

BINDU VARGHESE

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US Citizen

HIGHLIGHTS

- Extensive experience in developing and testing immunotherapies in animal models of several diseases
- Strong background in synthesis of targeted imaging agents, drugs, proteins and liposomes
- Industrial experience (IBM Thomas J. Watson Research Center, NY)
- Two patents pending

EDUCATION

- Postdoctorate, Oncology, Department of Medicine, Stanford University Sept 2006 – Present
Advisor: Ronald Levy, Chief of Oncology
Stanford University Dean's Fellowship 2007 - 2008
Ruth L. Kirschstein National Research Grant, NIH 2008
- PhD, Biochemistry, Department of Chemistry, Purdue University, June 2006
Dissertation: "Selective targeting of folate-drug conjugates to activated macrophages in autoimmune diseases"
Advisor: Philip S. Low, Ralph C. Corley Distinguished Professor of Chemistry
- BA, Manhattanville College, (Purchase, NY), 2000
Double Major: Chemistry and Biology, Departmental Honors
Double Minor: Mathematics and Italian
Merit Scholarship 1996 – 2000

RESEARCH EXPERIENCE

- Stanford University, Postdoctoral Scholar 2006-Present
- Developed novel therapies for the treatment of lymphoma using CpG and anti-idiotype antibodies
 - Investigated the mechanism of action of an immunotherapeutic regimen currently in clinical trials
- Purdue University, Graduate Research Assistant 2000 – Present
- Created folate-linked small molecular drugs, protein toxins, liposome-encapsulated drug complexes and immunotherapeutic agents for targeting to cancers and inflammatory diseases *in vivo*.
 - Identified the immune cell populations involved in folate receptor-targeted immunotherapy
 - Developed assays to evaluate *in vitro* and *in vivo* the mechanism of action of these immune cell populations
 - Investigated the saturation, binding and recycling characteristics of the folate receptor
 - Designed an efficient synthesis of folate-labeled PET compound for *in vivo* imaging in cancer and inflammatory diseases
 - Expressed and purified folate receptor beta protein for polyclonal and monoclonal antibody production
 - Motivated and supervised undergraduate students in research studies

EMPLOYMENT EXPERIENCE

- IBM Thomas J. Watson Research Center, Yorktown Heights, NY 1998 – 1999
- Laboratory Assistant, Department of Chemistry, Manhattanville College 1997 – 2000
- Teaching Assistant, General and Organic Chemistry, Purdue University 2000 – 2001

AWARDS

- Ruth L. Kirschstein National Research Fellowship 2008
- Stanford University Dean's Fellowship 2007 – 2008
- Iota Sigma Pi Chemical Honor Society 1997 – 2005
- Tri Beta Biological Honor Society 1997 – 2005
- Women in Science Travel Grant 2005
- Purdue Graduate Student Government Travel Grant 2005
- Sigma Xi Graduate Student Research Awards Competition, 1st Place 2003
- Alumni Graduate Student Teaching Award, General Chemistry, Purdue Univ. 2000
- Purdue Graduate Student Award for Outstanding Teaching, Dept of Chemistry 2000
- Merit Scholarship 1996 – 2000

PROFESSIONAL AFFILIATIONS

- Women in Science 2005 – 2006
- American Chemical Society 2005 – 2006

SKILLS

- Chromatography: FPLC, HPLC
- Flow Cytometry
- Solid State Peptide Synthesis
- Electrophoresis: SDS-PAGE, Agarose
- Blotting Techniques: Western, E.C.L.
- Molecular Biology: PCR, RT-PCR, routine subcloning
- Cell Culture: Bacterial and Mammalian
- Protein Expression and Purification
- DNA Extraction and Purification
- Lipid Synthesis/Liposome Formulation Techniques
- Bone Marrow-Induced Dendritic Cell Isolation
- Thioglycollate-Induced Macrophage Isolation
- Animal Handling, Breeding, Injections, Restraint, Surgery, Anesthesia, Euthanasia, Husbandry (Mice, Rats, Rabbits)
- Tail vein Injections, Catheter Insertions, Femoral Vein Injections, Para-orbital Vein Bleeds, Cardiac Puncture
- Animal Dissections, Biodistributions
- Tumor Implantation and Disease Induction in Animals: Rheumatoid Arthritis, Ulcerative Colitis, Graft-Versus Host Disease
- Polyclonal Antibody Production
- Histochemistry, Immunohistochemistry of Frozen and Paraffin Sections
- ELISAs
- Microscopy: Confocal, Two-Photon, Fluorescence and Light
- Trained for Use With Radioactivity: ^{111}In , $^{99\text{m}}\text{Tc}$, ^3H , ^{51}Cr
- Saturation, Binding and Recycling Studies *in vitro* and *in vivo*
- Tumor Digestion and Generation of 1st Passage Cells From Primary Tumor Tissue
- Protocol Writing for Approval From Animal Care and Use Committee
- Computer Skills: Sigma Plot, GraphPad Prism, Confocal Assistant, MS Office

VOLUNTEER EXPERIENCE

- National Chemistry Week, Purdue University 2003
- Volunteer Work, VA Medical Center 1996 – 2000
- Science Fair Judge, Wappinger Central School District, Wappinger Falls, NY 1996 – 2000

PATENTS PENDING

- “Method of Treatment for Lupus Erythematosus”
- “Folate Compounds Conjugated to F-18 for Use as Disease Diagnostics/Prognostics”

MANUSCRIPTS

- **Varghese, B.**, Haase, N., and Low, P.S. “Depletion of folate receptor targeting of activated macrophages leads to alleviation of symptoms and prolonged survival in two murine models of systemic lupus erythematosus” *Molecular Pharmaceutics* 2007 Sep-Oct;4(5):679-85.
- Li, J., Song, W., Czerwinski, D.K., **Varghese, B.**, Uematsu, S., Akira, S., Krieg, A.M., and Levy, R. “Lymphoma Immunotherapy with CpG Oligodeoxynucleotides Requires TLR9 either in the Host or in the Tumor Itself” *Journal of Immunology* 2007 Aug 15; 179(4):2493-500.
- Hartmann, L.C., Keeney, G.L., Lingle, W.L., Christianson, T.J., **Varghese, B.**, Hillman, D., Oberg, A.L., and Low, P.S. “Folate receptor overexpression is associated with poor outcome in breast cancer” *International Journal of Cancer* 2007 Sep 1; 121(5):938-42.
- **Varghese, B.***, Paulos, C.M.*, Widmer, W.R., Breur, G.J., Vlashi, E., and Low, P.S. “Treatment of experimental arthritis by depletion of activated macrophages using folate receptor-targeted immunotherapy” *Arthritis Research & Therapy* 2006; 8(3):R77.
*Both authors contributed equally
- **Varghese, B.**, Paulos, C.M., Widmer, W.R., and Low, P.S. “Optimization of folate-targeted immunotherapy in rats with adjuvant-induced-arthritis” (Submitted)
- **Varghese, B.***, Vlashi, E.*, Ayala-López, W., and Low, P.S. “Folate receptor saturation, recycling and release kinetics in macrophages *in vitro* and *in vivo*” (In preparation)
*Both authors contributed equally

ABSTRACTS

- **Varghese, B.**, Taidi, B., Widman, A., Do, J., and Levy, R. "Generation of CD8 T Cell-Mediated Protective Immunity against Tumor Escapees" *Blood (ASH Annual Meeting Abstracts)*, Nov 2008; 112: 2623.
- **Varghese, B.**, Vlashi, E., and Low, P.S. "Folate Receptor Saturation, Recycling, and Release Kinetics in Activated Macrophages" *Blood (ASH Annual Meeting Abstracts)*, Nov 2008; 112: 4655.
- Low PS, Paulos C, Ayala-Lopez W, **Varghese B**, Hilgenbrink A, and Lu Y. "Selective targeting of drugs to activated macrophages: Use in imaging and therapy of inflammatory diseases" *Inflammation Research* 55: S112-S113 Suppl. 2, OCT 2006.
- **Varghese, B.**, Paulos, C.M., Breur, G.J., Widmer, W.R., and Low, P.S. "Folate-targeted immunotherapy to activated macrophages in rheumatoid arthritis" Abstract # MEDI 236, 229th *American Chemical Society National Meeting*, San Diego, California, March 2005
- **Varghese, B.**, Paulos, C.M., Breur, G.J., Widmer, W.R. and Low, P.S. "Folate-targeting of haptens to activated macrophages mediates immunotherapy in rheumatoid arthritis" Abstract # 27, 33rd *Annual Autumn Immunology Conference*, Chicago, Illinois Nov 2004
- Paulos, C.M., Turk, M.J., Breur, G.J., Widmer, R.W., **Varghese, B.** and Low, P.S. "Folate targeting of haptens to activated macrophages mediates immunotherapy of adjuvant-induced arthritis in rats" Abstract #119, 2003 *Keystone Symposia*, Taos, New Mexico January 2003

PRESENTATIONS

- Poster, "Generation of CD8 T Cell Mediated Protective Immunity Against Tumor Escapees" American Society of Hematology, San Francisco, Dec 2008
- Invited Speaker, "Generation of CD8 T Cell Mediated Protective Immunity Against Tumor Escapees" Stanford Asilomar Oncology Retreat, Asilomar, California, Nov 2008
- Invited Speaker, "Generation of CD8 T Cell Mediated Protective Immunity Against Tumor Escapees" Stanford Asilomar Immunology Retreat, Asilomar, California, Nov 2008
- Poster, "Immunostimulatory CpG Enhances the Anti-Tumor Effect of Anti-Idiotype Antibodies in B Cell Lymphoma" Stanford Asilomar Oncology Retreat, Asilomar, California, Nov 2007
- Poster, "Immunostimulatory CpG Enhances the Anti-Tumor Effect of Anti-Idiotype Antibodies in B Cell Lymphoma" *Comprehensive Cancer Research Training Program*, Menlo Park, California, September 2007
- Invited Speaker, "Folate receptor targeted therapy for rheumatoid arthritis and lupus" 1st *International Conference on Folate Receptors*, Aberfoyle, Scotland, June 2006
- National Radio Interview, "Tech Nation", *National Public Radio*, October 7, 2005
- Invited Speaker, "Targeting vitamin conjugates to macrophages in inflammatory diseases" Discovery Park, Purdue University October 5, 2005
- Invited Speaker, "Vitamin-mediated targeting of folate conjugates to macrophages in autoimmune diseases" Endocyte, Inc., West Lafayette, Indiana. August 26, 2005
- Invited Speaker, "Folate receptor-targeted immunotherapy for the treatment of cancer and inflammatory diseases" *Purdue University Life Science (PULSE) Retreat*, John S. Wright Forestry Center at Martell Forest, Purdue University, August 20, 2005
- Poster, "Folate-targeted immunotherapy to activated macrophages in rheumatoid arthritis" 229th *American Chemical Society National Meeting*, San Diego, California, March 2005
- Invited Speaker and Poster, "Folate-targeting of haptens to activated macrophages mediates immunotherapy in rheumatoid arthritis" 33rd *Annual Autumn Immunology Conference*, Chicago, Illinois Nov 2004
- Invited Speaker, "Method of treatment of rheumatoid arthritis" Endocyte Inc., West Lafayette, Indiana, February 2004
- Poster, "Folate targeting of haptens to activated macrophages mediates immunotherapy of adjuvant-induced arthritis in rats" 2003 *Keystone Symposia*, Taos, New Mexico January 2003
- Poster, "Suppression of rodent adjuvant-induced arthritis by folate targeting of haptens to activated macrophages" *Sigma Xi Graduate Student Research Awards Competition*, 1st Place (Life Sciences Division), Purdue University 2003
- "Naturally occurring TIMP-3: An inhibitor of matrix metalloproteinase activity in endometriosis" Original Proposal, Department of Chemistry, Purdue University, April 2003
- "The role of macrophages in endometriosis" Departmental Seminar, Department of Chemistry, Purdue University, December 2002