry has summarized the qualities of the Korey lecturer as someone who has "… been an active member of the Association…a working MD or MD/PhD neuropathologist…responsible for diagnostic work as well as teaching and research. The lecture should be aimed at the members of the Association, and the lecturer might well serve as a role model for younger members."

We are pleased to have Matthew Frosch, MD, PhD join our list of distinguished speakers.

Year	***Lecturer***	***Title***
1989	Nicholas K. Gonatas	MG-60, a Novel Sialoglycoprotein of Medial Cisternae of the Neuronal Golgi Apparatus: Implications and Applications
1990	Henry M. Wisniewski	Amyloidosis in Alzheimer's Disease and the Spongiform Encephalopathies
1991	Robert D. Terry	Alzheimer's Disease as Seen by a Lucky Morphologist
1992	Henry de Forest Webster	Formation and Regeneration of Myelin
1993	Kunihiko Suzuki	Molecular Genetics of Tay-Sachs and Related Disorders: The Legacy of Saul Korey
1994	*No Lecture*	*XIIth International Congress (Toronto)*
1995	Blas Frangione	Amyloid Genes and Chaperones in Alzheimer Disease
1996	Floyd Gilles	The 3R's of Neuro-oncology – Recording, Reliability and Reporting
1997	Donald L. Price	The Role of Neuropathologists in the Analyses of Models of Neurodegenerative Disease
1998	Sandra H. Bigner	Molecular Genetics of Medulloblastoma
1999	William F. Hickey	Key Participants in the Initiation of Inflammation in the Central Nervous System
2000	Mary E. Case	Neuropathology and Forensic Pathology: A Natural Synergism
2001	Paul H. Kleihues	Molecular Biology of Brain Tumors
2002	James E. Goldman	Astrocytes, Intermediate Filaments, Cellular Stress and Neuropathology
2003	Samuel K. Ludwin	Pathology and Pathogenesis in Multiple Sclerosis
2004	James M. Powers	The Road Not Taken

Year	*Lecturer*	*Title*
2005	Bernardino Ghetti	Deciphering Hereditary Presenile Dementias: Neuropathology at the Crossroads of Neuropsychiatry and Molecular Genetics
2006	Donna M. Ferriero	Molecular Mechanisms of Hypoxic-Ischemic Injury in the Developing Nervous System
2007	Dennis W. Dickson	Neuropathology and Genetics of Parkinsonism
2008	David N. Louis	Brain Tumor Classification: Little Steps and Big Jumps
2009	Stephen J. DeArmond	Mechanisms of Neurodegeneration in Prion Disease Originating from the Neuronal Plasma Membrane
2010	Peter C. Burger	A Long-Term Perspective on Pediatric CNS Tumors
2011	Hans H. Goebel	Protein Aggregate Myopathies
2012	Michael Norenberg	Astrocyte Pathobiology
2013	Harry Vinters	Gain and Pain from Cerebral Microvessels – Adventures in Vascular Neuropathology
2014	Thomas J. Montine	Alzheimer's Disease and Related Dementias
2015	Matthew Frosch	Working at the Crossroads of Neurodegeneration and Cerebrovascular Disease

SAUL R. KOREY LECTURE

Working at the Crossroads of Neurodegeneration and Cerebrovascular Disease

Matthew P. Frosch, MD, PhD
Massachusetts General Hospital and Harvard Medical School, Boston, MA

Speaker Biography

Matthew Frosch received his MD from Harvard Medical School through the Harvard-MIT Division of Health Sciences and Technology (HST) and his PhD in Biophysics from Harvard Graduate School of Arts and Sciences, followed by training in Anatomic Pathology and Neuropathology at Brigham and Women's Hospital. He is the Director of the C.S. Kubik Laboratory for Neuropathology of the Pathology Service of the Massachusetts General Hospital and is the Lawrence J. Henderson Associate Professor of Pathology at Harvard Medical School. He is the Core Leader for the Neuropathology Core of the Massachusetts Alzheimer Disease Research Center (MassADRC). Dr. Frosch has an active role education: at Harvard Medical School and MIT as the Associate Director of the Harvard-MIT Division of Health Sciences and Technology (HST), and at MGH as the Associate Director of Training (for Research) of the MGH Pathology Residency program and directing the MGH Neuropathology Training program. Dr. Frosch's research aims to understand the pathogenesis of cerebral amyloid angiopathy using mouse models and human tissue.

Learning Objectives

At the end of this activity, learners should be able to:

1. Recognize the morphologic features of cerebral amyloid angiopathy, including distinct patterns associated with hemorrhage vs. cognitive presentations.
2. Discuss the potential interactions of cerebral amyloid angiopathy with experimental therapeutic approaches to Alzheimer disease
2. Explain how mouse models of cerebral amyloid angiopathy can be used to understand the development and progression of the disease

Abstract and Relevant References

Cerebral amyloid angiopathy (CAA) involves the deposition of Aß in the walls of leptomeningeal and parenchymal arteries and capillaries. It is well established as a risk factor for intraparenchymal hemorrhage, both large 'lobar hemorrhages' and smaller 'microbleeds' (1). While the hemorrhagic risks associated with CAA have been long understood and highlighted by the increasing sensitivity to detecting microbleeds with modern imaging methods, CAA can also cause other forms of neurologic impairment. In clinicopathologic studies, we have found that a subset of patients with subacute cognitive decline and seizures have CAA associated with the presence of an inflammatory response, often containing giant cells; for these individuals, there can be dramatic improvement after immunosuppressive therapy (2, 3). This naturally-occurring variant form of CAA has significant implications for possible complications of immunotherapy for AD (4). The relationship between the presence of CAA and a range of imaging abnormalities in both cerebral cortex and underlying white matter remains an area of intense investigation for correlations between imaging and histopathology.

We have used mouse model systems to expand our understanding of this form of cerebrovascular disease (5-8). A full understanding of CAA and its consequent patterns of brain injury will require elucidation of of events by which Aß is deposited in blood vessels, the factors determine the distribution of involvement and what the consequences are for the cells of the vessel wall. In this age of emerging potential Alzheimer disease therapeutics, it is also essential to understand how vascular amyloid deposits can respond to therapeutic interventions (immunotherapy, gamma-secretase inhibitors) that have been shown to alter

Aß deposits in model systems and are currently in clinical trials. The perivascular space, which is essential for the initiation of CAA depositis, also plays a role in the efflux of Aβ from brain parenchyma and the mechanisms which drive this flux are also critical potential contributors to the pathogenesis of CAA and Alzheimer disease.

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6. Robbins EM, Betensky RA, Domnitz SB, et al. Kinetics of Cerebral Amyloid Angiopathy progression in a transgenic mouse model of Alzheimer disease. J Neuroscience. 2006, 26:365-371.
7. Prada C, Garcia-Alloza M, Zhang-Nunes SX, et al. Antibody-mediated clearance of Aβ from Cerebral Amyloid Angiopathy revealed quantitative in vivo imaging. J. Neurosci. 2007, 27:1973-80.
8. Arbel-Ornath M, Hudry E, Eikermann-Haerter K, et al. Interstitial fluid drainage is impaired in ischemic stroke and Alzheimer's disease mouse models. Acta Neuropathol. 2013 Sep;126(3):353-64.

ENDOWED LECTURESHIP

MATTHEW T. MOORE LECTURE

In 1970, Dr. Matthew T. Moore made a contribution to the AANP to establish the Moore Award, which is given annually to recognize the "Best Paper on Clinico-Pathological Correlation Presented at the Annual Meeting." In 1987, Rechelle Fishman, a former patient of Dr. Moore, bequeathed $75,000 to the Moore Award Fund. Dr. Moore requested that this bequest be used to establish a "Rachelle Fishman-Matthew Moore Distinguished Lectureship" (later shortened to just the "*Moore Lectureship*"), which is "to be given by a distinguished lecturer, on a subject which represents the leading edge of advanced research in neuropathological subjects of contemporary interest. The lecture is to take place on the day of the Presidential Address." In 1988, it was decided that this Lectureship would replace the "Distinguished Lectureship" that had been sponsored each year by the Association. The Moore Lecturer is selected annually by the President in conjunction with the Nominating Committee and the Chair of the Program Committee.

We are pleased to have Eric C. Holland, MD, PhD join our list of distinguished speakers.

Year	Lecturer	Title
1990	Robert H. Horvitz	The Genetic Control of GABAergic and Serotonergic Neuronal Differentiation and of Programmed and Pathological Cell Death in a Nematode Nervous System
1991	Charles Janeway	Induction, Mediation and Continuation of Immune Responses
1991	Ramzi S. Contran	Cytokine-Endothelial Interactions in inflammation, Immunity and Vascular Injury
1992	D. Carleton Gajdusek	The genetic Control of Spontaneous Generation of Infectious Amyloids: Kuru-CJD-GSS-Scrapie-BSE
1995	Leroy Hood	Deciphering the Human Genome: Implciations for Medicine of the 21st Century
1996	Martin Raff	Programmed Cell Death--Mechanisms and Social Controls
1998	James Eberwine	Single Cell Molecular Neuropathology
1999	Richard T. Johnson	Viral Pathogenesis, an Overview
2001	Dennis Choi	Ischemia-Induced Perturbations in Neuronal Ionic Homeostasis
2002	J. William Langston,	MPTP: Its impact on Parkinson's Disease Research
2003	Carolyn C. Meltzer	Future of PET in the Study of Neurological Disease
2004	Henry L. Paulson	Toward Understanding the Pathogenesis of Repeat Expansion Diseases
2005	Peter St. George Hyslop	Molecular Genetics and Biology of Alzheimer Disease Generate Clues for Therapeutics
2006	Keith L. Ligon	Stem and Progenitor Cell Insights into Gliomas: Novel Origins, Markers and Targets
2008	William Mobley	Trafficking Trophic Signals to Prevent Neurodegeneration
2009	Donald W. Cleveland	From Charcot to Lou Gehrig: Mechanisms and Treatment of ALS
2011	Mark Gilbert	RTOG: Clinical Trials and the Increasing Role of Neuropathology
2012	Kevin P. Campbell	Mechanistic and Molecular Insights into the Pathogenesis of Glycosylation – Deficient Muscular Dystrophy
2013	Bradley Hyman	How does Alzheimer's Disease know Neuroanatomy?
2014	David N. Louis	WHO's Next? Guidelines for the Next WHO Classification of Brain Tumors
2015	Eric C. Holland	Brain Tumors in Mouse and Man

MATTHEW T. MOORE LECTURE

Brain Tumors in Mouse and Man

Eric C. Holland, MD, PhD
University of Washington, Seattle, WA

Speaker Biography

Dr. Holland is a Board-certified Neurosurgeon specializing in the treatment of patients with gliomas. His current positions include: Senior VP and Director, Human Biology Division; Director, Solid Tumor Translational Research, Fred Hutchinson Cancer Research Center and UW Medicine; Director, Nancy and Buster Alvord Brain Tumor Center; Chap and Eve Alvord and Elias Alvord Chair in Neuro-Oncology, UW Medicine; and Professor of Neurological Surgery, University of Washington. He received his education at the University of Chicago, 1985, PhD (Biochemistry and Molecular Biology) and Stanford University, 1990, MD. Dr. Holland's research has centered around the development of genetically accurate mouse models of gliomas. He has used them to study the biology of these tumors, the way that they respond to current therapy, and the development of new methods for treating them.

Learning Objectives

At the end of this activity, learners should be able to:

1. Identify how mouse modelling can inform us about brain tumors
2. Identify the evolution of gliomas
3. Identify how to visualize big data on human gliomas

Abstract and References

My laboratory is seeking to understand the molecular mechanisms underlying the development of central nervous system tumors. This work is based on developing genetically accurate models of these cancers in mice. In this process, we have developed mouse models of many subtypes of gliomas, including gliomas, ependymomas, and AT/RT. Using these models we study the biology of gliomas and the biology of therapeutic response to standard treatment and novel signal transduction inhibitors, the presence of stem like cells and the microenvironmental niches that they live in, and developing molecular imaging strategies to follow pathway activation during tumor development and therapeutic response. In addition, we are developing visualization tools to analyze large human glioma clinical/molecular datasets.

1. Huse JT, Holland EC. Targeting brain cancer: advances in the molecular pathology of malignant glioma and medulloblastoma. Nat Rev Cancer. 2010 May;10(5):319-31.
2. Charles NA, Holland EC, Gilbertson R, Glass R, Kettenmann H. The brain tumor microenvironment. Glia. 2011 Mar 28. doi: 10.1002/glia.21136.
3. Ozawa T, Riester M, Cheng YK, Huse JT, Squatrito M, Helmy K, Charles N, Michor F, Holland EC. Most Human Non-GCIMP Glioblastoma Subtypes Evolve from a Common Proneural-like Precursor Glioma. Cancer Cell. 2014 Aug 11;26(2):288-300.

91ST ANNUAL MEETING

AANP

AMERICAN ASSOCIATION OF NEUROPATHOLOGISTS

Meritorious Awards

Following Business Meeting II
Saturday, June 13

Recipients:
Dr. John Q. Trojanowski
Presented by: **Dr. Peter Nelson**

Dr. Bette K. Kleinschmidt-DeMasters
Presented by: **Dr. Joseph E. Parisi**

MERITORIOUS AWARDS

Awards for Meritorious Contributions to Neuropathology

The *Award for Meritorious Contributions to Neuropathology* recognizes a member who has made significant contributions to the advancement of knowledge in neuropathology and provided service to the American Association of Neuropathologists. Each recipient of the award is nominated by the President, in conjunction with the Nominating Committee and with the approval of the Executive Council. The qualities of outstanding scientific achievement and service are embodied in this year's recipients, Drs. John Q. Trojanowski and Bette K. Kleinschmidt-DeMasters. They join the rich roster of distinguished former award recipients.

Year	Recipient
1959	Armando Ferraro
	Arthur Weil
1960	Joseph H. Globus
	George B. Hassin
1968	Abner Wolf
	Paul I. Yakovlev
	Harry M. Zimmerman
1970	Webb E. Haymaker
1971	James W. Kernohan
1972	George A. Jervis
1979	Raymond D. Adams
	David Cowen
	Matthew T. Moore
1981	Richard Lindenberg
1983	Orville T. Bailey
1984	Margaret Murray
1985	Kenneth M. Earle
	Nathan Malamud
	Leon Roizin
1986	Martin G. Netsky
1987	*No Award Presented*
1988	Edward P. Richardson, Jr.
	F. Stephen Vogel
1989	Lucien J. Rubinstein
	Robert D. Terry
1991	Lysia K. S. Forno
1992	John Moossy
	Gabriele M. ZuRhein
1993	Peter W. Lampert
	Elias E. Manuelidis
1994	Murray B. Bornstein
	Samuel P. Hicks
	Lowell W. Lapham
1995	Amico Bignami
	Asao Hirano
1997	Henryk M. Wisniewski
1998	Richard L. Davis
	Wolfgang Zeman
1999	Lucy B. Rorke
2000	William R. Markesbery
2001	John J. Kepes
	Henry de Forest Webster
2002	Dikran S. Horoupian
	Fusahiro Ikuta
	Kurt A. Jellinger
2003	Bernardino F. Ghetti
2004	Michael N. Hart
2005	E. Tessa Hedley-Whyte
	Suzanne S. Mirra
2006	Joseph E. Parisi
	Jeannette J. Townsend
2007	James M. Powers
	Cedric S. Raine
2008	Kinuko Suzuki
	Margaret G. Norman
2009	Peter C. Burger
	Pierluigi Gambetti
	Nicholas K. Gonatas
2010	Stephen J. DeArmond
	Samuel K. Ludwin
2011	William W. Schlaepfer
	Leroy R. Sharer
2012	Bernd W. Scheithauer
	Donald L. Price
2013	Reid Heffner
	Dawna Armstrong
2014	Floyd Gilles
	Françoise Gray
2015	John Q. Trojanowski
	Bette K. Kleinschmidt-DeMasters

MERITORIOUS AWARD

American Association of Neuropathologists Award for Meritorious Services to Neuropathology 2015

John Q. Trojanowski, MD, PhD, University of Pennsylvania

Dr. John Q. Trojanowski is an experimental neuropathologist who has provided immense contributions to the study of neurodegenerative diseases. His story, and his character, as experienced by his colleagues, are marked by cultural sophistication, originality, hard work, collaborative largesse, and many great successes.

Dr. Trojanowski was born in Connecticut and received MD & PhD degrees from Tufts University; by his graduation from Tufts he had studied in Pennsylvania (USA), Vienna (Austria), Boston (USA), and Rotterdam (the Netherlands).

As if to confirm his penchant for richly complex connections--his PhD degree work focused at least partly on teasing out the neuroanatomical connections of the pulvinar! Following those adventures, Dr. Trojanowski interned and completed a pathology residency in the Harvard Medical School system, began neuropathology training with Dr. E.P Richardson, and then completed his residency/fellowship training in Neuropathology at the University of Pennsylvania under the late Dr. Nicholas Gonatas.
Dr. Trojanowski's >30 year tenure at the University of Pennsylvania was marked by many truly outstanding achievements and happy events -- personal, administrative, collaborative, and scientific.

On the all-important personal front, Dr. Trojanowski has been married to Dr. Virginia Lee for the duration – this "power couple" of the research field met in a Boston bar in 1976, migrated together from Harvard to U. Pennsylvania, and have flourished as scientific and personal partners ever since.
Administratively, Dr. Trojanowski wears a large number of formidable hats. To name a few, Dr. Trojanowski is Director of Medical Pathology and Medical Pathology Research, Dept. of Pathology & Lab. Med., Univ. of Pennsylvania School of Medicine; Director, NIA Alzheimer's Disease Core Center; Director, Institute on Aging, University of Pennsylvania; and Director, NINDS Morris K Udall Parkinson's Disease Research Center of Excellence. These positions indicate his central role in building the U. Pennsylvania team to its powerhouse status in neurodegenerative disease research, a true beacon of research excellence in the world.

Whereas his administrative responsibilities are formidable, Dr. Trojanowski's collaborative tendencies have enabled an even broader and deeper world-wide impact. Dr. Trojanowski has served on dozens of advisory boards, study sections, and other committees and organizations that have greatly benefited the field. Beyond those contributions, Dr. Trojanowski has been successful at the rare feat of collaborating productively with pathologists, neurologists, basic scientists, governmental, foundations, industry/private, and other groups. The collaborative work has gone mainstream—he participated in making a documentary movie, "Alzheimer's Disease: Facing the Facts", which won an Emmy Award and the CINE Golden Eagle Award for Best Documentary. Dr. Trojanowski's remarkable tendency to break down barriers and siloes has been a hallmark of his career.

And what a career from a scientific perspective! Credited on PubMed with over 1000 coathorships, Dr. Trojanowski has made a steady contribution to the study of neurodegenerative diseases that span many diseases, disciplines, genes, and domains. From consensus papers to Science papers, from biomarkers to drug discovery, Dr. Trojanowski has helped lead the way. These contributions are impossible to convey adequately in a single paragraph but include fundamental contributions in the areas of Tau and Alpha-Synuclein, meriting the Potamkin Prize in 1998. Subsequent work from Dr. Trojanowski and the CNDR team (very much including Dr. Lee) on TDP-43 has led to a completely new fundamental insights about brain disease, illustrating for us all that even in the 21st century, researchers still can dream of earth-shattering new discoveries. Other prizes and honors include National Academy of Sciences membership and the J. Allyn Taylor International Prize in Medicine.

Thus, as Dr. Trojanowski accepts this award from the AANP for "Meritorious Service", this plaque will not be the biggest piece of bronze-colored metal on his wall or the highlighted line on his CV. Nor is the "service" provided to neuropathologists by Dr. Trojanowski necessarily measured in citations, administrative hats, or even the hard work performed during his 1997-1998 Presidency of the AANP. For this writer, Dr. Trojanowski – John – embodies a spirit of excellence and passion about neuropathology, at a time when our field is thirsty for those things. He reminds us we can lead – after all, in the 28 years of the Potamkin prize, 10 neuropathologists have been awarded this prize ! Dr. Trojanowski helps lead the way for the world, for UPENN, for patients, for all researchers, and, very much so, for us neuropathologists… perhaps his greatest "service" to us, is to provide inspiration -- as we help push, not merely follow, the field forward.

MERITORIOUS AWARD

American Association of Neuropathologists Award for Meritorious Services to Neuropathology 2015

B.K. Kleinschmidt-DeMasters, MD, Professor and Head of Neuropathology, University of Colorado

B.K. Kleinschmidt-DeMasters is a neuropathologist and medical educator involved in translational neuro-oncology, pituitary disease and infectious disease research. She oversees neuropathology diagnostic services for University of Colorado Hospital, Children's Hospital Colorado and is responsible for neuropathology cases for Denver Veteran's Administration, Denver General Hospital, St. Anthony Hospital, and several other front-range Colorado hospitals. Dr. DeMasters has served as chair of the CAP Neuropathology Committee, member of the American Board of Pathology Residency Exam Committee, and Residency-in-Service Training Examination (RITE) Committee for Neurology. She plays an active role in the education of residents for the Departments of Pathology, Neurology and Neurosurgery, Fellows in Neuroradiology and medical school students. She has mentored summer college students and served on graduate student committees, has received the Pathology Department's Summit Award for Excellence in Resident Education yearly since its inception, and was the departmental Pathologist of the Year in 2012. She is the author of numerous textbook chapters, co-authored several neuropathology textbooks, serves on the editorial boards of 4 journals, has conducted short courses at the United States and Canadian Academy of Pathology meeting, and is the neuropathologist for a long-standing grant from the National Multiple Sclerosis Society for brain banking. Last, but definitely not least, she is the wife of 1, mother of 3, mother in law of 2 and grandmother of 2.

91ST ANNUAL MEETING

AANP

AMERICAN ASSOCIATION OF NEUROPATHOLOGISTS

Diagnostic Slide Session

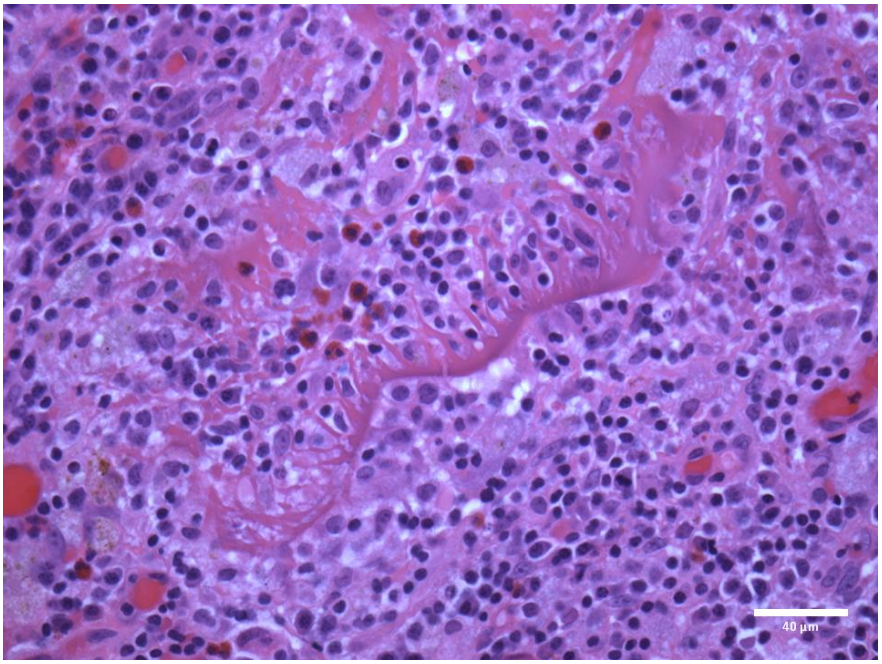
56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015
CASE 2015-1

Submitted by:
Derek Oakley, MD, PhD, and E Tessa Hedley-Whyte, MD
C S Kubik Laboratory of Neuropathology.
Massachusetts General Hospital
55 Fruit Street,
Boston, MA 02114

Clinical History:
This 54yo right handed woman had a recent near gross-total resection of a right parieto-occipital glioblastoma. The tumor was characterized as IDH1-wild-type, EGFR amplified, Met non-amplified, MGMT methylated, and positive for mutations in PTEN and TP53. Approximately 1 month following her initial resection, before the initiation of chemoradiation, she presented to an outside hospital ED complaining of worsening cognition, visual-spatial deficits, right-sided headache, nausea, vomiting, and gait difficulties. Imaging showed a large cystic and solid lesion in the right parietal lobe with multiple foci of nodular enhancement associated with 8mm of midline shift. She underwent re-resection for presumed recurrent tumor.

Material submitted:
One H&E stained slide

Points for discussion:
1. Diagnosis
2. Pathogenesis and prognosis



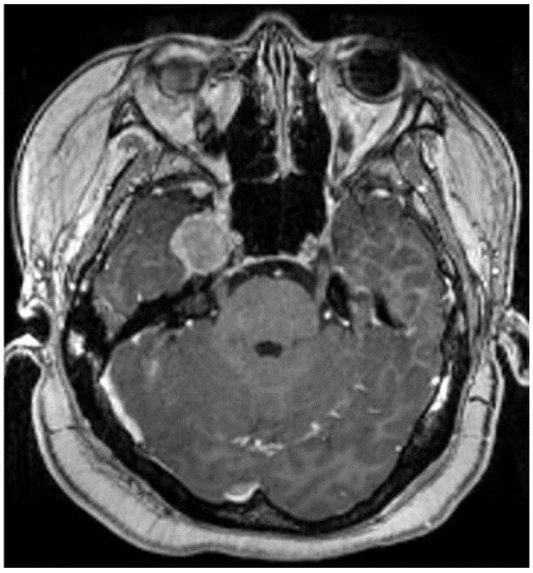
56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015
CASE 2015-2

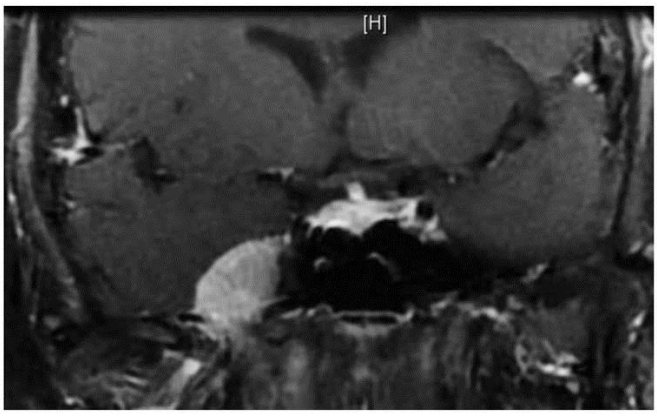
Submitted by:
Jennifer Ziskin, MD, PhD and Edward D. Plowey, MD, PhD
Stanford University School of Medicine
300 Pasteur Drive, Edwards Building Room R241
Stanford, CA 94305

Clinical History:
The patient is an 18 year old woman with a complex past medical history significant for dilated cardiomyopathy diagnosed at 3 months of age, pulmonary hypertension, and moderate bilateral hearing loss. She underwent orthotopic heart transplant at 17 years of age followed by multiple complications including renal insufficiency, DRESS syndrome, and pulmonary nocardiosis. At 18 year of age she presented with several months of right facial pain and hyperalgesia involving the right tongue, gums, teeth and ear. A root canal and extraction of 3 teeth was performed, however the pain persisted. The pain became daily and she started to develop right eye pain. She was diagnosed with trigeminal neuralgia. Subsequently, an MRI was performed revealing a contrast enhancing, extra-axial, 20 mm mass lesion in Meckel's cave. The mass abutted the trigeminal nerve and extended through the foramen ovale. The patient underwent a right subtemporal craniotomy with subtotal excision of the mass.

Material submitted:
MRI images prior to resection and H&E stained section of the resected lesion

Points for discussion:
1. Diagnosis
2. Prognostic features





56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015
CASE 2015-3

Submitted by:
R.S. Tashjian[1], A.M. Langer-Gould[2, 3], S. Natarajan[4], B.K. Kleinschmidt-DeMasters[5], H.V. Vinters[1]

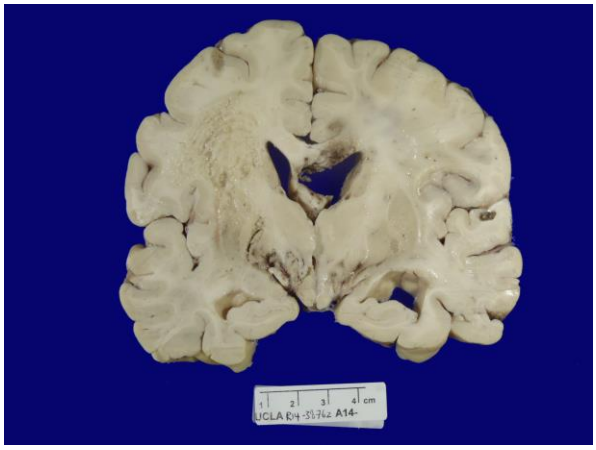
[1] Department of Pathology and Laboratory Medicine, University of California, Los Angeles (UCLA), David Geffen School of Medicine, Los Angeles, CA USA
[2] Department of Neurology, University of Southern California (USC), Keck School of Medicine, Los Angeles CA, USA
[3] Department of Research and Evaluation, Kaiser Permanente Southern California, Los Angeles CA, USA
[4] Department of Pathology, Kaiser Permanente Southern California, Los Angeles CA, USA
[5] Department of Pathology, University of Colorado Denver, Anschutz Medical Campus, Aurora, CO, USA

Clinical History:
The patient was a 42-year-old male with complicated history of rapidly progressive neurologic deterioration. Imaging studies demonstrated bi-hemispheric abnormalities. He was treated for presumptive diagnosis of tumefactive multiple sclerosis with Solumedrol, plasmapharesis, and Cyclophosphamide but showed no improvement. The initial brain biopsy showed features consistent with a "macrophage-rich lesion," although it was unclear whether the biopsy was representative. In the intensive care unit, the patient developed septic shock with fevers up to 106 degrees Fahrenheit, and he was managed with pressors and broad-spectrum antibiotics.

Autopsy findings:
Not available

Materials submitted:
1. One (1) unstained slide of cerebral cortex and white matter
2. One (1) postmortem image

Points for discussion:
1. Pathologic findings
2. Pathogenesis of this disorder
3. Relationship of pathologic lesions to neuroradiographic findings



56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015. CASE 2015-4

Submitted by:
Abeer Tabbarah, MD, Barbara Crain MD, PhD, and Fausto J. Rodriguez, MD
Johns Hopkins University
Department of Pathology
Division of Neuropathology
Sheikh Zayed Tower, Rm M2101
1800 Orleans Street
Baltimore, MD 21231

Clinical History:
The patient was a 73-year-old man with a past medical history of angioimmunoblastic T-cell lymphoma diagnosed in 2009 and treated with 6 cycles of cyclophosphamide, doxorubicin, vincristine, and prednisone with complete remission in 2010. He developed treatment-related acute myeloid leukemia in 2012 that was unresponsive to chemotherapy. He also had chemotherapy-induced cardiomyopathy with an ejection fraction of 25% and treatment-related chronic kidney disease. In April 2014, he underwent a non-myeloablative haploidentical bone marrow transplant.

He presented to the hospital approximately two months after for one episode of aphasia, which had been preceded by gait instability, lightheadedness and altered mental status for about 1 week. Vital signs showed a blood pressure of 105/60 and hypothermia (34.9 °C). White blood cell count was low with a left shift. On neurologic exam, he had depressed consciousness and was disoriented. He also had multifocal myoclonus, bilateral tremor more evident with intention than at rest, and dysmetria. There were no focal neurologic findings. He was admitted, but no acute intracranial changes were present on CT scan. In the hospital, he had rapid worsening of his mental status with respiratory failure requiring intubation. Bone marrow biopsy showed an aplastic marrow and suspected graft failure. He developed polymicrobial bacteremia and septic shock, and his family decided to make him comfort care. He died approximately one month after the recent hospitalization.

Autopsy findings:
Bone marrow profoundly hypocellular

Material submitted:
1 H&E stained section of the hippocampus

Points for discussion:
1. Differential Diagnosis
2. Pathogenesis

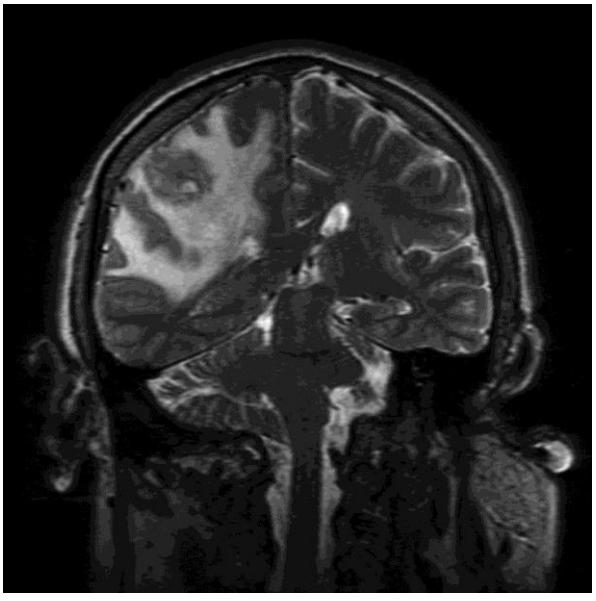
56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015.
CASE 2015- 5

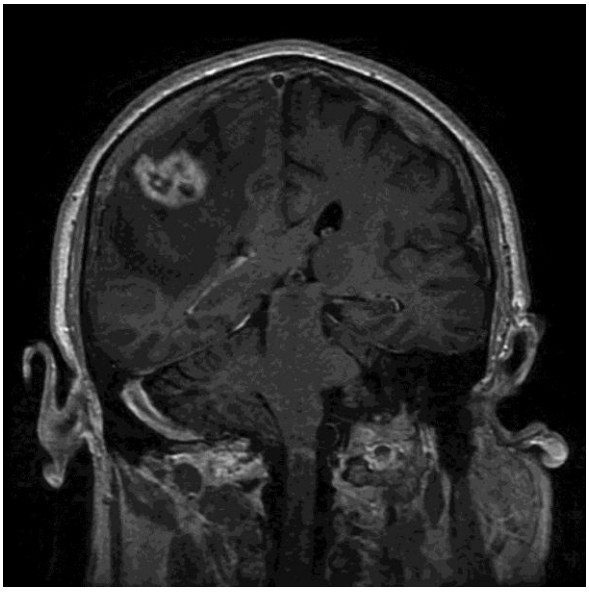
Submitted by:
Seth Lummus, DO, and B.K. Kleinschmidt-DeMasters, MD
University of Colorado Health Sciences Center, Department of Pathology, Academic Office 1, Mailstop B216, 12631 East 17th Avenue, Aurora, CO 80045

Clinical History:
A 54 year-old Caucasian male, status post renal transplant 10 years prior due to IgA nephropathy chronic immunosuppression (CellCept and prednisone), presented with progressive left sided weakness. He had first noticed weakness and clumsiness in his left hand about 5-6 weeks prior to admission with more recent onset of tripping over his left foot and severe headaches. He had slowly developed more difficulty with his daily activities including handwriting, dressing, and grooming. Initial MRI scans showed a new enhancing right frontal mass with extensive edema. He denied any loss of consciousness, confusion, seizures, and changes in vision or hearing. He had no relevant travel history, no exotic pets, and lived in a rural area of Nebraska. A biopsy of the lesion was performed.

Material submitted:
1. Initial MRI images of brain (T1 and T2 coronal FLAIR post gadolinium enhancement)
2. H&E section of biopsied lesional tissue (virtual slide)

Points for discussion:
1. Differential diagnosis
2. Diagnosis
3. Treatment considerations





56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015. CASE 2015 - 6

Submitted by:
Armine Darbinyan[1], Jessica Robinson-Papp, Michelle Jacobs, Catherine Cho, Susan Morgello*
Mailing address: Department of Pathology, Icahn School of Medicine at Mount Sinai, One Gustave L. Levy Place – Box 1194, New York, NY 10029

Clinical History:
A 35 year old African-American man was referred to the Manhattan HIV Brain Bank (MHBB) with 5 years of slowly progressive gait disturbance and dysarthria. He had been diagnosed with HIV, which was sexually-acquired, around the same time his neurologic symptoms began. He was poorly adherent to antiretroviral medications, reaching a CD4+ nadir of 16. Other medical conditions included hypertension, asthma, anxiety and depression. Social history was significant for chronic cocaine dependence, several incarcerations, and periods of homelessness with extreme social alienation. In his 20s he had been a boxer, and had sustained a total of 3 knockouts. There was no known family history of neurologic disease, however both his parents had died in their 50's (mother of cardiac disease, father of unknown causes), and he had no full siblings.

Neurologic examination at presentation revealed grossly normal mental status. Cranial nerve examination was significant for mild dysarthria, decreased facial expression, slow saccades, and mild impairment of upward gaze. Motor exam revealed normal strength and tone in his upper extremities, but in the lower limbs there was mild symmetric weakness involving both distal and proximal muscles, and mild to moderate spasticity. Vibratory sense was mildly reduced in the toes, but sensory examination was otherwise normal. Cerebellar examination was normal in the upper extremities, and limited by weakness and spasticity in the lower extremities. Gait was wide-based and unsteady. Clinical diagnostic evaluation revealed normal serum folate and B12, and negative RPR. MRI of the brain was interpreted as normal. Somatosensory evoked potentials were consistent with myelopathy. He refused a lumbar puncture. A diagnostic molecular test was performed. The patient was followed in the MHBB for the next 15 years, until his death at the age of 50. During this time his neurologic course was steadily progressive. Within two years, at age 37, he had developed nystagmus, dysmetric saccades, progressive ataxia involving the trunk, spasticity involving the upper extremities, worsening dysarthria and hypophonia, and peripheral neuropathy. Repeat MRI of the brain demonstrated a mild, diffuse cerebral and cerebellar atrophy, and more marked brainstem atrophy. By age 42, the patient was wheelchair bound, unable to bear weight on his legs. At age 43, he was institutionalized for care. At the time of his death (due to pneumonia and sepsis), he was bed bound with a tracheostomy, and was able to communicate only through blinking his eyes.

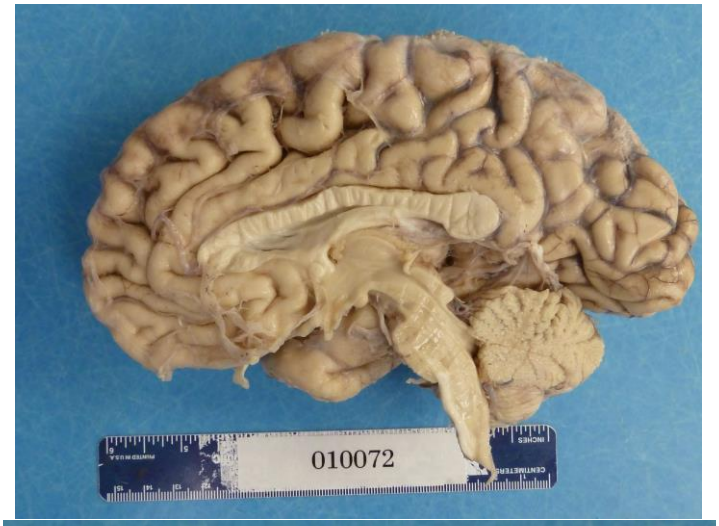
Autopsy findings: The brain weighed 1150 grams with its dural cap. The ventricular system was diffusely dilated with a fenestrated septum pellucidum, the contours of the caudate nuclei were normal. There was remarkable atrophy of the pons, pallor of the substantia nigra and multiple, ill-defined gray plaques in the cerebral and cerebellar white matter. The spinal cord was extremely atrophic.

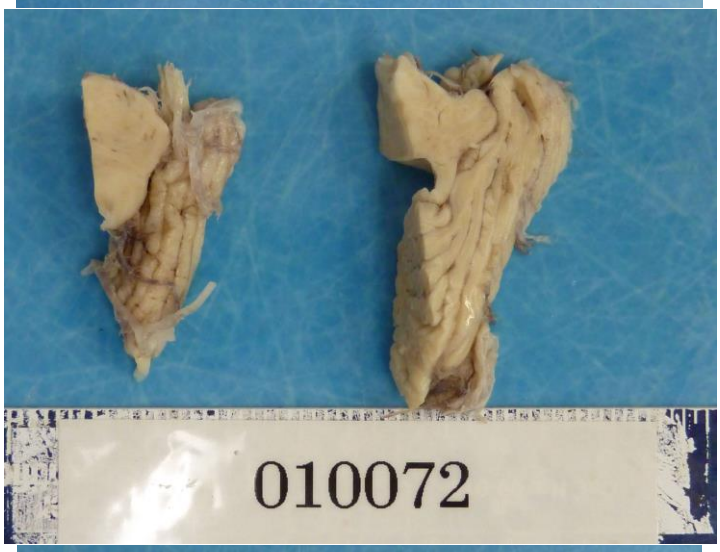
Material submitted: 1. Images of the medial aspect of the fixed brain cut in sagittal orientation, and fixed coronal sections of a half hemisphere at the level of the caudate and globus pallidus. 2. H&E slide of the spinal cord.

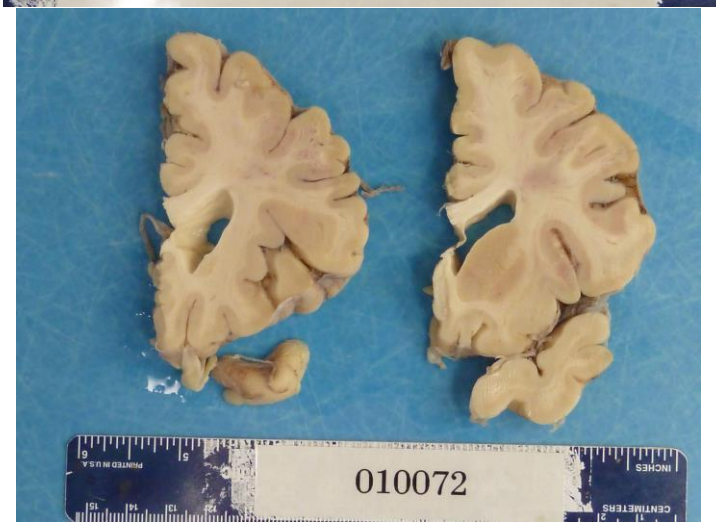
Points for discussion:

1. What was the diagnostic molecular test?
2. Is the neuropathology typical of this disorder?

56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015.
CASE 2015 – 6, Continued







56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015. CASE 2015-7

Submitted by: Rachael Vaubel, Eoin Flanagan, Caterina Giannini and Joseph Parisi
Mayo Clinic, 200 First St SW, Rochester, MN, 55905

Clinical History: The patient is a 55 year old man who presented with a three month history of progressive gait unsteadiness with numbness and tingling of his feet and fingertips as well as right foot weakness. His medical history was significant for an unintentional 25-pound weight loss over the past year, hypertension, 80 pack-year smoking history, and a small bowel resection for perforation 12 years prior.

Neurologic examination showed a severely ataxic gait, positive Romberg sign, loss of vibration and proprioception in his feet, and decreased pinprick sensation in his feet without a sensory level. His hip and knee flexion strength was mildly decreased bilaterally. His reflexes were brisk in the upper extremities and absent in the lower extremities.

Laboratory studies were significant for a microcytic anemia with a hemoglobin of 9.3 g/dL and MCV of 72.9 fL. Tissue transglutaminase antibodies were positive and endoscopic biopsy confirmed a diagnosis of celiac disease. Additional laboratory studies including vitamin B12, thiamin, and vitamin E levels, serum protein electrophoresis, fasting glucose and hemoglobin A1C, liver function tests, electrolytes, TSH, ANA, paraneoplastic antibody panel, PSA, PET-CT, as well as serology for Anaplasma, Erlichia, Babesiosis, and Lyme disease were all unrevealing. CSF examination was normal.

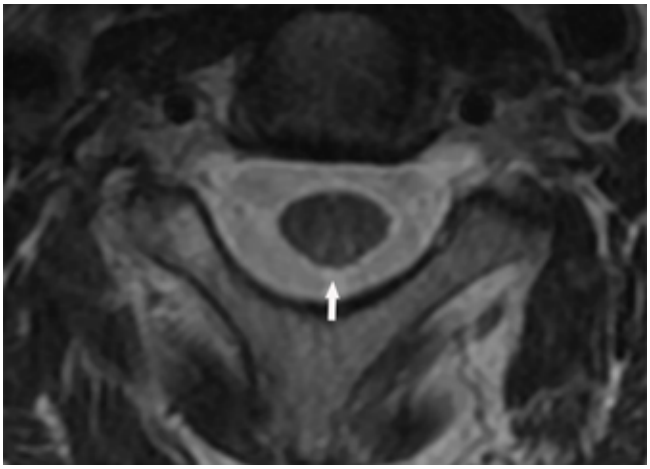
Head CT and MRI were unremarkable. Spine MRI showed a very subtle T2 signal hyperintensity within the dorsal columns (white arrow) but no other abnormalities. Additional laboratory studies were performed which led to a diagnosis for his neurologic symptoms. Five months later, he collapsed suddenly and died.

Autopsy findings: Autopsy disclosed a ruptured basilar tip aneurysm with severe subarachnoid hemorrhage.

Material submitted: H&E slide of the spinal cord. MRI image.

Points for discussion:

1. Etiology and Pathogenesis
2. Neuropathologic findings and differential diagnosis



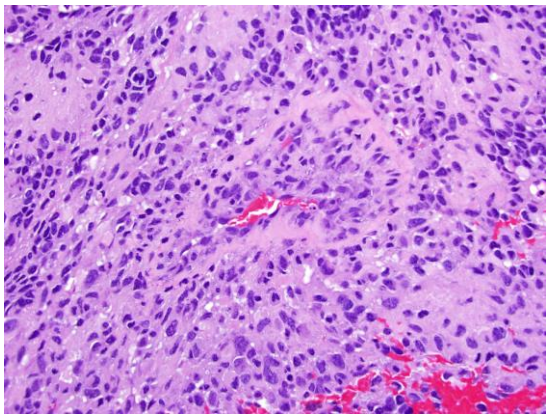
56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015
CASE 2015-8

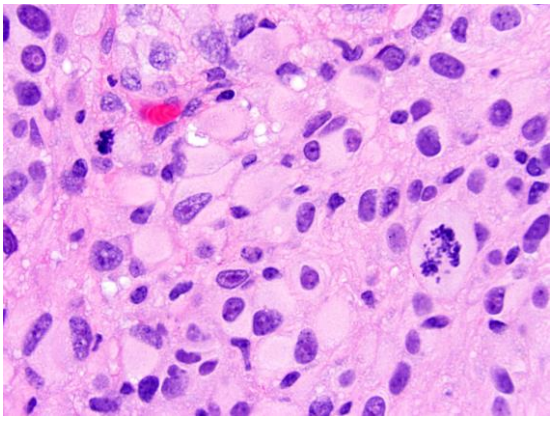
Submitted by:
Sanda Alexandrescu, MD [1], Matthew Wood, MD, PhD [1], Andrew Bollen, MD [1], Emma Du, MD [2], Arie Perry, MD[1]
Department of Pathology, University of California San Francisco, San Francisco, CA [1].
Department of Pathology, Scripps Clinic Medical Group, Inc., La Jolla, CA [2].

Clinical History:
The patient is a 26-year-old man with a medical history of 10 years of progressive right lower extremity weakness and recent onset of urinary dysfunction. A recent neurologic examination was positive for right lower extremity weakness, diminished pinprick and touch sensation, and patellar and Achilles tendon areflexia. Non-contrast magnetic resonance imaging (MRI) of the lumbar spine showed a 9 cm intramedullary tumor that extended from T9 to T12 vertebrae. The tumor had a cystic component distally, and it was isointense compared to the cord on T1 sequences and hypointense on T2 sequences. A biopsy was performed and submitted for evaluation.

Material submitted:
1. One hematoxylin-eosin-stained slide
2. Two hematoxylin-eosin photographs from areas not represented on the slide

Points for discussion:
1. Differential diagnosis
2. Ancillary studies





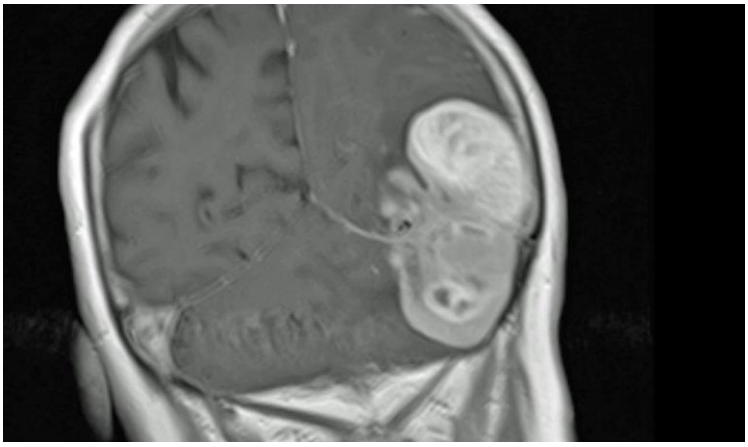
56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015
CASE 2015-9

Submitted by:
Phedias Diamandis[1], Brendan C. Dickson[2], Dennis Izukawa[3], Claire I. Coire[4]
[1]Neuropathology Program, Department of Laboratory Medicine and Pathobiology, University of Toronto, Toronto, Ontario, Canada
[2]Department of Pathology and Laboratory Medicine, Mount Sinai Hospital, Toronto, Canada.
[3]Department of Neurosurgery, Trillium Health Partners, Mississauga, Ontario, Canada
[4]Department of Pathology, Trillium Health Partners, Mississauga, Ontario, Canada

Clinical History:
This 71-year-old female had a 6-month history of worsening speech function with paraphasic errors. The initial CT scan of the head was interpreted to show multiple left sided lesions in the superior and posterior fossa, suspicious for metastases. The metastatic work-up failed to reveal a primary source. Subsequent MR imaging a month later showed this to be a left-sided, complex dural-based mass extending both supra- and infra-tentorially, measuring up to 7.5 cm in maximum dimension. A follow-up CT scan, just a month later, showed a 0.5 cm enlargement in the maximum dimension with progressive narrowing of the fourth ventricle. Neurological deterioration that included right hemiparesis, unsteady gait and worsening aphasia necessitated surgical resection.

Material submitted:
Image from MRI study and an H&E section of cerebellar mass

Points for discussion:
1. What is the histological differential diagnosis of this lesion?
2. What highly specific and sensitive immunohistochemical and molecular techniques could be used to definitively resolve this differential diagnosis?
3. What is the pathophysiological basis for the diagnostic immunohistochemical staining pattern of this lesion?



56th ANNUAL DIAGNOSTIC SLIDE SESSION 2015
CASE 2015-10

Submitted by:
Amanda O. Fisher-Hubbard, MD, Sandra Camelo-Piragua, MD, Paul McKeever, MD, PhD
University of Michigan, Department of Pathology
1301 Catherine St, Room 5226 Med Sci I
Ann Arbor, MI 48109

Clinical History:
The patient is a 62-year-old man with a history of coronary artery disease and hypertension who was in his usual state of health until 2 weeks prior to admission, when he developed decreased appetite, neck and back pain, nausea, and vomiting. Shortly after admission to an outside hospital, he had a tonic-clonic seizure and was intubated. MRI showed extensive irregular gyriform parenchymal abnormalities in the bilateral cerebral hemispheres and extensive leptomeningeal enhancement throughout the basilar cisterns as well as coating the surface and insinuating the sulci of the bilateral cerebral hemispheres. A lumbar puncture was significant for elevated protein (539 mg/dL, normal range = 15 – 45 mg/dL); a Gram stain was negative. He was treated for meningitis, including tuberculous meningitis, for several days. He showed minimal clinical improvement and was extubated. One week after extubation, he developed altered mental status and was re-intubated. MRI demonstrated communicating hydrocephalus with persistent diffuse leptomeningeal enhancement. A repeat lumbar puncture showed an elevated opening pressure. A VP shunt was placed and he was transferred to our hospital for further care. Upon admission, his physical exam was significant for an inability to follow commands and a mild left-sided facial droop. He moved all extremities spontaneously and withdrew to pain. He remained intubated while his work-up continued. His intracranial pressure remained elevated. Eleven days after admission, he underwent a left frontal craniotomy for subdural and intraparenchymal biopsies (provided for your review).

After the brain biopsies, he experienced a slow but progressive decline in his neurological status. His mental status fluctuated between coma and minimal consciousness. He required serial aspirations of CSF to control his intracranial pressure. A repeat MRI thirteen days after admission revealed persistent hydrocephalus, diffuse leptomeningeal enhancement, progressive areas of cortical restricted diffusion, and vascular irregularities on MR angiography. Two weeks later, he was transitioned to comfort care and died the following day. An autopsy was requested by his family.

Material submitted:
1. One representative hematoxylin and eosin-stained slide from the left frontal brain biopsy.
2. One representative UNSTAINED slide from the dorsal brainstem (post-mortem).

Points for discussion:
1. Discuss the differential diagnosis.
2. Discuss the process seen in the biopsy and correlate it with the autopsy findings.
3. Review the clinical settings in which these features can be seen.

91ST ANNUAL MEETING

AANP

AMERICAN ASSOCIATION OF NEUROPATHOLOGISTS

Presidential Symposium

Learning Objectives:

1. *Describe how a precision medicine approach differs from the traditional approach to complex diseases, like dementia.*
2. *Identify new insights provided population-based brain autopsy studies of brain aging and dementia.*
3. *Review the current knowledge of genetic risk architecture for Alzheimer's disease.*
4. *Review the rationale and design of a precision medicine-based clinical trial, the Alzheimer's Prevention Initiative.*

PRESIDENTIAL SYMPOSIUM

Precision Medicine for Dementia

Thomas J. Montine, MD, PhD,
University of Washington

Speaker Biography

Dr. Montine received his education at Columbia University (BA in Chemistry), the University of Rochester (PhD in Pharmacology), and McGill University (MD and CM). His postgraduate medical training was at Duke University, and he was junior faculty at Vanderbilt University where he was awarded the Thorne Professorship in Pathology. Currently, Dr. Montine is the Nancy and Buster Alvord Endowed Professor in Neuropathology and Chair of the Department of Pathology at the University of Washington where he also is Adjunct Professor of Neurological Surgery. Dr. Montine is Adjunct Professor of Neurology at Oregon Health & Science University.

Dr. Montine is the founding Director of the Pacific Northwest Udall Center (one of 10 NINDS-funded Morris K. Udall Centers of Excellence for Parkinson's Disease Research) and is Director of the UW Alzheimer's Disease Research Center (one of 15 NIA-funded centers). Both of these national centers perform focused basic, translational, and clinical research. Each emphasizes a vision for precision medicine that comprises functional genomics, development of surveillance tools for pre-clinical detection, and discovery of molecularly tailored therapies.

The focus of the Montine Laboratory is on the structural and molecular bases of cognitive impairment. Their goal is to define key pathogenic steps and thereby identify new therapeutic targets. The Montine Laboratory addresses these prevalent, unmet medical needs through a combination of neuropathology, biomarker development and application early in the course of disease, and experimental studies that test hypotheses concerning specific mechanisms of neuron injury and approaches to neuroprotection.

Learning Objectives

At the end of this activity, learners should be able to:

1. Identify the reasons for current focus on precision medicine by the US government
2. Recognize the components of precision medicine and how they differ from traditional approaches
3. Identify the application of precision medicine to neurodegenerative diseases that cause dementia

Abstract and Relevant References:

The goal of precision medicine is to deliver optimally targeted and timed interventions tailored to an individual's molecular drivers of disease. This concept has wide currency in cancer care and in some diseases caused by monogenetic mutations, such as cystic fibrosis, and recently has been endorsed by the White House Office of Science and Technology for more widespread application in medicine. This presentation will present an overview of precision medicine and how it can bring greater clarity to the clinical and biological complexity of Alzheimer's disease and related dementias. Subsequent presentations in the Presidential Symposium and other presentations during AANP 2015 will explore details of precision medicine for neurodegenerative diseases that cause dementia.

1. Precision medicine: Clarity for the clinical and biological complexity of Alzheimer's and Parkinson's diseases. Montine TJ, Montine KS. J Exp Med. 2015;212:601-5

PRESIDENTIAL SYMPOSIUM

Clinical and Pathologic Complexity

Julie A. Schneider, MD, MS
Professor, Departments of Pathology (Neuropathology) and Neurological Sciences
Associate Director and Neuropathology Core Leader, Rush Alzheimer's Disease Center
Rush University Medical Center, Chicago IL

Speaker Biography

Dr. Julie A. Schneider is a Professor of Pathology (Neuropathology) and Neurological Sciences at Rush University Medical Center and Rush Alzheimer's Disease Center. She completed her Neurology training at the University of Chicago and Neuropathology training at Emory University in Atlanta and is board certified in both specialties. Dr. Schneider has fellowship training in the neuropathology of dementia, is certified in Geriatric Neurology, and has a Masters Degree in Clinical Research with a focus in Epidemiology. She is the Associate Director and Neuropathology Core Leader of the Rush Alzheimer's Disease Center and the senior neuropathologist for the Religious Orders Study, the Rush Memory and Aging Project, and the Rush Minority Aging Research Study. Dr. Schneider has provided peer review for over 25 journals and is on the editorial board of 2 journals; and has provided numerous grant peer review for the National Institutes of Health, Alzheimer's Association, and over 5 other funding agencies. She has participated in numerous scientific and external advisory boards for academia and industry; and has presented findings from her research both nationally and internationally. Dr. Schneider has extensive experience with clinical-pathologic epidemiologic studies of aging and dementia and has over 200 peer-reviewed publications and 4 book chapters.

Dr. Schneider's research focuses on degenerative, vascular, and mixed brain pathologies and age-related cognitive and motor decline. She is interested in mechanisms of neural reserve and thresholds for age-related cognitive and motor decline especially from a community perspective. She is also interested in genetic and other risk factors and their contribution to pathology and effect on the overall health of the brain. Her current research is focused on brain vascular disease, especially clinically unrecognized disease, including vessel disease and infarction and how brain vascular disease contributes with or without Alzheimer's disease pathology to cognitive impairment. In addition, Dr. Schneider is exploring risk factors, mechanisms, and the clinical expression of cognitive impairment associated with TDP-43 pathology with or without coexisting Alzheimer's disease pathology.

Learning Objectives:

At the end of this activity, learners should be able to:

1. Describe cerebrovascular and neurodegenerative pathologies that often coexist with AD pathology and add independently to the odds of dementia
2. Define neural/cognitive reserve and factors that increase and decrease reserve in older persons.
3. Recognize differing patterns of underlying dementia pathologies as related to specific populations including clinic cohort, community cohorts, oldest old and racially diverse cohorts.

Abstract and Relevant References:

Age-related decline in cognition is very common and is associated with significant morbidity, mortality, family stress, and monetary and social consequences. While Alzheimer's disease (AD) is thought to be the most common clinical and pathologic diagnosis, it is now recognized that both diagnoses are fraught with complexities. Data from 2 community-based studies of aging and cognition, studying over 1000 older persons, followed longitudinally with autopsy at the time of death, will be used to demonstate these complexities. Persons with the diagnosis of probable AD at death are confirmed to have pathologic diagnosis of AD about 90% of the time, but over half are shown to have additional common pathologies. These pathologies include

vascular pathologies: specifically - macroscopic infarcts, microinfarcts, arteriolosclerosis, atherosclerosis, and cerebral amyloid angiopathy; and other neurodegenerative pathologies including Lewy body disease, hippocampal sclerosis and TDP-43 pathology. These other pathologies are not only common but also lower threshold for dementia and add to cognitive impairment. Many of these pathologies also affect episodic memory the clinical hallmark of AD, making clinical distinction of AD vs. mixed AD pathologies difficult. In addition, patterns of mixed pathology have found to differ in special populations, especially in community cohorts, racially diverse cohorts and the oldest old. Another complexity is the common presence of AD in normal older persons. Indeed, both pathologic and radiographic studies have also shown that 1/3 of older persons without cognitive impairment have sufficient AD pathology to render a pathologic diagnosis of AD. This has led to the concept of preclinical Alzheimer's disease, where many of the pathologic hallmarks are already present but clinical symptoms are minimal or absent. While mixed AD pathologies increase odds of clinical expression of AD, other factors lower the likelihood of expressing AD pathology, thereby increasing one's cognitive or neural reserve. These factors include genetics, lifestyle, diet, and personality factors. Further study of those factors that increase and lower neural reserve may provide avenues to prevention and treatment.

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PRESIDENTIAL SYMPOSIUM

Alzheimer's Disease Genetics: Progress and Promise

Gerard D. Schellenberg, PhD
Professor, Pathology and Laboratory Medicine, Perelman School of Medicine
University of Pennsylvania, Philadelphia, PA

Speaker Biography

Dr. Schellenberg is a Professor in the Department of Pathology and Laboratory Medicine in the Perelman School of Medicine, at the University of Pennsylvania. His work focuses in the genetics of neurodegenerative disorders including Alzheimer's disease, progressive supranuclear palsy, and different forms of frontotemporal lobar degeneration, and Guam amyotrophic lateral sclerosis/parkinsonism dementia complex. He started working on Alzheimer's disease genetics in 1987 and was responsible for mapping and cloning of presenilin genes and for identifying mutations responsible for early-onset Alzheimer's disease. In subsequent work on frontotemporal dementia, his group identified mutations in the MAPT gene that cause a form of this disorder. This gene encodes tau, the protein in neurofibrillary tangles. Recently his collaborators showed that the MAPT gene also harbors genetic variants that influence Alzheimer's disease risk. In work on progressive supranuclear palsy, he used genome-wide association methods to identify 4 genes that influence risk for this rare neurodegenerative disease, and one of these is MAPT. In 2008, he founded the Alzheimer's Disease Genetics Consortium (ADGC), which is comprised of a group of investigators who are using genome-wide association analysis methods to identify Alzheimer's disease genes. The ADGC has amassed clinical and genetic information on over 14,000 late-onset Alzheimer's disease cases and 20,000 cognitively normal elderly subjects, and identified over 20 novel risk genes for this devastating disease. Dr. Schellenberg and colleagues are now participating in Alzheimer's Disease Sequencing Project (ADSP) where genomic sequence is being generated for over 11,000 subjects. Dr. Schellenberg is analyzing these data for genetic changes that lead to Alzheimer's disease with the eventual goal of identifying novel therapeutic targets. Dr. schne also identified the gene and mutations that cause Werner's syndrome, a premature aging disorder. He currently also works on autism genetics.

Learning Objectives

At the end of this activity, learners should be able to:

2. Identify the relationship between early genetics studies and current drug trials as examples of gene discovery leading to drug development.
3. Identify the progress made in identifying common and rare genetics variants that either cause or alter risk for Alzheimer's disease.
4. Identify the pathogenic mechanisms that Alzheimer's disease genetics studies have revealed.
5. Identify the relationship between genetic signals and underlying causal variants and genes.

Abstract and Relevant References

AD is a progressive neurodegenerative disorder that is effectively untreatable. Work is ongoing to completely resolve the genetics of this disease. This work offers the potential to identify novel candidates for therapeutic targets. Early work identified mutations in the amyloid precursor protein (*APP*) gene, and presenilins 1 and 2 that cause AD, and alleles of the apolipoprotein E gene (*APOE*) that increase (ε4) or decrease (ε2) susceptibility to late-onset AD (LOAD). This work, which occurred between 1992 and 1995, is the basis of therapies currently in clinical trials. These include immune response-based therapies designed to remove Aβ, a toxic fragment of *APP*, and γ-secretase (presenilin) inhibitors designed to reduce the amount of Aβ produced. Thus a 23 year lag (and counting) between gene discovery and a successful drug is discouraging. However, the recent success in rapidly taking a gene discovery result (*PCSK9*) to a therapy in 9 years illustrates the power of disease genetics leading to a drug. Gene discovery tools have advanced rapidly and a variety of techniques are being used to

resolve AD genetics. Early work took advantage of rare autosomal dominant AD families and used linkage analysis and positional cloning to identifying genes. More recent work made use of advances in genotyping technology that made large scale genome association studies feasible. These studies led to the identification of 24 new late-onset AD loci, and this type of study will continue to be productive as larger cohorts of cases and controls are developed. The latest technology to be deployed for Alzheimer's disease genetics is massively parallel DNA sequencing. This approach makes it possible to identify rare variants that influence Alzheimer's disease risk. In terms of mechanisms and therapeutic targets, early work established that Aβ is a toxic molecule. Thus reducing the levels of this peptide, either by removing existing Aβ, or preventing its synthesis could potentially treat or prevent Alzheimer's disease. More recent genome-wide association studies indicate that the innate immune system influences Alzheimer's disease risk. Complete resolution of Alzheimer's disease genetics is likely to increase our understanding of mechanisms and lead to additional therapeutic targets.

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PRESIDENTIAL SYMPOSIUM

Alzheimer's Prevention Initiative

Eric M. Reiman, MD
CEO of Banner Research, Banner Health

Speaker Biography

Dr. Reiman is Executive Director of the Banner Alzheimer's Institute, Chief Executive Officer of Banner Research, Clinical Director of Neurogenomics at the Translational Genomics Research Institute, Professor of Psychiatry at the University of Arizona, University Professor of Neuroscience at Arizona State University, and Director of the Arizona Alzheimer's Consortium. He received his undergraduate and medical degrees at Duke University, his psychiatry residency training at Duke and Washington University in St. Louis, and his training in brain imaging research at Washington University. Dr. Reiman's research interests include brain imaging, genomics, the unusually early detection and tracking of Alzheimer's disease (AD), and the accelerated evaluation of AD prevention therapies. He is also interested in strategies to establish a new standard of dementia care for patients and family caregivers and new models of collaboration in biomedical research. He is an author of more than 250 publications and a principal investigator of several NIA supported research programs, including the Arizona AD Center, the longitudinal study of cognitively normal persons apoliipoprotein (APOE4) homozygotes, heterozygotes, and non-carriers, the Alzheimer's Prevention Initiative (API) Autosomal Dominant AD trial, and the API APOE4 trial. He is a recipient of the 2013 Potamkin Prize for his contributions to the study of preclinical AD and the accelerated evaluation of AD prevention therapies.

Learning Objectives

At the end of this activity, learners should be able to:

1. Identify how brain imaging techniques and other biomarkers are being used to detect and track the preclinical stages of Alzheimer's disease.
2. Identify the opportunities and challenges involved in the evaluation of promising but unproven Alzheimer's disease prevention strategies.
3. Identify the strategy now being employed by the Alzheimer's Prevention Initiative (API) to help accelerate the evaluation of investigational prevention therapies.

Abstract and Relevant References

The Alzheimer's Prevention Initiative (API) was established to help accelerate the evaluation of treatments to postpone, reduce, or completely prevent the clinical onset of Alzheimer's disease (AD). It includes preclinical AD/theragnostic biomarker trials of investigational amyloid-β (Aβ) immunization and medication therapies in cognitively unimpaired persons who, based on their age and genetic background, are at especially high imminent risk for progression to the clinical stages of AD and exceptionally large registries to support these and other prevention trials. With support from NIH, philanthropy and industry, the API autosomal dominant AD trial is evaluating Genentech's investigational passive Aβ immunotherapy in unimpaired 30-60 year-old presenilin 1 (PSEN1) E280A mutation carriers from the world's largest autosomal dominant AD kindred in Colombia, and the international API apolipoprotein E4 (APOE4) trial is planning to evaluate Novartis's investigational active immunotherapy and BACE1 inhibitor in unimpaired 60-75 year-old APOE4 homozygotes. The potentially license-enabling 60-month trials are intended to provide a better test of the amyloid hypothesis, clarify the extent to which a treatment's biomarker effects are associated with a clinical benefit and provide the evidence needed to support their use as reasonably likely surrogate endpoints in even faster prevention trials, provide a public resource of data and biological samples after the trials are over, provide a foundation for other prevention trials, complement and support other prevention programs, clarify the role of APOE genetic testing and disclosure in the era of AD prevention trials, and help empower at risk individuals in

the fight against AD. In this presentation, I will show how we have used brain imaging, other biomarker and cognitive measurements to detect and track the earliest changes associated with the predisposition to AD. I will describe our ongoing effort to establish the scientific means, accelerated approval pathway, and public-private partnerships needed to rapidly evaluate the range of promising prevention therapies and find ones that work as quickly as possible.

I am grateful to my API partners Pierre Tariot and Jessica Langbaum, our API ADAD partner Francisco Lopera, all of our colleagues, collaborators, and research participants, NIH, Genentech, and Novartis, and our other philanthropic and foundation supporters.

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