

MSTP STUDENT DESCRIPTION

NAME: Krishnan Chakravarthy

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Undergraduate College/University attended: The University of Chicago

Major: Biological Sciences

Years in MSTP (1-8): 5

DEPARTMENT: Microbiology/Immunology

THESIS ADVISOR: Dr. Paul Knight

RESEARCH DESCRIPTION:

PhD Thesis title: The role of adaptive immunity in mediating increased susceptibility to secondary bacterial infections post Influenza

Date of Completion (or expected) of PhD: August 2009

Research Description: In early 2000, influenza was the 7th leading cause of death in the United States, primarily in the elderly. This major health problem has become even more of a concern, as we are now on the horizon of a potentially devastating avian flu pandemic. According to the CDC, through June 2006 over 10 countries have reported transmission of influenza A (H5N1) virus to humans. The United States has pledged over \$334 million dollars in international aid for battling influenza, further highlighting the importance of this common and deadly viral pulmonary disease. In the major flu pandemic of the early 1900's, secondary bacterial pneumonia (not primary viral pneumonia) was the major factor in cause of death in both community and nosocomial settings. Secondary bacterial infections account for 35-40% mortality associated with influenza. Additionally, a secondary bacterial infection typically leads to more prolonged and severe symptoms when compared to flu or bacterial infection alone with a disproportionate increase in morbidity and mortality. The objective of my thesis will be to examine the role of the pulmonary adaptive immune Th1 response to influenza virus in a murine model with specific reference to the phenomenon of increased predisposition to secondary bacterial infection. Additionally, a therapeutic modality will be examined that selectively modulates the robust Th1 response that we predict will improve bacterial clearance following a subsequent pulmonary bacterial challenge.

PUBLICATIONS / ABSTRACTS PRESENTED:

Mehak Sharma (MSII), Krishnan V Chakravarthy, Jadwiga Helinski, Paras N Prasad, and Paul R. Knight. Selective targeting of nanoparticles to alveolar type II epithelial cells and alveolar macrophages for gene therapy. State University of New York at Buffalo School of Medicine Medical Student Research Forum 2009 (Third Honors at 2009 Annual Medical Student Research Forum). Buffalo, NY 2009

Chakravarthy, Krishnan, J. Helinski, Bruce Davidson, Paul R Knight. Using surface-functionalized quantum dots to target therapeutic drugs/genes to lung alveolar macrophages for single cell drug/gene delivery. Annual Western New York MD/PhD conference. Rochester NY 2008

Chakravarthy, Krishnan. NanoAxis. NSTI Nanotech 2008 11th annual Conference, Hynes Convention Center Boston MA 2008

Chakravarthi, Krishnan, J. Helinski, Davidson, Bruce, Paul R. Knight. Role of the Adaptive Th1 Response in Influenza and Secondary Bacterial Pneumonia. American Thoracic Society International Conference,

Toronto Ontario 2008

Chakravarthy, Krishnan, J. Helinski, Davidson, Bruce, Paul R. Knight. Role of the overactive adaptive Th1 response in mediating increased susceptibility to secondary infections following influenza. ASCI/AAP Joint Meeting, Chicago Illinois 2008

Chakravarthy, Krishnan, J. Helinski, Paul R. Knight. Influenza and secondary bacterial pneumonia – Assessing the role of the adaptive immune response at the viral-bacterial crossroads. Buffalo Immunology 7th Annual Conference, Buffalo NY 2007

Renfeng Liu D.O. Krishnan Chakravarthy, Barbara Mulan, Jadwiga Helinski, Paul R. Knight. Effect of halothane in decreasing susceptibility to secondary bacterial infection following influenza infection. Tarat Teaching Day at State University of New York at Buffalo, Buffalo NY 2007

L. Chang, B.A. Davidson, J. Helinski, K. Raghavendran, N. Nader, K. Chakravarthy, P.R. Knight. Alveolar Macrophage Effector and Regulatory Function Following in Vitro Exposure to Gastric Aspiration Components. Abstract for poster presentation, 54th Annual Association of University Anesthesiologists, Chicago IL 2006.

Chakravarthy, Krishnan, Swaminathan T.S.. Using the photocatalytic effect to increase phenol degradation with TiO₂ coated ceramic beads. Abstract for the Summer environmental research award, Indian institute of Technology Madras and University of Chicago, Chicago IL 2002.

Chakravarthy, Krishnan, Blumenthal Kenneth. Isolation of v8 protease from Staphylococcal Aureus. Abstract for poster presentation for the Biological Sciences Undergraduate Research Fellowship Program, Buffalo NY, August 2001

Milewski, Robert, Govindaraju, Venu, Chakravarthy, Krishnan. MI2: Multimodal Integration in medical informatics. Grant submission from the Center of Excellence in Document Analysis and Recognition (CEDAR), State University of New York at Buffalo. June 2000.

Chakravarthy, Krishnan, Slocum HK. Development of multiplex time-lapse video system for evaluation of cellular heterogeneity and anti-cancer therapeutics. Abstract for poster presentation for the Roswell Park Summer Research Program, Buffalo NY, August 1999

AWARDS / HONORS:

- 2009 Guest Researcher Program and Contractor at the Centers for Disease Control and Prevention Influenza Division, Atlanta GA
- 2008 Winner of the University of Buffalo Henry Panasci Technology Entrepreneurship Competition
- 2008 Ruth L. Kirschstein National Research Service Awards for Individual Predoctoral MD/PhD Fellows (F30) awarded by the National Institute of Health
- 2004 Medical Scientist Training Program (MD,PhD) Fellowship Recipient (State University of New York at Buffalo School of Medicine)
- 2001 Summer Environmental Research Award Recipient (Indian Institute of Technology Chennai)
- 2000 Biological Sciences Undergraduate Summer Research Fellowship Recipient (State University of New York at Buffalo)
- 1999 Roswell Park Cancer Institute Summer Program Fellowship recipient

Memberships in professional societies:

2006-09 Buffalo Collegium of Immunology Member
2007-08 American Physician Scientists Association (APSA)

EXTRACURRICULAR INTERESTS:

1. Youth Group Leader for the Buffalo Sathya Sai Organization
2. Squash
3. Intramural Basketball