BIOGRAPHICAL SKETCH

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NAME: Saligrama, Naresha

eRA COMMONS USER NAME (credential, e.g., agency login): NSALIGRAMA

POSITION TITLE: Postdoctoral Research Fellow

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Karnataka Veterinary, Animal and Fisheries Sciences University, Bidar India	BVSc & AH	2004	Veterinary Sciences
Indian Veterinary Research Institute, Izatnagar India	MS	2006	Biochemistry
University of Vermont, Burlington, Vermont USA	Ph.D.	2013	Cell and Molecular Biology
Stanford University, Stanford, California USA	Postdoc	2013-present	Immunology

A. Personal Statement

My main objective is to understand the antigen specific T cell repertoire in autoimmune diseases with a special emphasis on EAE and Multiple sclerosis (MS). I was trained as a veterinarian and worked for a year in India as field veterinarian. With an intent to gain basic research experience, I enrolled in a biochemistry master's program focusing mainly on understanding the mechanisms of immune evasion by a stomach fluke, *Hemonchus contortus*. To further my understanding of the immunological mechanisms, I pursued my scientific interest by enrolling in a graduate program at the University of Vermont, Burlington, VT. As a graduate student, I worked on the cell specific roles of histamine and histamine receptors in EAE, a principal animal model of organ-specific autoimmune disease for MS. During my graduate studies, I gained extensive experience in mouse immunology, molecular biology, genetics, receptor biology, and pharmacology. With the objective of applying knowledge acquired during my graduate studies to understanding human immunology and to performing translational research, I accepted a postdoctoral position in the laboratory of Dr. Mark M Davis, a Professor of Immunology in the Department of Microbiology and Immunology, Stanford University, Stanford, CA. For the past three years, I have focused my studies on determining the T cell repertoire and clonal diversity, and identifying novel autoantigens in MS and EAE, with a long-term objective of developing antigen-specific immunotherapies.

B. Positions and Honors

Positions and Employment

2004-2006 Junior Research Fellow, Department of Animal Biochemistry, Indian Veterinary Research Institute, Izatnagar, Uttar Pradesh, India (Dr. Paritosh Joshi Lab)

2006-2007 Graduate Teaching Assistant, Department of Biology University of Vermont, Burlington VT, USA

2007-2013 Graduate Research Assistant, Vermont Center for Immunology and Infectious Diseases, University of Vermont, Burlington VT, USA (Dr. Cory Teuscher lab)

June 2013- Postdoctoral Research Fellow, Department of Microbiology and Immunology, Stanford University, Stanford CA, USA (Dr. Mark M Davis lab)

Other Experience and Professional Memberships

2010-2013 Member, American Association of Immunologists
2012- Member, European Histamine Research Society
2013- Editorial Board Member, International Research Journal of Bacteriology

Honors and Awards

1998-2003 Jindal Merit Scholarship for pursuing Veterinary Medicine and Animal Science
2004-2006 Recipient of Junior Research Fellowship of Indian Council of Agriculture Research for pursuing masters in Animal Biochemistry
2010 American Association of Immunologists' trainee abstract award. AAI 97th annual meeting held in Baltimore, MD from 7 - 11 May 2010
2010 Second place, oral presentation, Graduate Student Research Day, College of Medicine, University of Vermont, Burlington, VT
2011 American Association of Immunologists' trainee abstract award. AAI 98th annual meeting held in San Francisco, CA from 13 - 17 May 2011
2012 Finalist and second prize winner, **Art A. Hancock Young Investigator Award**, European Histamine Research Society 41st annual meeting, Queens University, Belfast, Northern Ireland, UK
2012 Travel Award to attend European Histamine Research Society 41st annual meeting, Queens University, Belfast, Northern Ireland, UK
2014-2017 **National Multiple Sclerosis Society Postdoctoral Research Fellowship (**$163,000.0)
2016 The **Outstanding Postdoctoral Mentor Award** for the 2015-2016 academic year. Voted by Stanford Immunology graduate students.

C. Contribution to Science

1. *H. contortus* is an economically important gastrointestinal parasite of domestic animals, secretes calreticulin (CalR), a Ca^{2+} binding protein which modulates the host immune response. CalR acts by inhibiting the classical complement pathway by binding to complement C1q protein. In the following publication, we mapped the regions in the N-domain of CalR that facilitates C1q binding. In addition to already identified C1q binding motifs in human CalR, we identified two additional sites in the N-domain of *H. contortus*. Multiple C1q binding motifs in CalR is significant as it functions to evade host immune response.

    1. *__Naresha S__, *Suryawanshi A, Agarwal M, Singh BP, Joshi P. (2009). Mapping the complement C1q binding site in *Haemonchus contortus* calreticulin. *Mol Biochem Parasitol*. 166(1): 42-6. (*Equal contribution)

2. In addition to the contributions described above, with a team of collaborators, we investigated the role of sex chromosome in EAE susceptibility. We showed that chromosome Y (ChrY) consomic mouse strains on the C57BL/6J background show differences in susceptibility to EAE and experimental myocarditis. On the B6 background, we show that ChrY possesses gene regulatory properties that impact genome-wide gene expression in pathogenic $CD4^+$ T cells. Using these consomic panel of mice we provide evidence for a mechanism for sexual dimorphism in EAE and paternal parent-of-origin effects in female mice.

    1. Blankenhorn EP, Butterfield R, Case LK, Wall EH, del Rio R, Diehl SA, Kremenstov DN, **Saligrama N**, and Teuscher C. (2011). Genetics of experimental allergic encephalomyelitis supports the role of T helper cells in multiple sclerosis pathogenesis. *Ann Neurol*. 70(6): 887-96.
    2. Case LK, Toussaint L, Moussawi M, Roberts B, **Saligrama N**, Brossay L, Huber SA, and Teuscher C. (2012). Chromosome Y regulates survival following coxsackievirus B3 infection. *G3*. 2(1): 115-21.
    3. Case LK, Wall EH, Dragon JA, **Saligrama N**, Kremenstov DN, Moussawi M, Zachary JF, Huber SA, Bunn JY, Blankenhorn EP, and Teuscher C. (2013). The Y Chromosome as a regulatory element shaping immune cell transcriptomes and susceptibility to autoimmune disease. *Genome Res*. 23 (9): 1474-85.

4. Case LK, Wall EH, Osmanski EE, Dragon JA, **Saligrama N**, Zachary JF, Lemos B, Blankenhorn EP, and Teuscher C. (2015). Copy number variation in Y chromosome multicopy genes is linked to a paternal parent-of-origin effect on CNS autoimmune disease in female offspring. *Genome Biology*. 16 (1) :28.
5. *Bearoff F, *Case LK, Krementsov DN, Wall EH, **Saligrama N**, Blankenhorn EP, and Teuscher C. (2015). Identification of genetic determinants of the sexual dimorphism in CNS autoimmunity. PLoS ONE 10(2): e0117993. doi: 10.1371/journal.pone.0117993 (*Equal contribution)

3. As part of the doctoral research I elucidated the immunological role of Histamine receptor (HR) H_1, H_2, H_3, and H_4 in EAE and Multiple Sclerosis. To determine the cell specific effects of HRs in EAE, I generated transgenic mice that express H_1R specifically in myeloid cells (*Cd11b* promoter) and H_2R specifically in T cells (*dlck* promoter) and studied them for susceptibility to EAE. In addition, by studying susceptibility to EAE among double (H_1H_2 and H_3H_4) and triple HRKO mice, we addressed synergistic or compensatory functions of HRs in EAE. Furthermore, I generated $H_1H_2H_3H_4$RKO mice to discover a novel HAergic pathway regulating EAE susceptibility in the absence of canonical HR signaling.

    1. **Saligrama N**, Noubade, R, Case LK, del Rio R, and Teuscher C. (2012). Combinatorial roles for histamine H_1-H_2 and H_3-H_4 receptors in autoimmune inflammatory disease of the central nervous system. *Eur. J. Immunol.* 42: 1536–1546.
    2. **Saligrama N**, Noubade R, Case LK, Poynter EM, and Teuscher C. (2012). H_1R expression by $CD11b^+$ cell is not required for susceptibility to experimental allergic encephalomyelitis. *Cell. Immunol*. 278: 27-34
    3. **Saligrama N**, del Rio R, Case LK, Noubade R, and Teuscher C. (2013). Systemic lack of canonical histamine receptor signaling results in increased resistance to autoimmune encephalomyelitis. *J Immunol*. 191(2): 614-22.
    4. **Saligrama N,** Case LK, Kremenstov DN, and Teuscher C. (2014). Histamine H_2 receptor signaling x environment interactions determine susceptibility to experimental allergic encephalomyelitis. *FASEB J*. 28 (4): 1898-1909**.**

Complete List of Published Work in MyBibliography:

D. Additional Information: Research Support and/or Scholastic Performance

<u>Ongoing Research Support</u>

FG-2081-A-1 Saligrama(PI) 7/1/2014-6/30/2017

Immunophenotypic Analysis, Determination of Clonal Diversity, and Specificity of T Cell Repertoire in MS and EAE

The goal of this study is to comprehensively understand of the T cell repertoire in MS and also in the mouse model, Experimental autoimmune encephalomyelitis (EAE) with a focus on identifying and targeting dominant clonal T cells.

Role: PI

Funding agency: National Multiple Sclerosis Society