CURRICULAM VITA

SIVADASAN KANANGAT, Ph.D

Citizenship-United States of America

EDUCATION

INSTITUTION AND LOCATION	DEGREE	YEAR	FIELD OF STUDY
Malabar Christian College, Calicut, University of Calicut, India	B.Sc	1975-1978	Zoology,Botany, Chemistry
Christian Medical College, Vellore, University of Madras, India	M.Sc	1979-1982	Microbiology & Immunology
Tuberculosis Research Center, University of Madras, India	Ph.D	1985-1989	Microbiology & Immunology
University of TN Knoxville,TN	Post-Doctoral	1989-1994	Molecular Virology & Viral Immunology

ACADEMIC/CLINICAL APPOINTMENTS

06/2010: Present: Director, Histocompatibility & Immunogenetics, Rush University Medical Center, Department of Pathology, Rush University Medical Center, Chicago, IL
11/05/2013: Present: Director & Associate Professor, Histocompatibility & Immunogenetics, Rush University Medical Center, Department of Pathology, Rush University Medical Center, Chicago, IL
01/2008-06/2010: Histocompatibility Specialist/Assistant Director; HLA laboratory, Department of Pathology, St.Jude Children's Research Hospital, Memphis, TN.
07/2000-12/2007: Assistant Professor, Department of Medicine, University of Tennessee Health Science Center, Memphis.
04/1997-6/00: Senior Research Associate/Laboratory Director, Division of Pulmonary and Critical Care Medicine, University of TN Health Science Center, Memphis.
05/1994-4/1997: Senior Research Associate, Department of Microbiology, Division of Viral Immunology, UT, Knoxville.

BOARD CERTIFICATION AND LICENSURE

Diplomate-American Board of Histocompatibility and Immunogenetics **D (ABHI)** 2011

American Society for Histocompatyibility & Immunogenetics **(ASHI)** Approval as Laboratory Director, Technical Supervisor and Clinical Consultant. 2011

Medical Laboratory Professional Licensure from the Department of Health, State of Tennessee.

HONORS AND AWARDS

University Merit Scholarship: 1975-1978. University of Calicut, India.
University Merit Scholarship: 1978-1979 University of Cochin 1978-1979—(Discontinued to Join for M. Sc in Medical Microbiology at Christian Medical College, Vellore, India in August 1979.

SOCIETY MEMBERSHIPS

Member of American Society for Histocompatibility and Immunogenetics since 2008

TEACHING

Rush UniversityMedical Center Chicago, IL

a.Pathology Residents 2010-Present

Introduce the Pathology residents to Clinical Histocompatibility and Immunogenetics; give them an overview of histocompatibility testing performed in our laboratory; introduce them to the Science of HLA and disease association; HLA support for Transfusion and importance of HLA Typing in certain drug sensitivity testing. The "introduction of Pathology Residents to Clinical HLA system is designed to help them to better judge the biopsies while doing a Graft failure/Rejection, or Graft Vs Host Disease.

b. **M1 Medical Students---** Transplantation Immunity and Tumor Immunology—May 2015; May 2016

c. Masters In BioTechnology – Chromosome Mapping and Human Genome Organization – Sept/Oct 2014; 2015

d. MLS (Medical Laboratory Science) Students:

Introduce the MLS students to Clinical Histocompatibility and Immunogenetics with an overview of Histocompatibility testing for solid organ transplant, stem cell transplant, HLA and Disease association; and HLA and Drug sensitivity reactions.

University of Tennessee Knoxville, TN, Department of Life Sciences

Cytokine Biology to Undergraduate degree students.

Christian Medical College & Hospital, Vellore, India.

a. Third Year Medical Students- Retrovirology

b. Medical Technology Students **(**Diploma in Clinical Pathology): Bacterial Pathogenesis

c. Bachelor's degree in Nursing**:** Medical Microbiology

Mentorship to students/residents/trainees/fellows (names and years of service)

a. MS in Biochemistry Rush University Graduate Health Sciences –Student's name: Howide Eldib; Just recently got approved as faculty in Graduate Health Sciences – Officially from 2015 Sept-

b. Mentorship in Short Term Dissertation work for Master's and Bachelor's Medical Laboratory Science (MLS) students at Rush University Medical Center, Chicago.

MLS Master's:

1. Hannah Hutchson: Masters' Student in Medical Technology- Project: **Complement Binding HLA Specific antibodies in Platelet refractory patients.**

2. Viktorija Makarovaite: Masters' Student in Medical Technology- Project: **Endothelial Cell gene expression in response to binding by non-HLA Endothelial Cells.**

3. Sarah Mandley: A Retrospective Study of HLA Class I and II IgG **subtypes in Transplant Patients and Candidates using the single antigen bead-based Luminex method**.

4. Melinda Wills: **A Mechanistic Approach towards the Role of HLA Antibodies and Non-HLA Endothelial Cell Antibodies on the Genesis of Renal Interstitial Fibrosis: An Indication of Chronic Allograft Rejection. 2014**

5. Saba Rezaeian 2015. **An Inquiry into the Potential Role of HLA and Non-HLA Antibodies in the Genesis of Irreversible Fibrosis Leading to Chronic Allograft Rejection**

MLS Bachelor's—HLA Specialty Projects

1. David Ryes: MLS student 2011**: Project- Naturally occurring HLA antibodies in transplant patients.**

2. Mateusz J Bachula: MLS student 2012: **Project-Development of Donor Specific Antibodies Post Renal Transplants and correlation with graft function and survival**

3. Monika Desai: **2013. Immunologic Cross-reactivity between Viruses and Human Leukocyte antigen**

4. Nora: **HLA-B*27 allele distribution among patients at Rush University Medical Center**

5. Kirubel: **Analysis of the clinical data on the Genotypes of Killer Immunoglobulin like Receptors (KIR) of Hematopoeitic stem cell transplant donors**

6. Neha Viradia: **Retrospective analysis on HLA-DQ typing in the diagnosis of Celiac disease.**

7. Maria Hussain: **Evaluation of Human Leukocyte Antigens (HLA) Antibody Production within Cross Reactive Groups (CREGs)**

8. Vinu Sabu: **Review of HLA-DP alleles in hematopoetic stem cell transplant (HSCT) candidates and their HLA matched (HLA – ABCDRDQ) donors at Rush University Medical Center**

9. Jackie Yabuta-Brodrick 2015: Retrospective analysis on the role of non-DSA HLA Antibodies following renal transplantation on renal function using chemical, histological or immunological parameters.

c. Fellows of Allergy & Immunology, University of TN, Health Science Center, Memphis, TN

Mike Alcordo, M.D., J. Yang M.D., Christy F Michael M.D.,Allen James, M.D., Brenden Hill M.D., ---Guided their short –term laboratory projects during their fellowship under Dr. T.J. Yoo, M.D., Ph.D., Professor of Medicine (Allergy&Immunology at UTHSC, Memphis)

d. Doctoral student thesis committees (name and years of service)

Shilpa Despande: Ph.D University of Tennessee, Knoxville TN, 1994-1997
John Sam Babu: Ph.D University of Tennessee, Knoxville, TN 1991-1994
Smita Nair: Ph.D University of Tennessee Knoxville, TN, 1991-1994,

e. Undergraduate students' Research Training:

Eric Pestler (From Germany): 1991-1992, University Of Tennessee, Knoxville.
Kim C, Andrew (Both as second year Veterinary Medicine Students at the University of Tennessee Knoxville.

f-High school Student for Science Fair: Shaleen Cholera (From White Station High School Memphis, TN) 2005-2007 --- **Won the Intel Semifinal in the National Contest in 2007.**

-High school Student for Scientific Inquiry Research: Serena Tolani (From Hinsdale Central High School, Hinsdale IL)

CLINICAL SERVICE

June 2010-Jan 2012: Co-Director- Histocompatibility & Immunogenetics, RUSH University Medical Center, Chicago, IL:

Feb 2012- Present: Director, Technical Supervisor and Clinical Consultant: Histocompatibility & Immunogenetics, Rush Medical Laboratories, Chicago, IL.

Oversees the HLA work up (Typing and antibody assays), review reports, suggests further testing if needed, makes interpretations of the results, communicate with the transplant teams, explores

possibilities of expanding the testing profile, giving directions to the technical staff, implementing new policies and procedures, overseeing validations, assist in developing new protocols, providing educational support to the transplant team, residents of Pathology, hematology/oncology residents, and to the transplant teams, working on quality improvement and overall in helping the laboratory to serve the clients (the transplant programs – The patients and their medical care givers).

4 New Histocompatibility Tests have been or are being introduced at Rush University Medical Center since Joining in June 2010:

1. KIR Genotyping for hematopoetic stem cell transplantation (HSCT): (Molecular method: rSSOP – Luminex based Microbead array from One Lambda Inc). KIR (**K**iller **I**mmunoglobulin like **R**eceptors) present on the natural killer (NK)cells are being used as markers to select unrelated and related donors for hematopoieitc stem cell transplant in addition to HLA allele and haplotype matching. The HLA alleles of B locus and A Locus bearing Bw4 epitope and all of the HLA C locus alleles are the known ligands of these KIRs. The KIR can be inhibitory or activating. Based on the HLA alleles of the recipient and the KIR genotype of the donors, one can determine the overall functionality of the donor's NK cells' KIR as predominantly activating or Inhibitory or neutral. And donors with NK cells having a predominantly activating phenotype is recommended for stem cell transplant. We can type the donors for their KIR Genotype. The commercial assay was validated in the laboratory with Survey samples from UCLA and coded samples from the University of Chicago, IL and the test was approved by ASHI ARB in Nov 2011. The KIR Typing and Interpretation is in effect for Clinical services as of Dec 2012.

2. Endothelial Cell Cross Match:

The assay is designed to detect antibodies against the endothelial cells. Since the endothelial cells of the allograft are hard to obtain, the endothelial cell precursors expressing a specific marker is isolated from the peripheral blood using a monoclonal antibody. These endothelial precursor cells are then used in a flow cytometer based cross match using the recipients' sera.

Clinical relevance: Antibodies that recognize donor endothelial cell antigens have been implicated in cases of humoral rejection when no donor specific anti-HLA antibodies can be detected in the recipients' serum. There are wide array of endothelial cell antigens and at present there are no standardized assay for these many antigens. Endothelial cell antigenic mismatch between the donor and recipient are very crucial since the endothelial cells constitute the first contact point between the transplanted organ and the recipient's immune system. Endothelial cell cross matching (ECXM or XM-Cross match) provides testing for antibodies to non-HLA antigens only expressed on endothelial cells prior to transplantation. The endothelial cell cross match can identify antibodies that may increase the risk of antibody-mediated rejection before or after transplantation in cases where there are no detectable HLA antibodies or known pre sensitization.

The Endothelial cell Crossmatch and Interpretation is in effect for Clinical services as of Dec 2012.

3. Donor Specific Lymphocyte Lysate Assay: This is a modified form of crossmatch/antibody assay developed by LifeCodes/Tepnel/Genprobe.

Principle: Donor lymphocytes are first isolated and lysed. The lysate is then incubated with Class I specific and Class II specific color shaded beads that are coated with monoclonal antibodies against the HLA antigens. These beads are then incubated with the recipient's serum, and any HLA antibodies against the donor (present in the recipient's serum) will be captured by the bead since the bead has the HLA of the donor (from the donor's lymphocyte lysate captured by the HLA Monoclonal antibodies bound to the beads) bound to the monoclonal antibody. These donor specific HLA antibodies will be detected using the Luminex analyzer after addition of anti-human IgG conjugated with PE.

Clinical relevance: **T**his assay is supposed to mirror the Flow cross match PLUS with the advantage that the lysate can be stored for future follow up antibody monitoring after transplantation without having to have the live cells for crossmatch. Also, this is actually an in house donor specific HLA antibody testing. The commercial solid phase assays now use specific HLA antigens, but there are many allele specific HLAs that are not covered by the commercial beads. When the donor's own lymhocytes are used as the HLA antigen source, it becomes HIGHLY donor specific. So essentially it is an HLA Donor Specific HLA Antibody assay cum-cross match with an added advantage that the cell lysate can be stored for future testing (if needed) without having to worry about cell viability upon storage.

Validation study has been completed and will be offered for clinical services by April 2012.

4. C1q Binding Assay: Another Luminex Microbead array based method from One Lambda Inc.

Principle: C1qScreen™ from One Labda, offers to identify complement binding antibody from non-complement binding antibody. C1qScreen™ is a microbead based assay that can be used in the Luminex platform. This assay kit consists of two reagents, C1q and PE Conjugated Anti-C1q. The complement component (C1q) bound by the antigen-antibody complex is detected with an R-phycoerythrin (PE) labeled anti-C1q antibody. If the patient's serum has complement fixing antibody then the reaction will be positive and the Fluorescence intensity is measured using Luminex-based LABScan™ 100 flow analyzer which indicates the relative amount of antibody bound to the sample. If the serum does not have complement fixing antibodies, then the C1q can not bind and the sample should be negative upon subjecting to Luminex-based LABScan™ 100 flow analyzer.

Clinical Relevance: Antibodies towards HLA could be of several functional types; it could be IgM or IgG. While all HLA antibodies directed against the selected donor's HLA antigens (and non-HLA antigens as well) are important and clinically relevant, antibodies of the IgG class that efficiently fix complement are the most important ones since they can cause acute antibody mediated rejection and also preformed /preexisting antibodies of this type in high concentrations can cause hyperacute rejection of the allograft. While CDC- crossmatch and antibody testing detects both IgM (the most potent complement fixing antibody) and IgG that fix complement, the more sensitive Flow cytometry based assay, as it is done in most laboratories do not distinguish between the different subtypes of IgG complement fixing or non-complement fixing). While complement fixing antibodies are most relevant in hyper acute and acute antibody mediated rejection, non-complement fixing antibodies are involved in reducing the longevity of the graft

survival. Hence it is important to distinguish between the complement fixing and non-complement fixing antibodies for possible choice of clinical management.

Test has been validated and offered for clinical services from July 2012.

Jan 2008-June 2010: Clinical Histocompatibility Specialist and Assistant Director-HLA Laboratory: Department of Pathology, St. Jude Children's Research Hospital, Memphis, TN

Assist the Laboratory director in reviewing the results, case files, of patients typed for Histocompatibility; Provide educational seminars to the Staff Technologists, Assist the Director in compiling survey/proficiency tests, validate new methodologies, instruments, Initiate and support problem solving, evaluate new tests that could improve up on Histocompatibility testing, and to work with the director for setting goals and objectives for long-term mission of the laboratory to support the transplant program of St. Jude Childrens' Research Hospital.

April 1997 –July 2000: **Laboratory Director/Research Associate –** University of Tennessee Health Science Center, Memphis, TN

Job Responsibilities: This position was required to develop a basic science laboratory to carry out research in the area of Acute Respiratory Distress Syndrome (ARDS). It involved budgetary planning (to renovate the laboratory space, for the procurement and installing of laboratory equipment), constant interaction with the purchase department to be able to get the best products within the limit of the university regulation and budget sealing (which involved preparing appropriate justification). Once the laboratory was up and running the responsibilities included conception and execution of research projects, training and supervision of laboratory technicians and research student trainees along with budgetary planning for laboratory supplies and personnel expenses.

1982-1985: Associate Research Microbiologist - Christian Medical College hospital, Vellore. India.

Job description/Responsibilities: This was a junior position for fresh Masters Degree holders. Responsibilities included microbiological analysis of clinical specimens from in-patients and outpatients and reporting the results with the approval of a senior faculty member. The position also required teaching of laboratory courses to Medical and paramedical students, and nursing students.

COMMITTEE AND ADMINISTRATIVE SERVICES

Commissioner for Region 5 Laboratories Accredited by American Society for Histocompatibility &Immunogenetics (ASHI) 2012-2016

Chair, ASHI Bylaw Committee 2014-2017

Member, Histocompatibility Committee, National Kidney Registry -2014-present

Associate Editor: ASHI QUARTERLY (A publication of American Society for Histocompatibility & Immunogenetics) Contributes to Current Literature

Member, American Society for Histocompatibility &Immunogenetics (ASHI) Scientific and Clinical Affairs Committee 2009-2011

Member, ABHI CHT/CHS Examination Development Committee- Feb 2012-2013

SCIENTIFIC AND SCHOLARLY ACTIVITIES

Membership or Offices in Professional Societies (terms)—Please see above—ASHI Membership and committee memberships.

Reviewer for Funding Agencies: Co-Reviewed NIH applications for R01 and R21 awards during the years of 1995-1997

Reviewer for Professional Journals

Reviewed articles for Nature, Science, J Expt Med, J Virology, Virology, Microbial Pathogenesis, Infection and Immunity, J Infect Dis, Clinical Orthopedics Related Research, Am J Physiol (Lung).

Reviewed abstracts in the areas of Bone Marrow transplantation, Solid Organ Transplantation (Pre and post-Transplant Testing), HLA and Disease Association, Case Studies for:
35th ASHI National Meeting 2009- San Fransisco, CA
36th ASHI National Meeting 2010, Hollywood, FL
37th ASHI National Meeting 2011, New Orleans, LO
38th ASHI National Meeting 2012, San Juan Puerto Rico
39th ASHI National Meeting 2013, Chicago, IL
40th ASHI National Meeting 2014, Denver, CO
41st ASHI National Meeting 2015, Savannah, GA
42nd ASHI National Meeting 2016, St. Louis, MO
43rd ASHI National Meeting 2017, San Francisco, CA

Patents
Inventor-Intracellular Interleukin-1 Receptor Antagonists—**US Patent 7,674,464, March 9, 2010**.

Invited Seminars and Lectures

Annual One Lambda-Advanced Workshop on Clinical Histocompatibility.

Georgetown University-Dept. Microbiology and Immunology: June 19, 2007.

Hoffman Medical research Laboratory, University of Southern California, Los Angeles, CA Oct 12, 2007

New York State University, Buffalo, NY: Inflammation- Infections and Fibrosis. October 2002
Food and Drug Administration, Bethesda, MD: March 2001: Inflammation: The good, the bad and the Ugly

National Eye Institute, Bethesda MD: March 1998: Title: Inflammation: A double edged sword

Pfizer Corporation: Jan 1997: Immunopathogenesis of Herpetic stromal keratitis

Oral/Poster Presentations at International and National Meetings

Siva Kanangat, Umberto Meduri, Elizabeth A. Tolley, Arnold E. Postlethwaite & Dennise R. Schaberg, Extracellular Replication of Bacteria in Presence of Cytokines or Lipopolysaccharide(LPS): Linear and Non-Linear Responses. **International conference on "Non-Linear Dose-Response Relationships in Biology, Toxicology, and Medicine: June 11-13th 2002; University of Massachusetts, Amherst, MA**

Siva Kanangat, Umberto Meduri, Elizabeth A. Tolley, Arnold E. Postlethwaite & Dennise R. Schaberg,Short Peptides derived from Human recombinant IL-1beta enhances extracellular replication of S. aurues**.**
First International Congress on Cytokines and Chernokines in Infectious Disease (chairman), National Institutes of Health, Bethesda, USA, September 1999.

University Of TN health Science Center-Vanderbilt University Retreat meetings 2001, 2002 and 2003.
Topic for 2001: Interleukin-1 (IL-1) and IL-1 receptor antagonist mediated stimulation of S. aureus growth—Implications in the pathogenesis of Septic Arthritis.
Topic for 2002: Novel functions of intracellular IL-1 receptor antagonist (icIL-1RA)
Topic for 2003: IL-1 and TNF mediated epithelial mesenchymal transition—Implications in the pathogenesis of Fibrosis.

Funding History of Peer-Reviewed Grants (NIH, Professional Foundations) including type of the grant, role on the project, name of the agency, dollar amount, duration

Currently Approved for Funding (Awaiting Letter): From Absorber Inc., Sweden

Molecular effects on endothelial cell by non-HLA Antibodies Endothelial cell antibodies

Current Pending or Applied for -- Title:
National Cancer Institute; 1R21CA227374-01
Role: Co-Investigator (J.Borgia - PI)
"(PQ8) Autoantibodies associated with PD-1 immune checkpoint toxicity in lung cancer"
Purpose: The goal of this proposed study is to identify circulating autoantibody biomarkers resulting from PD-1/L1 directed immunotherapy in NSCLC that also have prognostic significance.

($275,000 Total Direct Funds)
4/1/2018-3/31/2020

Past

Principal Investigator (R03 NIH): NIAMS, National Institutes of Health: IL-1 and IL-1ra Stimulation of *S. aureus* Replication (October 1st, 2001- September 30th, 2004) Direct Cost: $150,000/-

Co-Investigator Project # 2: 1-**P50AR44890-01A2 Dr. Postlethwaite PI (SCOR)- NIAMS, National Institutes of Health**)**:** On the Pathogenesis of Scleroderma; Various aspects of Collagen I and III Biology in SSc and defects of MMP regulation in SSc lesional fibroblasts (August 24th 2001-July 31st July 2006 Total Direct cost of entire project: $4,380, 000/-

Principal Investigator {Center of Excellence (Connective Tissue Diseases) UT Health Science Center, Memphis} –**September 1st 2002- August 31st 2003:** Pilot and Feasibility grant: Transdifferentiation of Epithelial cells: Use of RNA silencing strategy to determine the role of key mediators: $ 20,000/Year

Principal Investigator (Rheumatic Diseases Core Center/NIAMS-UT Health Science Center, Memphis): September 1st 2003- August 31st 2006: Mechanisms of TGF-β Mediated differentiation of Human Fibroblasts (An In vitro Model for to study the origin of abnormal fibroblast in patients suffering from systemic sclerosis/Scleroderma). $20,000/year

Principal Investigator: Veteran Affairs, Memphis: Intramural award (Research Enhancement Award Program): October 1st 2005- Mechanisms of fibroblast-Myofibroblat transition: Role of cell density and icIL-1ra. 15,000/year

Co-Principal Investigator of University of Tennessee Medical Group grants (to study the association between inflammatory mediators and bacterial replication extracellularly and intracellular (1997-1998, and 1998-1999, and 1999-2000. $15,000/Year

BIBLIOGRAPHY

BOOK CHAPTER

Rouse BT and **Sivadasan Kanangat**. Chapter 8: Herpes simplex virus: In Persistent viral Infections. Ahmed R and Chen I {Eds}: John Wiley and Sons Ltd, UK, p: 165. 1999

PEER-REVIEWED JOURNAL ARTICLES

Kanangat S. 2017. Modulation of alloimmune response by commensal gut microbiota and potential new avenues to influence the outcome of allogeneic transplantation by modification of the 'gut culture'. Int J Immunogenet. 2017 Feb;44(1):1-6. doi: 10.1111/iji.12301. Review.

Lopez-Soler RI, Borgia JA, **Kanangat S**, Fhied CL, Conti DJ, Constantino D, Ata A, Chan R, Wang Z. 2016. Anti-vimentin Antibodies Present at the Time of Transplantation May Predict Early

Development of Interstitial Fibrosis/Tubular Atrophy. Transplant Proc. 2016 Jul-Aug;48(6):2023-33. doi: 10.1016/j.transproceed.2016.04.009.

1.Fhied C, **Kanangat S,** Borgia JA. Development of a bead-based immunoassay to routinely measure vimentin autoantibodies in the clinical setting. J Immunol Methods. 407:9-14.

2.16(th) IHIW: global distribution of extended HLA haplotypes. Askar M, Daghstani J, Thomas D, Leahy N, Dunn P, Claas F, Doran S, Saji H, **Kanangat S**, Karoichane M, Tambur A, Monos D, El-Khalifa M, Turner V, Kamoun M, Mustafa M, Ramon D, Gandhi M, Vernaza A, Gorodezky C, Wagenknecht D, Gautreaux M, Hajeer A, Kashi Z, Fernandez-Vina M. 2013 Int J Immunogenet. 40:31-8

3. Zhou B, Yuan J, Zhou Y, Yang J, James AW, Nair U, Shu X, Liu W, **Kanangat S**, Yoo TJ. 2012. The attenuation of cockroach allergy by DNA vaccine encoding cockroach allergen Bla g 2. Cell Immunol. 278:120

4. Zhou B, Ensell M, Zhou Y, Nair U, Glickstein J, Kermany MH, Cai Q, Cai C, Liu W, Deng YP, Kakigi A, Barbieri M, Mora M, **Kanangat S**, Yoo TJ. 2011. Prevention and treatment of allergic manifestations by DNA vaccine encoding cockroach allergen Bla g 1 in a mouse model of allergic airway inflammation. Allergy. 2011 Sep 29. doi: 10.1111/j.1398-9995.2011.02727.x. [Epub ahead of print]

5. Zhou B, Kermany MH, Glickstein J, Cai Q, Cai C, Zhou Y, Nair U, Kim JW, Kim P, Liu W, **Kanangat S**, Yoo TJ. 2011. Murine autoimmune hearing loss mediated by CD4+ T cells specific for β-tubulin. Clin Immunol. 138: 222-30.

6.**Siva Kanangat**, Arnold Postlethwaite, Shaleen Cholera, Latonya Williams and Dennis Schaberg. Modulation of Virulence Gene Expression of *S.aureus* by IL-1β: Novel Implications in Bacterial Pathogenesis. Microbes and Infection-, 9(3):408-415. 2007

7. **Siva Kanangat**, Postlethwaite A, Hasty K, Kang A, Smeltzer M, Appling W, Schaberg D. Induction of multiple matrix metalloproteinases in human dermal and synovial fibroblasts by Staphylococcus aureus: implications in the pathogenesis of septic arthritis and other soft tissue infections. Arthritis Res Ther. 8(6): R176, 2006,

8. **Siva Kanangat**, Postlethwaite A. Higgins GC, and Hasty KA. Novel functions of intracellular IL-1receptor antagonist in human dermal fibroblasts: Implications in the pathogenesis of fibrosis (J Invest Dermatol 126: 756-765. 2006.

9. Takagi K, Takagi M, **Siva Kanangat**, Warrington K, Shigemitzu H, and Postlethwaite AE. Modulation of TNF-α .□Gene Expression by Pamidronate in Murine Macrophage: Regulation by STAT-1 Dependent Pathways. J Immunol 174 : 1801-1810. 2005.

10.Postlethwaite AE, Shigemitsu H, and **Siva Kanangat.** Cellular Origins of Fibroblasts: Possible Implications for Organ Fibrosis in Systemic Sclerosis Arnold E. Current Opinions in Rheumatology. 16: 733-8. 2004.

11. Meduri GU, **Siva Kanangat**, Bronze M, Patterson DR, Meduri CU, Pak C, Tolley EA, and Schaberg DR.. Effects of Methylprednisolone on Intracellular Bacterial Growth. Clin Diagn Lab Iimmunol 8: 1156-1163. 2001

12**. Sivadasan Kanangat**, Bronze M, Meduri GU, Tolley EA, and Schaberg DR. Enhanced extracellular growth of S. aureus in the presence of selected linear peptide fragments of human IL-1 b and IL-1 receptor antagonist. J Infect Dis 183:65-69. 2001.

13. **Sivadasan Kanangat**, Meduri GU, Tolley EA, Patterson DR, Meduri CU, Pak C, Griffin P, Bronze MS, and Schaberg DR. Effects of cytokines and endotoxin on the intracellular growth and survival of bacteria. Infect Immun 67: 2834-2840. 1999.

14. Meduri G, **Sivadasan Kanangat**, Steffan J, Tolley E and Schaberg D Cytokines (IL1, IL 6 and TNF) enhance the growth of bacteria. Am J Respir Crit Care Med, 16: 1-7. 1999.

15. Daheshia M, **Sivadasan Kanangat**, and Rouse BT Production of key molecules by ocular neutrophils early after herpetic infection of the cornea. Exp Eye Res 67: 619-624. 1998.

16.Thomas J, **Sivadasan Kanangat** and Rouse BT Herpes simplex virus replication induced expression of chemokines and proinflammatory cytokines in the eye - Implications in herpetic stromal keratitis. J Interferon Cytokine Res 18: 681-690. 1998.

17. Meduri G, **Sivadasan Kanangat.** Glucocorticoid treatment of sepsis and acute
: Time for a critical appraisal (Editorial), Crit Care Med 26: 1-4. 1998.

18. Yu Z, Karem K, **Sivadasan Kanangat**, Manickan E and Rouse BT.. Protection by minigene: A novel approach of DNA vaccine. Vaccine 16: 1660-1667. 1998

19. Daheshia M, Kuklin N, **Sivadasan Kanangat**, Manickan E and Rouse BT.
Suppression of ongoing ocular inflammatory disease by topical administration of plasmid DNA encoding IL 10. J Immunol 159: 1945 – 1952. 1997.

20. Manickan E, **Sivadasan Kanangat**, Rouse RJD, Yu Z, and Rouse BT. Enhancement of immune response to naked DNA vaccine by immunization with transfected dendritic cells. J Leuk Biol 64: 125-132. 1997.

21. Thomas J, Gangappa S, **Sivadasan Kanangat** and Rouse BT. On the essential involvement of neutrophils in the immunopathologic disease Herpetic stromal keratitis. J Immunol 158: 1383 – 1391. 1997.

22. Karem K, **Sivadasan Kanangat** and Rouse BT Cytokine expression in the gut associated lymphoid tissue (G.A.L.T) after oral administration of attenuated Salmonella vaccine strains. Vaccine 14: 1495-1502. 1996.

23. Bouley DM, **Sivadasan Kanangat** and Rouse BT. The role of innate immune system in the reconstituted SCID mouse model of herpetic stromal keratitis. Clin Immunol & Imunopathol 80: 23-30, 1996

24**. Sivadasan Kanangat**, Babu, JS, Knipe DM and Rouse BT. Herpes simplex virus mediated modulation of cytokine gene expression in permissive cell line: selective up - regulation of IL-6 gene expression. Virology 219:29-300. 1996.

25. **Sivadasan Kanangat**, Blair P, Reddy R, Daheshia M, Godfrey V, Rouse BT and Wilkinson E. Disease in scurfy mouse is associated with overexpression of cytokine genes. Euro J Immunol 26:161-165 1996, year?

26. **Sivadasan Kanangat**, Thomas J, Gangappa S, Babu JS and Rouse BT. Herpes simplex virus mediated up - regulation of IL 12p40 mRNA expression: Implications in immunopathogenesis and protection. J Immunol 156:1110-1116. 1996.

27. Babu JS, Thomas J, **Sivadasan Kanangat**, Morrison L, Knipe D, and Rouse BT. Requirement of viral replication for induction of ocular immunopathology by herpes simplex virus. J Virol 70:101-107. 1996.

28. Bouley DM, **Sivadasan Kanangat**, Wire W, and Rouse BT. Characterization of herpes simplex virus type 1 infection and herpetic stromal keratitis in IFN gamma knockout mice. J Immunol 155: 3964-3971. 1996.

29. Banks TA, Rouse BT, Kerly MK, Blair PJ, Godfrey VL, Kuklin N, Bouley DM, Thomas J, **Sivadasan Kanangat** and Muceski ML Lymphotoxin alpha deficient mice: Effects on secondary lymphoid organ development and humoral immune responsiveness. J Immunol 155: 1685-1693. 1995.

30. Babu JS, **Sivadasan Kanangat** and Rouse BT. T cell cytokine mRNA expression during the course of the immunopathological ocular disease herpetic stromal keratitis. J Immunol 154: 4822-4829. 1995.

31. **Sivadasan Kanangat**, Nair S, Babu JS and Rouse BT. Enhanced cytokine mRNA expression in murine dendritic cells and better induction of T cell derived cytokines by dendritic cells than macrophages during in vitro co stimulation assay using specific antigens. J Leuk Biol 57: 310-316. 1995.

31. Ozaki S, Wolfenbarger D, - deBram Hart M, **Sivadasan Kanangat**, Weiss D, and Solomon A. Characterization of a novel interleukin-6 autocrine dependent human cell line. Leukemia 8: 2207-2213.
1995.

33. Lathey JL, **Sivadasan Kanangat**, Rouse BT, Agosti JM and Spector M. Dysregulation of cytokine expression in monocytes from HIV positive individuals. J Leukoc Biol 56: 47-352. 1994.

34. Banks TA, Jenkins FJ, **Sivadasan Kanangat**, Nair S, Dasgupta S, Foster CM and Rouse BT. Vaccination with the immediate - early protein ICP 47 of herpes simplex virus type 1 induces virus specific lymphoproliferation, but fails to protect against lethal challenge. Virology 200: 236-243. 1994.

35. Lathey JL, **Sivadasan Kanangat** and Rouse BT. Differential expression of tumor necrosis alpha and interleukin 1 beta compared with IL6 in monocytes from human immunodeficiency virus - positive individuals as measured by polymerase chain reaction. J Acquired Immuno Def Synd 1: 109-115. 1994.

36. Babu JS, **Sivadasan Kanangat** and Rouse BT. Limitations and modifications of quantitative polymerase chain reaction: Application to measurement of multiple mRNAs in small amounts of sample RNA. J Immunol Methods 165: 207-216. 1993.

37**. Sivadasan Kanangat**, Soloman A and Rouse BT. Use of quantitative polymerase chain reaction to quantitate cytokine messenger RNA molecules. Mol Immunol 29:1229-1236. 1992.

38. Paramasivan CN, Rao S, **Sivadasan Kanangat**, Anuprabha S, Kanungo R, and Prabhakar R Non - fermenting Gram-negative bacteria in human infections. Indian J Med Microbiol 6: 73-79. 1988.

39. Paramasivan CN, **Sivadasan Kanangat**, Datta M, Vallishayee RS and Prabhakar R Non - fermenting Gram-negative bacilli associated with acute respiratory infections in children in Madras. J Trop Pediatrics 33: 343-345. 1987.

40. Paramasivan CN, Vijayan VK, **Sivadasan Kanangat** and Prabhakar R Bacteriology of bronchoalveolar lavage fluid obtained from tropical pulmonary eosinophilia patients Indian J Chest Dis All Sciences 29: 138-143. 1987.

41**. Sivadasan Kanangat**, Paramasivan CN, Datta M, Valleshayee RS, Gopi PG and Prabhakar R Bacteriology of acute respiratory infections in children. Indian J Med Microbiol 5: 237-244. 1987.

42. John TJ, **Sivadasan Kanangat** and Kurien B Evaluation of passive bacterial agglutination for the diagnosis of typhoid fever. J Clin Microbiol 20: 751-753. 1984.

43. Mani V, Jadhav M, **Sivadasan Kanangat**, Thangavelu CP, Rachel M, and Prabha J Maternal and neonatal colonization with group B Streptococci and neonatal outcome. Indian Pediatrics 21: 357-363.
1984.

44. Sridharan G, Thangavelu CP, **Sivadasan Kanangat**, Vanitha M, Rajeswari P and Koshi G Grouping of beta - hemolytic Streptococci from primary plates by micronitrous acid - coagglutination method. Indian J Med Res 79: 479-481. 1984.

45. **Sivadasan Kanangat**, Kurien B and John TJ Rapid diagnosis of typhoid fever by antigen detection. Lancet 1: 134–135. 1984.

Peer-Reviewed Abstracts Presented at National/International Meetings

Kanangat S, Miller R, Rezaeian S, Eldib H, Cimbaluk D, Fhied C, Kurbegovic-Skaljic I, Prod M, Borgia J, Flaws M, Castillo D, DeCresce R. Biomarkers of Epithelial-Mesenchymal Transition (EMT) in Chronic Allograft Nephropathy: Potential for Early Detection and Development of Novel Therapeutic Agents. Am J Transplant. 2017; 17 (suppl 3**)]. [Poster of Distinction]**

P006. Michael Conciatori, Michael Prod, Maria Oppermann, Maribeth Flaws, **Siva Kanangat**. Assessing the functional significance of HLA antibodies in renal allograft. Human Immunology, Volume 77, Supplement, September 2016, Page 44

P062 Anish Laul, Gopal Patel, Ina Kurbegovic -Skaljic, Sylvia Piggott, **Siva Kanangat**. Evaluation of HLA-DP T-cell epitope (TCE) matching algorithm for selecting donors BMT/HSCT Human Immunology, Volume 77, Supplement, September 2016, Page 83

OR50 Gopal Patel, Ina Kurbegovic-Skaljic, Sylvia Piggott, Antonio Jimenez, **Siva Kanangat**. Potential new molecular markers to select donors for bone marrow/hematopoeitic stem cell transplantationHuman Immunology, Volume 77, Supplement, September 2016, Page 29

Marjola Furczon, Michele Higgins Prod, Sylvia Piggott, Maria Oppermann, **Siva Kanangat**. Prevalence of HLA-DP antibodies in patients awaiting renal transplantation. Human Immunology, Volume 76, Supplement, October 2015, Page 157

Ina Kurbegovic-Skaljic, Maria Oppermann, Michele Higgins Prod, Sylvia Piggott, **Siva Kanangat**. Unexplainable strong flow cytometric and CDC B cell positive crossmatches attributed to the “prozone phenomenon” of a DSA to DQA1∗05:05. Human Immunology, Volume 76, Supplement, October 2015, Page 140

Monika Gil, PharmD, Tim Humlicek, Pharm D, Barbara Pisani, MD, Jose Mendez, MD, Maria Oppermann, Michele Prod, and **Sivadasan Kanangat, PhD**. Heart Transplant after antibody reduction with bortezomib and plasmapheresis in a highly sensitized patient.
Human Immunology, Vol 75 Supp 1 The American Society for Histocompatibility & Immunogenetics, 40th Annual Meeting, Denver CO, Oct 20th 24 2014

Michele Prod, Maria Opperman, Ina Kurbegovic-Skaljic, Sylvia Piggott, Erin/Nadia, David Cimbaluk and **Siva Kanangat**. C4d Negative Antibody mediated renal allograft rejection- Need for molecular signature. Human Immunology, Vol 75 Supp 1 The American Society for

Histocompatibility & Immunogenetics, 40th Annual Meeting, Denver CO, Oct 20th 24 2014 **(Won the ASHI Presidential Award)**

Siva Kanangat,Maria Opperman, Michele Prod, Ina Kurbegovic-Skaljic, Sylvia Piggott, Erin Christian, Nadi Permakova,, David Cimbaluk, Samuel Saltzberg, Steven Jensik, And Edward Hollinger. Renal Allograft with Polyoma virus (BKV) Nephropathy leading to C4d positive Renal Biopsy with Single Class I and multiple Class II Circulating Donor-Specific HLA Antibodies. Human Immunology, Vol 75 Supp 1 The American Society for Histocompatibility & Immunogenetics, 40th Annual Meeting, Denver CO, Oct 20th 24 2014

Sarah Mandley, Maria Opperman, Michele Prod, **Siva Kanangat 2013**
A Retrospective Study of HLA Class I and II IgG subtype 1, 2, 3, and 4 on Transplant Patients and Transplant Candidates using the single antigen bead-based Luminex method.
Human Immunol 74, Supp 1 The American Society for Histocompatibility & Immunogenetics, 39th Annual Meeting Nov 17-21, 2013, Chicago, IL.

Oppermann M, Ina Kurbegovic-Skaljic Michele Prod, Erin Christian, Sylvia Piggott, S. Jensik, Ed. Hollinger, Robert DeCresce and **Siva Kanangat 2013**. Mysterious "Suboptimal" Function of a Deceased Donor (DD) Renal Allograft. Human Immunol 74, Supp 1 The American Society for Histocompatibility & Immunogenetics, 39th Annual Meeting Nov 17-21, 2013, Chicago, IL.

Priya Bhatia Oppermann M, Ina Kurbegovic-Skaljic Michele Prod, Erin Christian, Sylvia Piggott, **Siva Kanangat 2013** HLA Allele-Specific Antibodies and their Potential Significance in Transplantation. Human Immunol 74, Supp 1 The American Society for Histocompatibility & Immunogenetics, 39th Annual Meeting Nov 17-21, 2013, Chicago, IL.

Viktorija Makarovaite, Maribeth Flaws, Lindsey Murdoch, Maria Opperman, Michele Prod, Sylvia Piggott, Ina Kurbegovic-Skaljic and **Siva Kanangat 2013** Endothelial Cell Gene Expression Profile in Response to Exposure with Endothelial Cell Antibodies {Oral Presentation} Human Immunol 74, Supp 1 The American Society for Histocompatibility & Immunogenetics, 39th Annual Meeting Nov 17-21, 2013, Chicago, IL .

Tenisha West, Cristina Fhied, Mary Bet Flaws, **Sivadasan Kanangat**, and Jeffrey A. Borgia **2013**: Development of a Multiplex Luminex Assays to Detect Autoimmunity Biomarkers Associated with the Epithelial-Mesenchymal Transition {Oral Presentation} Human Immunol 74, Supp 1 The American Society for Histocompatibility & Immunogenetics, 39th Annual Meeting Nov 17-21, 2013, Chicago, IL. **ASHI Scholar Award**

1026-LB**: Siva Kanangat,** Michele Prod, Maria Oppermann, Sylvia Piggot, Stephen Jensik. Discrepancy between CDC-AHG Crossmatch and Flow Cytometry cross match with serum showing multiple Class I and Class II HLA Antibodies: Non-Complement Binding IgG Antibodies? Human Immunology, Volume 74, Issue 5, May 2013, Page 499

91-P: Is 10 out of 10 Perfect? **Kanangat, Siva;** Prod, Michele; Piggot, Sylvia; Opperman, Maria; Kurbegovic, Ina; | Jensik, Stephen; and Jaramillo, Andres. Human Immunology, Vol: 72, Supp: 1, 2011

37-P. Significant Increase in kidney transplant in highly sensitized patients by implementation of the Virtual Cross Match. Andres Jaramillo, Ph.D, Bozena Labuda, B.S, John Turon, B.S, David Freedom, B.S, Daniel Magas, B.S, Martin D. Jendrisak, M.D, Anat R. Tambur, Ph.D, Sujata Gaitonde, M.D, Susana R. Marino, M.D., Ph.D, Brian Suskind, Ph.D, Fritz Lower, M.D, **Sivadasan Kanangat, Ph.D**, Lawrence Jennings, M.D., Ph.D. Human Immunology, Vol 72, Suppl 1, 2011

63-P: Painful Family "Memories"? **Kanangat, Siva**; Prod, Michele H; .Kurbegovic, Ina; Jaramillo, Andre's. Human Immunology, Vol: 71, Suppl 1, 2010

114-P: Outcome Analysis in Patients Receiving Paternal vs. Maternal Hematopoietic Stem Cell Transplantation. **Kanangat, Siva**, Turner, Victoria; Geiger, Terrance L; .Yang, Jie; Wong, Chong; and Leung, Wing. Human Immunology, Vol: 71, Suppl 1, 2010

261-P: New allele, laboratory error or something else? Kanangat, Sivadasan; Embrey, Christy;.Turner, Victoria. Human Immunology, Vol: 70, Supp 1, 2009

Karen A. Hasty, **Siva Kanangat**, Arnold E. Postlethwaite. Collagenase Expression is inhibited in Fibroblasts from Fibroti c, but not Non-fibrotic, Scleroderma Skin: The Role of Intracellular Interleukin 1 Receptor Antagonist {American College of Rheumatology (ACR) annual conference-Nov 6-11, Boston MA, 2007}.

Ahn J, Canale T, Hasty K and **Siva Kanangat**. S.aureus enhances MMP expression culture porcine chondrocytes: Implications in septic arthritis. Annual Meeting of Pediatric Orthopedic Society of North America. May 2005, Ottawa, Canada)

Postlethwaite AE, Carbone LD, McKown K, **Siva Kanangat**, Kang AH, and Ingels J. Transdifferentiation of fibroblast-like cells (FLC) from monocyte precursors from peripheral blood of patients with systemic sclerosis (SSc). Arthriitis&Rheumatism. 50: Number 9 (Suppl).2004 Annual Scientific Meeting San Antonio, Texas. October 16-21, 2004,

Siva Kanangat, Higgins G, Hasty K, and Postlethwaite AE. Myofibroblast phenotype and reduced MMP-1 expression in human fibroblasts overexpressing intracellular receptor antagonist: Implication in the genesis o fibrosis in scleroderma. Arthriitis&Rheumatism. 50: Number 9 (Suppl).2004 Annual Scientific Meeting San Antonio, Texas. October 16-21, 2004,

Siva Kanangat, Higgins G, Hasty KA, and Postlethwaite AE. Collagenase (ma trix metalloproteinase-1) expression is reduced in human dermal fibroblasts overexpressing intracellular IL-1 receptor antagonist (icIL-1ra). American College of Rheumatology, Annual Scientific Meeting, , Orlando, FL. Arthritis and Rheumatism Vol 48.Supplement. October 23-28, 2003

Siva Kanangat, Postlethwaite AE, Schaberg DR, Meduri GU and Tolley E.

IL-1β modulates the replication and virulence gene expression in S.aureus: Implications in septic arthritis. American College of Rheumatology, Annual Scientific Meeting, New Orleans, LA. Arthritis and Rheumatism, Vol 46 (9) Supplement. October 24-29, 2002

Alcordo, MJ, Nair, U, **Kanangat, S**. and Yoo, TJ. Nasal Stimulation alone of Murine Models using Cat Allergen to Elicit an Allergic Response. American College of Allergy Asthma & Immunology (ACAAI), 2000.

Fleenor, JD, Yang, J, **Kanangat, S**, Du, X, Nair, U, Lee, H, Matsuno, H and Yoo, TJ. Naked DNA Vaccination of Cockroach (CR) Allergy in Mice. J. Allergy Clin Immunol. Vol 107 No 2: 962, 2000.

Moissidis, J, Nair, U., Saeed, A., **Kanangat, S.,** Mora, R., Barbieri, Yoo, T.J., The recombinant tissue plasminogen activator (rtPA) up regulates IL-8 and matrix metalloproteinase -I, American College Allergy Asthma & Immunology, 2000. American College of Allergy Asthma & Immunology, (ACAAI) 2001.

James, A., Saeed, A., Yang, J., Michael, C.F., Du, Park, Y.D., Nair, U., **Kanangat, S.,** Yoo, T.J., Liposome DNA vaccination is more effective than DNA vaccination alone in its suppression on Th2 response in cockroach allergy in mice, American College of Allergy Asthma & Immunology, (ACAAi) , 2001

Effect of Pro-Inflammatory Cytokines on Glucocorticoid Receptor Transcripts. Ryan Yates*[1], Siva Kanangat[2], Umberto Meduri[2], and James T. Dalton[1]. Departments of [1]Pharmaceutical Sciences and [2]Pulmonary Medicine, University of Tennessee at Memphis, Memphis, TN 38163. [1998 AAPS Annual Meeting (American Assn of Pharmaceutical Scientists Nov. 15-19, in San Francisco, CA)

On-line and/or audio-visual materials--- Medical student Lecture on Transplantation and Tumor Immunology—Available only internally.