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**CURRICULUM VITAE**

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DATE AND PLACE OF BIRTH: October 30, 1950 / Los Angeles, California

CITIZENSHIP: United States Citizen

EDUCATION:

1968-72 Stanford University, Stanford, California; B.S. in Chemistry and Biology, 1972  
1972-76 University of California School of Medicine, San Francisco, CA; M.D., 1976

POSTDOCTORAL TRAINING:

1976-77 Intern in Pathology, University of California, Davis, CA  
1977-79 Resident in Anatomic Pathology, University of California, San Francisco, CA  
1979-80 Fellow in Neuropathology, University of California, Davis, CA  
1980-81 Fellow in Neuropathology, Stanford University and Palo Alto Veterans' Administration Medical Centers, Palo Alto, CA  
1981-84 Research Fellow in Immunopathology, Massachusetts General Hospital, Boston, MA

EMPLOYMENT:

ACADEMIC APPOINTMENTS:

1981-84 Clinical and Research Fellow in Pathology, Harvard Medical School, Boston, MA  
1983-84 Instructor in Pathology, Harvard Medical School  
1985-89 Assistant Professor of Pathology, Harvard Medical School  
1990-92 Associate Professor of Pathology, Harvard Medical School  
1992- 2006 Associate Professor of Pathology with tenure, Stanford University School of Medicine

2006-present Professor of Pathology, Stanford University School of Medicine

#### HOSPITAL AND OTHER APPOINTMENTS:

1982-84 Assistant in Pathology, Massachusetts General Hospital, Boston, MA  
1984-91 Adjunct Assistant Neuropathologist, E.K. Shriver Center, Waltham, MA  
1985-91 Assistant Pathologist, Massachusetts General Hospital, Boston, MA  
1991-92 Adjunct Associate Neuropathologist in Biochemistry, E.K. Shriver Center, Waltham, MA  
1992-93 Associate Neuropathologist (Pathology), Massachusetts General Hospital, Boston, MA  
1992-2007 Staff Neuropathologist, Stanford University Medical Center, Stanford, CA  
1992-present Staff Neuropathologist, Veterans Affairs Health Care System, Palo Alto, CA  
2011-present Courtesy Appointment, Department of Neurology and Neurological Sciences, Stanford University School of Medicine

#### CURRENT LICENSURE AND CERTIFICATION:

California License Registration (1977-present)  
American Board of Pathology, Anatomic Pathology (1980)  
American Board of Pathology, Neuropathology (1982)

#### HONORS AND AWARDS

2019 Award for Meritoious Contrubtions to Neuropathology, American Association of Neuropathologists, June, 2019

#### PUBLIC SERVICE:

#### GRANT REVIEW COMMITTEES:

1987-95 Veterans' Administration Merit Review Board/Neurobiology (Ad hoc)  
1990, 95 NIH Neurological Disorders Program Project Special Review Committee  
1993-98 National Multiple Sclerosis Society Basic Sciences Study Section B  
1994-97 NIH AIDS & Related Research Study Section  
2002 NIH NINDS Performance and Safety Monitoring Board Site Visit  
2002 NIH NINDS, Ad hoc reviewer, Study Section NSD-C  
2006, 2008, 2010 National MS Society reviewer for Brain Bank proposals  
2008 US Army Peer Reviewed Medical Research Program Multiple Sclerosis Panel

#### EDITORIAL BOARDS:

1987-91 Associate Editor, *Journal of Immunology*  
1993-95 Review Panel, *Human Pathology*  
1996-97 Editorial Board, *Neurology*

1991-94, Editorial Board, *Journal of Neuropathology and Experimental Neurology*  
1996-2004  
2000-present Editorial Board, *Brain Pathology*  
2000-present Editorial Board, *Journal of Neuroimmunology*  
2005-2007 Associate Editor, *Journal of Neuropathology and Experimental Neurology*  
2007-2016 Editor-in-Chief, *Journal of Neuropathology and Experimental Neurology*  
2017-present Deputy Editor, *Journal of Neuropathology and Experimental Neurology*

AD HOC REVIEWER (2013-2019) FOR:

*Acta Neuropathologica, American Journal of Pathology, Annals of Neurology, Glia, Human Pathology, Journal of Clinical Investigation, Journal of Immunology, Journal of Neuroscience Research, Lancet Neurology, Multiple Sclerosis Journal, National Multiple Sclerosis Society, PLoS One*

OFFICES AND COMMITTEES IN PROFESSIONAL SOCIETIES:

1985-87 Awards Committee, American Association of Neuropathologists  
1990-92, 95-6 Program Committee, American Association of Neuropathologists  
1993-95 Membership Committee, American Association of Neuropathologists  
1996-98 Chair, Awards Committee, American Association of Neuropathologists  
2000-02 Program Committee, American Society for Investigative Pathology  
2001-02 Vice President, American Association of Neuropathologists  
2007-2016 Executive Council, American Association of Neuropathologists  
2009-present Policy Advisory Committee, Human Brain and Spinal Fluid Resource Center (Bank), West Los Angeles VA Healthcare Center, Los Angeles, CA  
2011-12 President, American Association of Neuropathologists  
2012-2013 Chair, Nominating Committee, American Association of Neuropathologists  
2014-2016 Nominating Committee, American Association of Neuropathologists

DEPARTMENTAL AND MEDICAL SCHOOL SERVICE:

1985-92 Pathology Residency Selection Committee, Massachusetts General Hospital  
1991-92 Research Seminar Coordinator, Massachusetts General Hospital  
1992-2001 Medical School Application Review Panel, Stanford University School of Medicine  
1993-present Member, Immunology Program, Stanford University School of Medicine  
1994-95 Chair, Anatomic Pathology Curriculum Committee, Department of Pathology  
1995-99 Member, Research and Development Committee, Palo Alto VA Health Care System  
1999-2001 Member, Laboratory Safety Committee, Palo Alto VA Health Care System  
1998-2001 Member, Stanford Immunology Program Postdoctoral Fellowship Committee

1999-2000 Chair, Stanford Immunology Program Postdoctoral Fellowship Committee  
2002-2004, Member, Stanford Immunology Program Predoctoral Committee  
2007-2009  
2018-2020 Member, VA Scientific Review Committee

#### MEMBERSHIPS:

American Association of Immunologists  
American Association of Neuropathologists  
American Society for Investigative Pathology  
International Society of Neuroimmunology  
New York Academy of Sciences  
Society for Neuroscience  
United States and Canadian Academy of Pathology

#### MAJOR RESEARCH INTERESTS:

Mechanisms of immune-mediated injury in the CNS.  
Clinicopathologic correlations of CNS inflammatory diseases

#### MEDICAL TEACHING EXPERIENCE:

1977-79 Systemic Pathology, University of California, San Francisco  
1979-81 Neuropathology, University of California, Davis and Stanford University School of Medicine  
1984-88 Neuro-pathophysiology Course, Harvard Medical School  
1991 General Pathology Course, Harvard Medical School  
1991, 93 Course Lecturer, "Pathogenesis of Neuroimmunologic Diseases", Marine Biological Laboratory, Woods Hole, MA  
1993-present Surgical Pathology Lectures for Residents, 1-2 per year  
1993-2004 Systemic Pathology (Pathology 230C), 5 Lectures, 2 Lab Sessions  
1997-2004 Pathology 230C, Neuropathology Teaching Lab Coordinator, Oral Examiner  
2002 Course Co-Director, American Association of Neuropathologists Annual Course, "Microglia in Neuropathology"  
2005-2012 HHD Inde 223, Neuropathology Teaching Lab Coordinator  
2005-present HHD Inde 223, Neuropathology, 3-4 Lectures, 2 Lab Sessions  
2012 Course Director, American Association of Neuropathologists Annual Course, "Acquired Neuropathology in a Changing World", Chicago, June, 2012

#### BIBLIOGRAPHY:

##### ORIGINAL REPORTS:

1. **Sobel RA**, Ruebner BH. Buerger's disease involving the celiac artery. *Hum Pathol*, 1979;10:112-115

2. Corkill G, Hanson FW, **Sobel RA**, Keller TM. Apoplexy in a prolactin microadenoma leading to remission of galactorrhea and amenorrhea syndrome. *Surg Neurol*, 1981;15:114-115
3. **Sobel RA**, DeArmond SJ, Forno LS, Eng LF. Glial fibrillary acidic protein in hepatic encephalopathy--an immunohistochemical study. *J Neuropathol Exp Neurol*, 1981;40:625-632
4. **Sobel RA**, Trice JM, Ellis WG, Nielsen SL. Pineoblastoma with ganglionic and glial differentiation. Report of two cases. *Acta Neuropathol*, 1981;55:243-246
5. Ellis WG, **Sobel RA**, Nielsen SL. Leukoencephalopathy in patients treated with amphotericin B methyl ester. *J Infect Dis* 1982;45:125-137
6. Hess JR, Michaud J, **Sobel RA**, Herman MM, Rubinstein LJ. The kinetics of human glioblastomas maintained in an organ culture system: An in vitro autoradiographic study. *Acta Neuropathol*, 1983;61:1-9
7. **Sobel RA**, Blanchette BW, Bhan AK, Colvin RB. The immunopathology of acute experimental allergic encephalomyelitis. I. Quantitative analysis of inflammatory cells in situ. *J Immunol* 1984,132:2393-2401
8. **Sobel RA**, Blanchette BW, Bhan AK, Colvin RB. The immunopathology of acute experimental allergic encephalomyelitis. II. Endothelial cell Ia expression increases prior to inflammatory cell infiltration. *J Immunol* 1984,132:2402-2406. PMID: 6425402
9. **Sobel RA**, Ellis WG, Nielsen SL, Davis RL. Central nervous system coccidioidomycosis: a clinicopathologic study of treatment with and without amphotericin B. *Hum Pathol*, 1984;15:980-995
10. **Sobel RA**, Colvin RB. The immunopathology of acute experimental allergic encephalomyelitis. III. differential in situ expression of Strain 13 Ia on endothelial and inflammatory cells of (Strain 2 X Strain 13) F1 guinea pigs with EAE. *J Immunol* 1985, 134:2333-2337
11. **Sobel RA**, Michaud J. Microcystic meningioma of the falx cerebri with numerous palisaded structures: an unusual histologic pattern mimicking schwannoma. *Acta Neuropathol*, 1985; 68:256-258
12. **Sobel RA**, van der Veen RC, Lees MB. The immunopathology of chronic experimental allergic encephalomyelitis induced in rabbits with bovine proteolipid protein. *J Immunol* 11985,136:157-163
13. van der Veen RC, **Sobel RA**, Lees MB. Chronic experimental allergic encephalomyelitis and antibody responses in rabbits immunized with proteolipid protein. *J Neuroimmunol* 1986,11:321-333

14. Gabuzda DH, Ho DD, de la Monte SM, Hirsch MS, Rota TR, **Sobel RA**. Immunohistochemical identification of HTLV-III antigen in brains of patients with AIDS. *Ann Neurol* 1986, 20:289-296
15. Yankner BA, Skolnick P, Shoukimas GM, Gabuzda DH, **Sobel RA**, Ho DD. Cerebral granulomatous angiitis associated with acute HTLV-III infection of the central nervous system. *Ann Neurol* 1986,20:362-364
16. **Sobel RA**, Colvin RB. Responder strain-specific enhancement of endothelial and mononuclear cell Ia in delayed hypersensitivity reactions in (Strain 2 X Strain 13) F1 guinea pigs. *J Immunol* 1986;137:2132-2138
17. **Sobel RA**, Collins AB, Colvin RB, Bhan AK. The in situ cellular immune response in acute herpes simplex encephalitis. *Am J Pathol* 1986,125:332-338
18. **Sobel RA**, Hanzakos JL, Blanchette BW, Williams AM, Dellapelle P, Colvin RB. Anti-T cell monoclonal antibodies in vivo. I. inhibition of delayed hypersensitivity but not cutaneous basophil hypersensitivity reactions. *J Immunol* 1987,138:2500-2506
19. **Sobel RA**, Blanchette BW, Russo MA, Williams AM, Colvin RB. Anti-T cell monoclonal antibodies in vivo. II. modulation of acute and chronic experimental allergic encephalomyelitis (EAE) in guinea pigs. *J Immunol* 1987,138:2507-2513
20. **Sobel RA**, Natale JM, Schneeberger EE. The immunopathology of acute experimental allergic encephalomyelitis (EAE). IV. an ultrastructural immunocytochemical study of class II major histocompatibility antigen (Ia) expression. *J Neuropathol Exp Neurol* 1987,46:239-249
21. Scott CF Jr., Lambert JM, Goldmacher VS, Blattler WA, **Sobel R**, Schlossman SF, Benacerraf B. The pharmacokinetics and toxicity of murine monoclonal antibodies and of gelonin conjugates of these antibodies. *Int J Immunopharmacol* 1987, 9: 211-225
22. Schluesener HJ, **Sobel RA**, Linington C, Weiner HL. A monoclonal antibody against a myelin oligodendrocyte glycoprotein induces relapses and demyelination in central nervous system autoimmune disease. *J Immunol* 1987,139:4016-4021
23. **Sobel RA**, Ames MB. Major histocompatibility complex molecule expression in the human central nervous system--immunohistochemical analysis of 40 patients. *J Neuropathol Exp Neurol* 1988,47:19-26
24. Tuohy VK, **Sobel RA**, Lees MB. Myelin proteolipid protein-induced experimental allergic encephalomyelitis: variations of disease expression in different strains of mice. *J Immunol* 1988,140:1868-1873

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26. **Sobel RA**, Schneeberger EE, Colvin RB. The immunopathology of acute experimental allergic encephalomyelitis: V. A light microscopic and ultrastructural immunohistochemical analysis of fibronectin and fibrinogen. *Am J Pathol* 1988,131:547-558
27. Schluesener HJ, **Sobel RA**, Weiner HL. Demyelinating rat experimental allergic encephalomyelitis (EAE): Treatment with a monoclonal antibody against activated T cells. *J Neuroimmunol* 1988,18:341-351
28. Tuohy VK, Lu Z, **Sobel RA**, Laursen RA, Lees MB. A synthetic peptide from myelin proteolipid protein induces experimental allergic encephalomyelitis. *J Immunol* 1988,141:1126-1130
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33. **Sobel RA**, Mitchell ME. Fibronectin in multiple sclerosis lesions. *Am J Pathol* 1989, 135:161-169
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40. Louis DN, Hamilton AH, **Sobel RA**, Ojemann RL. Pseudopsammomatous meningioma with elevated serum carcinoembryonic antigen: a true secretory meningioma. *J Neurosurg*, 1991;74:129-132
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43. Childhood Brain Tumor Consortium. The epidemiology of headache among children with brain tumors. *J Neuro-Oncol* 1991;10:31-46
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55. Lee JK, **Sobel RA**, Chiocca EA, Kim TS, Martuza RL. Growth of human acoustic neuromas, neurofibromas, and schwannomas in the subrenal capsule and sciatic nerve of the nude mouse. *J Neuro-Oncol* 1992,14:101-112
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- protein. VI. suppression of adoptively transferred disease and differential effects of oral vs. intravenous tolerization. *J Neuroimmunol*, 1993;46:73-82
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65. **Sobel RA**, Chen M, Maeda A, Hinojoza JR. Vitronectin and integrin vitronectin receptor localization in multiple sclerosis lesions. *J Neuropathol Exp Neurol* 1995;54:202-213
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- A145. Clemons KV, Capilla J, **Sobel RA**, Tong AJ, Martinez M, Stevens DA. Comparative efficacy of Abelcet (ABLC) and AmBisome (AmBi) against coccidioidal meningitis in rabbits. 48th Annual Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC), Washington DC, October, 2008
- A146. Crespo O, Kang SC, Daneman R, **Sobel RA**, Ho PP, Steinman L, Robinson WH. Tyrosine kinases in autoimmune demyelination. FOCIS, San Francisco, June, 2009
- A147. Zerboni L, **Sobel RA**, Ramachandran V, Ruyechan W, Abendroth A, Arvin A. Evaluation of human sensory ganglia for expression of varicella-zoster virus

immediate early regulatory protein IE63 during latency. International Herpesvirus Workshop, Ithaca, NY, July 2009

- A148. de Jong BA, Han MH, Kooi EJ, **Sobel RA**, Geurts JJ, Polman CH, Steinman L. Abundant alterations in microRNA and mRNA target expression in grey and white matter lesions of patients with multiple sclerosis. 25<sup>th</sup> Congress of the European Committee for treatment and research in multiple sclerosis. Düsseldorf, September, 2009
- A149. Nelson P, Khodadoust M, Spencer C, Varrin-Doyer M, Patarroyo JC, Prodhomme T, **Sobel R**, Stroud R, Zamvil S. Immunodominant T cell determinants of the autoantigen aquaporin-4. International Society for Neuroimmunology Congress, Sitges, October, 2010
- A150. **Sobel RA**, Albertelli MA, Butte MJ, Elias JE, Grimes K, Rubenstein E. Studies on the Aze (Azetidine-2-carboxylic acid) hypothesis of MS pathogenesis. Keystone Symposium on Immunology, Genetics and Repair of Multiple Sclerosis, Taos, NM, February, 2011
- A151. Nelson PA, Varrin-Doyer M, Spencer C, Sagan S, **Sobel RA**, Bennett JL, Zamvil SS. Aquaporin 4 peptide-specific T cells induce CNS inflammation. Congress of the European and Americas Committees on Treatment and Research in Multiple Sclerosis, Amsterdam, The Netherlands, October, 2011
- A152. Graham, KL, Zhang J, Lewen S, Burke TM, Zoudilova M, **Sobel RA**, Butcher EC, Zabel BA. Novel CMKLR1 small molecule antagonist suppresses autoimmune demyelinating disease. FOCIS Annual Meeting, Vancouver, June, 2011
- A153. Nelson PA, Varrin-Doyer M, Spencer C, Sagan SA, **Sobel RA**, Bennett J, Zamvil SS. Encephalitogenic and non-encephalitogenic T cell epitopes of aquaporin 4. ECTRIMS, Lyon, France, October, 2011
- A154. Nelson PA, Varrin-Doyer M, Spencer C, Sagan SA, **Sobel RA**, Bennett J, Zamvil SS. Encephalitogenic potential of discrete T cell epitopes of aquaporin-4 (AQP4). International Society for Neuroimmunology, Boston, November, 2012.
- A155. Burke TM, Tu H, Lewen S, Huang K, Carlson J, **Sobel R**, Zabel BA. Fms-like tyrosine kinase 3 ligand (FLT3L)-Fc chimera suppresses autoimmune demyelinating disease. American Association of Immunologists Annual Meeting, Honolulu, May, 2013
- A156. Zabel BA, Zhang J, Lewen S, Burke TM, Carlson J, Zoudilova M, **Sobel RA**, Butcher EC, Graham KL. A novel CMKLR1 small molecule antagonist suppresses experimental autoimmune demyelinating disease. American Association of Immunologists Annual Meeting, Honolulu, May, 2013
- A157. Hsu JL, Xiang X, Khan MA, Sobel RA, Clemons KV, Stevens DA, Nicolls MR.

Aspergillus invasion increases with progressive airway ischemia. 56th Annual Meeting of Thomas L. Petty Aspen Lung Conference: the lung microbiome: a new frontier in pulmonary medicine”, June, 2013, Aspen, CO)

- A158. Mayo L, Pires Da Cunha A, **Sobel RA**, Lassmann H, Quintana FJ, Weiner HL. Induction of IL-10 dependent T regulatory (Tr1) cells ameliorates disease severity in a model of secondary progressive multiple sclerosis by regulating CNS innate immunity. (American Academy of Neurology Annual Meeting, April, 2014, Philadelphia)
- A158. Graham KL, Werner BJ, Moyer KM, Zoudilova M, Haas JT, Farese RV, Jr., **Sobel RA**, Butcher EC. Transcriptional profiling of central nervous system-infiltrating CD4+ T cells identifies a lipid-metabolizing enzyme as a novel therapeutic target in experimental autoimmune encephalomyelitis. (FOCIS Annual Meeting, June, 2014, Chicago)
- A159. Hsu JL, Jiang X, Khan MA, **Sobel RA**, Clemons KV, Stevens DA, Nicolls MR. Aspergillus invasion increases with progressive airway ischemia. *Ann Am Thorac Soc* 2014; Suppl 1:S79. doi: 10.1513/AnnalsATS.201307-240MG.
- A160. Varrin-Doyer M, Schulze-Topphoff U, Pekarek K, **Sobel RA**, Zamvil SS. Laquinimod prevents disability progression in model of spontaneous chronic autoimmune encephalomyelitis. Joint ACTRIMS/ECOTRIMS Meeting, Boston, September, 2014
- A161. **Sobel RA**, Albertelli, MA, Grimes KV, Rubenstein EA. Azetidine-induced oligodendroglipathy. Joint ACTRIMS/ECOTRIMS Meeting, Boston, September, 2014
- A162. **Sobel RA**, Albertelli, MA, Grimes KV, Rubenstein EA. Azetidine-induced oligodendroglipathy. International Congress of Neuropathology, Rio de Janeiro, September, 2014. *Brain Pathol* 2014; 24, Suppl 1:1-103
- A163. Zhang X, Khan T, Zelasky C, Kurtoglu B, Cohen S, Miller R, **Sobel RA**, Markovic-Plese S. IL-11 induces Th17-cell responses in relapsing remitting multiple sclerosis (RRMS) and EAE. American Academy of Neurology Breakthroughs in Neurology Meeting, January, 2016, Orlando, FL.
- A164. **Sobel RA**, Albertelli MA, Hinojoza JR, Eaton MJ, Grimes KV, Rubenstein EA, Azetidine induced oligodendroglipathy. American Society for Neurochemistry Annual Meeting, March, 2016, Denver, CO
- A165. **Sobel RA**, Albertelli MA, Hinojoza JR, Eaton MJ, Grimes KV, Rubenstein EA, Azetidine induced oligodendroglipathy. 2016 Progressive MS Alliance International Scientific Meeting, May, 2016, San Francisco, CA.

A166. Zhang X, Khan T, Kurtoglu B, Kiapour N, Cohen S, Zelasky C, Naithani R, Yazhong T, Newman M, Warrington P, Gu A, Justa S, Miller R, **Sobel R**, Wan Y, Markovic-Plese S. The role of IL-11 in the development of Th17-mediated autoimmune responses in relapsing-remitting MS and EAE. American Academy of Neurology, Vancouver, BC, April, 2016

A167. **Sobel RA**, Hinojoza JR, Eaton MJ. Multispecific recognition of developmental neuronal antigens and neurite outgrowth inhibition by an anti-myelin proteolipid protein (PLP) peptide monoclonal antibody (mAb). American Association of Immunologists Annual Meeting, May, 2017, Washington, DC

A168. Samghabadi P, Makar S, Shanika Pelpola J, Thomas R, Reddy S, Spence A, Tranvinh E, Vogel H, Born D, **Sobel R**. Anti-PD-1-associated inflammatory-demyelinating lesions in patients with brain metastases. American Association of Neuropathologists Annual Meeting, June, 2017, Garden Grove, CA.

A169. Pawlak M, Vogel A-L, Schramm M, Worrall A, Chihara N, Bennett J, **Sobel RA**, Korn T, Kuchroo VK. Engineered expression of neuromyelitis optica patient-derived auto-antibodies against AQP4 elicits key features of clinical disease in an animal model. American Academy of Neurology Annual Meeting, April, 2018, Los Angeles, CA

A170. **Sobel RA**, Kilgore S, He SX. Parkinsonism and late-onset seizures: adult polyglucosan body disease (APBD) and dysembryoplastic neuroepithelial tumor (DNT). American Association of Neuropathologists Annual Meeting, June, 2018, Louisville, KY.

A171. **Sobel RA**, Eaton MJ, Hinojoza J. Anti-myelin proteolipid protein antibodies bind cell surface proteins on developing neurons and inhibit their differentiation. American Association of Neuropathologists Annual Meeting, June, 2018, Louisville, KY.

A172. Newell KL, Ghetti B, **Sobel RA**, Forno LS. Dementia pugilistica in a 77 year-old former boxing champion. American Association of Neuropathologists Annual Meeting, June, 2019, Atlanta, GA.

#### INVITED LECTURES AND MEETINGS:

1. Symposium "Autoimmune Damage to the CNS", American Society of Neurochemistry, Baltimore, March 1985
2. National Eye Institute Grand Rounds, National Institutes of Health, Bethesda, June 1985
3. Workshop on Genetic, Molecular and Cellular Aspects of Demyelinating Processes, sponsored by the National Multiple Sclerosis Society, Pacific Grove, November 1985

4. Platform Chair, Second International Congress of Neuroimmunology, Philadelphia, September, 1987
5. Visiting Lecturer, Department of Pathology, University of Alabama at Birmingham, October, 1987
6. Workshop on "The Role of Astrocytes in Inflammatory Demyelination", sponsored by the National Multiple Sclerosis Society, Galveston, March, 1990
7. Visiting Lecturer, Division of Demyelinating Diseases and Aging, National Institute of Neuroscience, National Center for Neurology and Psychiatry, Tokyo, August, 1990
8. Invited Speaker, International Congress of Neuropathology Symposium on Demyelination--Mechanisms and Background, Kyoto, September, 1990
9. Workshop on "Mechanisms of Vascular and Tissue Damage in Demyelinating Disease", sponsored by the International Federation of Multiple Sclerosis Societies, Viterbo, Italy, October, 1990
10. Invited Speaker, Department of Neuroimmunology, Max-Planck-Institut für Psychiatrie, Munich, October, 1990
11. Invited Speaker, International Conference on Biological Membranes. Species differences in cellular class II major histocompatibility complex molecule (Ia) expression in experimental allergic encephalomyelitis and their relevance to human central nervous system immune responses. Crans-sur-Sierre, Switzerland, June 1991
12. Plenary Lecturer on "Cell Adhesion Molecules", Third International Congress of International Society of Neuroimmunology, Jerusalem, October, 1991
13. Invited Speaker, NIH Consensus Development Conference on Acoustic Neuroma, Bethesda, December, 1991
14. Workshop on "Neurological Consequences of Immune Dysregulation: Lessons from HIV Infection and Multiple Sclerosis", sponsored by the National Multiple Sclerosis Society, Sanibel Island, FL, January, 1992
15. Invited Speaker, National Eye Institute, National Institutes of Health, Bethesda, April 1992
16. Platform Co-Chair, Session on Demyelinating Diseases/Immunology. American Association of Neuropathologists Annual Meeting, June, 1992
17. Invited Speaker, NIMH Workshop on Viral Diseases of the CNS, Chevy Chase, MD, July, 1993

18. Platform Co-Chair, Session on Demyelinating Diseases/Immunology. American Association of Neuropathologists Annual Meeting, June, 1993
19. Invited Speaker, FASEB Summer Research Conference on Neurofibromatosis, Santa Cruz, CA, July, 1994
20. Platform Chair, Session on Demyelinating Diseases. International Congress of Neuropathology, Toronto, September, 1994
21. Invited Speaker, Department of Neurology, University of Würzburg, Germany, October, 1994
22. Platform Co-Chair, Session on Demyelinating Diseases/Immunology. American Association of Neuropathologists Annual Meeting, June, 1995
23. Chair, Poster Discussion Session on "Glial Cytokines". American Society for Investigative Pathology, FASEB Meeting, New Orleans, June, 1996
24. Platform Co-Chair, Session on Demyelinating Diseases/Immunology. American Association of Neuropathologists Annual Meeting, June, 1996
25. Invited Speaker, Course on Neurobiology of CNS Diseases, American Society of Investigative Pathologists, New Orleans, April, 1997
26. Invited Speaker, Symposium on Immunopathology of Multiple Sclerosis, Vienna, November, 1997
27. Platform Co-Chair, Session on Demyelinating Diseases/Immunology. American Association of Neuropathologists Annual Meeting, June, 1998
28. Invited Speaker, Loyola University Medical Center Department of Pathology Grand Rounds, December, 1998
29. Invited Speaker, University of Washington Department of Pathology Grand Rounds, February, 1999
30. Organizer and Co-Chair, Symposium to Honor Marjorie B. Lees, American Society for Neurochemistry, March, 1999
31. Poster Session Chair, Session on Demyelinating and Metabolic Diseases. American Association of Neuropathologists Annual Meeting, June, 1999
32. Invited Speaker, Symposium on Multiple Sclerosis, University of California, Los Angeles, June, 1999
33. Platform Session Chair, Session on Demyelinating Diseases. American Association of Neuropathologists Annual Meeting, June 2000

34. Invited Speaker, International Symposium on Extracellular Matrix, Angra dos Reis, Rio de Janeiro, Brazil, September, 2000
35. Platform Session Chair, Session on Demyelinating Diseases. American Association of Neuropathologists Annual Meeting, June 2001
36. Invited Speaker, Serono Symposium on Dysfunction of the Blood-Brain Barrier in the Pathogenesis of Multiple Sclerosis, Chicago, September, 2001
37. Co-Chair, Annual Course, *Microglia in Neuropathology*. American Association of Neuropathologists Annual Meeting, Denver, June, 2002
38. Platform Session Co-Chair, Mechanisms of Neurological Diseases. American Society for Investigative Pathology Annual Meeting, San Diego, April, 2003
39. Platform Session Chair, Session on Immunology and Demyelinating Diseases. American Association of Neuropathologists Annual Meeting, June 2003
40. Invited Speaker, Berlex Corporation, December, 2003
41. Invited Speaker, University of Wisconsin at Madison, Department of Pathology, February, 2004
42. Organizer and Platform Session Co-Chair, Symposium on Immune Mechanisms in CNS Diseases, American Society of Investigative Pathology Annual Meeting, Washington, D.C., April, 2004
43. Invited Speaker, Nancy Davis MS Center Without Walls, Los Angeles, CA, May, 2004
44. Platform Session Chair, Session on Neurobiology and Demyelinating Diseases. American Association of Neuropathologists Annual Meeting, Cleveland, June 2004
45. Invited Speaker, Department of Pathology, Robert Wood Johnson Medical School, UMDNJ New Brunswick, NJ, October, 2004
46. Invited Speaker, Department of Pathology, University of Alabama at Birmingham, Birmingham, AL, November, 2004
47. Platform Session Chair, Session on Demyelinating Diseases. American Association of Neuropathologists Annual Meeting, Washington D.C., June 2005
48. Invited Speaker, Veterans Affairs Palo Alto GRECC, December, 2005.
49. Platform Session Co-Chair, "Stem cells and neuro-oncology". American Society of Investigative Pathology Annual Meeting, San Francisco, April, 2006



50. Co-chair, Demyelination and Infectious Disease Workshop, International Congress of Neuropathology, San Francisco, September, 2006
51. Co-Chair, "Myelin/Inflammatory/Infectious Diseases of the Nervous System", Experimental Biology Annual Meeting, April, 2007
52. Case Presentation, Diagnostic Slide Session of American Association of Neuropathologists, San Diego, April, 2008
53. Invited Speaker, Nancy Davis MS Center Without Walls, Los Angeles, CA, May, 2008
54. Invited Speaker, "Lore Dolman Lecture", Vancouver General Hospital, University of British Columbia, Department of Pathology, May, 2008
55. Invited Speaker, Serono Symposium "The Biological Basis of Progressive MS", November, 2010, Montreal, Canada
56. Platform session Chair, Keystone Symposium on Genetics, Immunology and Repair of Multiple Sclerosis, Taos, NM, February, 2011
57. Invited Speaker, Biogen Idec, April, 2011, Cambridge, MA
58. Session Chair for Neuroimmunology, Stanford Asilomar Immunology Conference, September, 2011
59. Presidential Address, American Association of Neuropathologists Annual Meeting, June, 2012
60. Invited Speaker, Workshop on Demyelinating Diseases. International Congress of Neuropathology, Rio de Janeiro, Brazil, September, 2014
61. Invited Speaker, North American Imaging in Multiple Sclerosis Consortium. "What we know about the relationship between veins and inflammation in MS". Los Angeles, CA, November, 2015
62. Invited Speaker. "What every neuropathologist needs to know about the *JNEN*". American Association of Neuropathologists Annual Meeting, Baltimore, MD, June, 2016
63. Invited Speaker. "Data on the Table" Seminar. Cleveland Clinic, Cleveland, OH, September 2016
64. Invited Speaker, Department of Neurology Grand Rounds, University of North Carolina School of Medicine, Chapel Hill, NC, November, 2016

#### PREVIOUS RESEARCH GRANTS

NIH Teacher Investigator-Development Award 00858. Massachusetts General Hospital, Harvard Medical School. 1984-1989.

National Multiple Sclerosis Society RG 1792. Massachusetts General Hospital, Harvard Medical School, 1989-1990.

NIH R01 NS 26773. “Mechanisms of Cellular Immune Responses in the CNS”. Massachusetts General Hospital, Harvard Medical School. 1989-1992. Stanford University School of Medicine. 1992-1999.

National Multiple Sclerosis Society Pilot Project PP612. “PLP peptide-induced clinical and pathologic heterogeneity in EAE”. Stanford University School of Medicine. 1998-1999.

Stanford University Dean’s Fellowship for Poonam Kuruganti, Ph.D. Stanford University School of Medicine. 1998-1999.

National Multiple Sclerosis Society Postdoctoral Fellowship FG 1296 for Poonam Kuruganti, Ph.D. “Endothelial cell barrier function in MS lesions” Stanford University School of Medicine. 1999-2001.

National Multiple Sclerosis Society RG 3055. “Endothelial cells in multiple sclerosis lesions” 1999-2003.

“Inflammatory mechanisms in cerebral ischemia”. NIH 1 R01 NS40516-01A1 P.I.: M. Yenari. 8/15/01 -- 6/30/07. Percent effort: 5% (terminated with Dr. Yenari’s departure from Stanford)

“Mild hypothermic neuroprotection for cerebral ischemia”. NIH NS 27292-08. P.I: G.K. Steinberg. Project Period: 10/01/00-9/30/2005. Percent effort: 5%

“Cytokine regulation of CIITA and class II MHC in glia”. NIH subcontract. P.I.: E. Benveniste (U. of Alabama). Project Period: 8/1/2000 – 3/31/2006. Percent effort: 5%.

“Large scale images of gene transcription in MS and EAE”. NIH. NS 41402. P.I.: L. Steinman 1/02-12/05. Percent effort, 5%

“Failure of axon repair in chronic MS lesions”. NIH NS 046414-01. PI: R.A. Sobel. Percent effort: 20% 7/1/03 – 6/30/07. TDC \$650,000.

SPARK Funding: “Aze in MS. Pilot studies”. 2009. TDC \$10,000

“Mechanisms of tolerance and immunity to central nervous system antigens” NIH. 9R01AI072737-10A1. Subcontract. PI: J. Goverman (U. Washington). Project Period 12/01/06 – 11/30/10. Co-investigator. Percent effort: 3%.

“Varicella-Zoster Virus Tegument Proteins in Pathogenesis”. PI: A. Arvin (Stanford). [5% effort] Project period 2009-2011.

“B cells in CNS autoimmunity” NIH. PI: S. Zamvil (UCSF) [Subcontract to Dr. Sobel for 5% effort]. Project Period: 12/1/2008 – 11/30/2013

“Safety and Efficacy of Positron Emission Tomography Imaging with BAY 94-9172 (ZK 6013443)—Autopsy studies. Protocol 14595”. PI: N. Raskind (Stanford). Bayer Health Care. Project Period: 2010 -2014

“Type II monocytes in CNS autoimmunity” NIH. PI: S. Zamvil (UCSF) [Subcontract to Dr. Sobel for 5% effort]. 6/1/09 – 6/31/14.

“Targeting Chemerin Receptor CMKLR1 in Multiple Sclerosis” DOD Idea Award. PI: B. Zabel. Project Period. 9/1/11-8/31/14

"Aquaporin-4 (AQP4)-specific T cells in CNS autoimmunity". Zamvil, UCSF, PI. (National MS Society, 10/1/12 – 9/30/15

“Aze-induced oligodendrogliopathy”. (Progressive MS Alliance / National MS Society). PI, 8/1/2014-7/31/15

“Characterization of novel MOG T cell epitopes shared in EAE and MS”. Zamvil, UCSF, PI (National MS Society, PI [Subcontract to Dr. Sobel for 10% effort]. National MS Society Subcontract. Role: Co-investigator. Dates of Project: 10/1/2014-9/30/2017

“Nrf2-dependent and -independent immune modulation by dimethyl fumarate in CNS autoimmunity”. S.S. Zamvil, PI [Subcontract to Dr. Sobel for 10% effort pending] Funding Source: NMSS Subcontract Role: Co-investigator. Dates of Project: 4/1/15-3/31/18.

#### CURRENT RESEARCH GRANTS:

##### Active:

“Analysis of T cell responses to myelin proteolipid protein”. Funded as Javitz Award to V.K. Kuchroo (2002-2020). NIH. P.I.: V. Kuchroo [Subcontract to Dr. Sobel for 10 % effort [TDC ~ \$225,000]

“Influence of NMO gut microbiota on CNS autoantigen-specific T cell responses”. S.S. Zamvil, PI [Subcontract to Dr. Sobel for 10% effort]. NIH NSR21 NS108159-01. Dates of Project: 7/1/2018-6/30/20  
Annual Direct Costs: \$9,000 for Year 1 and \$7,500 for Year 2.

##### Pending:

“Repertoire selection of AQP4-specific T cells that causes CNS autoimmune disease”

S.S. Zamvil, PI [Subcontract to Dr. Sobel for 10% effort]. NIH R01 AI131624-01A1.  
Dates of Project: 9/1/2018-10/31/23  
Total Direct Costs: \$76,000