

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors. Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: Lisa Michelle Hodge

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

POSITION TITLE: Associate Professor, Basic Science Research Chair

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 <i>(if applicable)</i>	Completion Date MM/YYYY	FIELD OF STUDY
University of Texas at Arlington	B. S.	12/95	Microbiology
University of North Texas Health Science Center	Ph. D.	05/01	Biomedical Sciences
University of Pittsburgh Medical Center	Postdoctoral Fellow	05/03	Immunology

A. Personal Statement

My training is in immunology, with an emphasis on the lymphatic system and mucosal immunity. My research experience with immunology began in 1996 as a Ph.D. student where I studied the pulmonary immune response to respiratory pathogens using mouse models. In 2001, as a postdoctoral fellow, I studied the role of dendritic cells in a mouse model of melanoma. In 2005 I became an independent researcher and began studying the role of osteopathic manual medicine treatments (OMT) on the lymphatic and immune systems. My lab demonstrated that OMT enhance lymph flow, release immune cells into lymph and mobilize cytokines into lymphatic circulation. We have also shown that OMT protects against pulmonary disease in rodents. Through enhancing lymphatic flow, OMT may drain inflammatory mediators, microbes, and toxins from diseased tissue and redistribute them to lymph nodes where they boost immunity. By understanding of the role of the lymphatic system during disease, our research will provide a scientific rationale for the clinical use of OMT.

My research has been recognized both nationally and internationally by basic science researchers, clinicians and researchers in the fields of massage therapy, physical therapy and osteopathic medicine. I serve on six national/international committees that promote research on manual therapies and train clinician researchers for the profession. I am a peer reviewer for several journals, on the editorial board for the Journal of the American Osteopathic Association, and serve as a peer reviewer for funding agencies such as the National Institutes of Health, the American Osteopathic Association and the American Academy of Osteopathy. I have served as a scientific advisor and/or session chair for six scientific conferences in manual medicine research, received twelve research grants related to studying the mechanisms of action of OMT, published 20 manuscripts and presented my research as an invited speaker/keynote on 43 occasions. I have also served as a co-investigator on two research awards from the American Osteopathic Research Association where my lab investigated the effect of OMT on the release of inflammatory biomarkers in patients with low back pain and patients with diabetes and low back pain.

B. Positions and Honors.

Positions and Employment.

2001-03	Fellow, Department of Dermatology, University of Pittsburgh Medical Center, Pittsburgh, PA
2003	Lecturer, Biology Department, Community College of Allegheny County, Pittsburgh, PA
2004	Lecturer, Life and Physical Sciences, Tarrant County College, Fort Worth, TX
2004-05	Visiting Professor, Department of Biology, Texas Wesleyan University, Fort Worth, TX

- 2005-11 Assistant Professor, Department of Molecular Biology and Immunology, University of North Texas Health Science Center at Fort Worth, TX
- 2006-16 Osteopathic Heritage Foundation Basic Science Research Chair, Osteopathic Research Center, University of North Texas Health Science Center at Fort Worth, TX.
- 2011-16 Associate Professor with Tenure, Department of Cell Biology and Immunology, University of North Texas Health Science Center at Fort Worth, TX.
- 2016-current Basic Science Chair, Osteopathic Research Center, University of North Texas Health Science Center at Fort Worth, TX.
- 2016-current Associate Professor with Tenure, Institute for Cardiovascular and Metabolic Diseases, University of North Texas Health Science Center at Fort Worth, TX.

Other Experience and Professional Memberships

- 1995-current Member, American Society for Microbiologists
- 1996-current Member, American Association of Immunologists
- 2007-current Member, Society for Experimental Biology and Medicine
- 2007-current Member, American Academy of Osteopathy
- 2008-current Ad hoc reviewer, The Journal of Experimental Biology and Medicine
- 2008-17 Session chair for the Seventh, Eight, Ninth and Tenth International Conference on Advances in Osteopathic Research
- 2009-current Chair, Grants Sub-Committee, Louisa Burns Osteopathic Research Committee
- 2009-current Member, American Academy of Osteopathy
- 2009-current Ad hoc reviewer, American Osteopathic Association Research Grants
- 2010 United States Delegate, Eighth International Conference on Advances in Osteopathic Research,
- 2011-current External Board of Scientific Counselors, Commission for Osteopathic Research Practice and Promotion
- 2011-current Ad hoc reviewer, NIH-NHLBI Pathway to Independence (PI) Awards (K99/R00)
- 2011-current Member, Executive Committee, Osteopathic Research Center
- 2011-15 Member, Consortium for Collaborative Osteopathic Research Development- Practice Based Research Network (CONCORD-PBRN)
- 2011 Ad hoc reviewer, The Journal of Experimental Physiology
- 2012-current Editorial Board, Journal of the American Osteopathic Association
- 2013-15 Member of the Scientific Committee for the 4th International Fascia Research Congress
- 2013-14 Ad hoc reviewer, NIH-NHLBI Conference Grant Awards (R13)
- 2014 Ad hoc reviewer, Journal of Alternative and Complementary Medicine
- 2015 Ad hoc reviewer, Journal of Integrative Medicine
- 2015-current Osteopathic Manipulative Medicine and Osteopathic Manipulative Therapy Research Task Force, the American Osteopathic Association

Honors:

- 2008 Established Researcher Award, the International Conference on Advances in Osteopathic Research.
- 2011 Research award, International Congress of Osteopathic Medicine.
- 2012 Presidents Award for Educational Excellence, UNTHSC
- 2012 Established Researcher Award, the International Conference on Advances in Osteopathic Research.
- 2013 Presidents Award for Educational Excellence, UNTHSC
- 2013 George W. Northup, DO, Medical Writing Award
- 2016 George W. Northup, DO, Medical Writing Award

C. Contributions to Science

My interest in osteopathic research began at UNTHSC as a collaboration with H. Fred Downey in the Department of Integrative physiology. His group was studying the effect exercise and osteopathic lymphatic pump techniques (LPT) on lymph flow in instrumented dogs. They found that treadmill exercise and LPT enhanced lymphatic flow. Since the lymphatic system is a vital component of the immune system, I was recruited as a co-investigator onto U19 AT002023 "Lymph Flow Enhancement by OMM in Conscious Dogs".

My role was to study the effect of LPT on the immune system of healthy dogs. At the completion of this research we found LPT significantly increased the concentration of leukocytes in thoracic duct lymph.

1. Lisa M. Hodge, H.H. King, A. G. Williams, Jr., S. Reder, T.J. Belavadi, J. Simecka, S. Stoll, and H. F. Downey. Abdominal lymphatic pump treatment increases leukocyte count and flux in thoracic duct lymph. *Lymphat Res Biol* 2007; 5(2): 127-132.

This discovery led to my R01 award in 2009. In these studies, we discovered that LPT significantly increased lymph flow and the lymphatic concentration of leukocytes in both dogs and rats. LPT did not preferentially mobilize any specific immune cell population, but significantly increased both thoracic duct lymph flow and total leukocyte concentrations, resulting in a tenfold increase in the leukocyte flux. In addition, LPT also enhanced the lymphatic flux of inflammatory cytokines, chemokines and reactive oxygen and nitrogen species in both the thoracic and mesenteric lymph. We also found that the mesentery was a significant source of the lymph, immune cells and inflammatory mediators that were mobilized during LPT

2. Lisa M. Hodge, M.K. Bearden, A. Schander, J.B. Huff, A. Williams, Jr., H.H. King, H.F. Downey. Abdominal Lymphatic Pump Treatment Mobilizes Leukocytes from the Gastrointestinal Associated Lymphoid Tissue into Lymph. *Lymphat Res and Biol* 2010; 8(2): 103-10.
3. A. Schander, H.F. Downey and L.M. Hodge. Lymphatic Pump Manipulation Mobilizes Inflammatory Mediators into Lymphatic Circulation. *J Exp Biol Med*; 2012; 237(1):58-63.
4. Schander A, Padro D, King HH, Downey HF, Hodge LM. Lymphatic pump treatment repeatedly enhances the lymphatic and immune systems. *Lymphat Res Biol*. 2013 Dec;11(4):219-26.

3. Concurrent with my R01 I was awarded several grants from the American Osteopathic Association to develop a small animal model to study the effect of LPT during disease. This was a substantial contribution as it led to the discovery that LPT protects against pneumonia by reducing the number of bacteria in the lungs of infected rats.

5. Huff, J.B., Schander, A., Downey, H.F. and Hodge, L.M. Lymphatic Pump Treatment Enhances the Lymphatic Release of Lymphocytes. *Lymphatic Research and Biology* 2010; 2010; 8(4): 183-7.
6. Creasy C, Schander A, Orlowski A, Hodge LM. Thoracic and Abdominal Lymphatic Pump Techniques Inhibit the Growth of *S. pneumoniae* Bacteria in the Lungs of Rats. *Lymphat Res Biol* 2013;11(3):183-6.
7. Hodge LM, Creasy C, Carter K, Orlowski A, Schander A, King HH. Lymphatic pump treatment as an adjunct to antibiotics for pneumonia in a rat model. *J Am Osteopath Assoc*. 2015 May 1;115(5):306-16.

Complete list of publications in My Bibliography

<http://www.ncbi.nlm.nih.gov/sites/myncbi/1-oPkGiqBBN55/bibliography/41269450/public/?sort=date&direction=ascending>

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

Pending Research Support

American Osteopathic Association (Primary Investigator). The effects of lymphatic pump treatment on the immune response during acute pneumonia.

The purpose of this study is to identify the mechanism by which lymphatic pump treatments protect against pneumonia.

American Academy of Osteopathy (Primary Investigator). A Novel Approach to Study the Effect of Osteopathic Manipulative Techniques on Tissue Edema in Rats with Impaired Lymphatic Function.

The purpose of this proposal is to identify potential mechanism(s) by which osteopathic manipulative medicine techniques may enhance lymphatic function and reduce inflammation.

Completed Research Support (5 most recent out of 12 completed awards)

AOA 13-11-687, Hodge (Primary Investigator), 09/01/13-02/29-16. Lymphatic pump treatment as an adjunctive therapy for the treatment of pneumonia. The purpose of this proposal to identify lymphatic pump treatment enhances efficacy of antibiotic for the treatment of pneumonia.

American Academy of Osteopathy, Hodge (Primary Investigator), 04/01/14-06/30/15. Lymphatic pump technique as a treatment modality for inflammatory bowel disease. The objective of this proposal is to determine if LPT provides protection during inflammatory bowel disease.

AOA 13-11-686, Licciardone (Primary Investigator), 09/01/13-08/31-15 . American Osteopathic Association Osteopathic Manipulative Treatment of Somatic Dysfunction and Chronic Low Back Pain in Patients with Type 2 Diabetes Mellitus. The purpose of this study is to ascertain if OMT improves low back pain symptoms in patients with Type 2 Diabetes Mellitus. Role: Co-Investigator.

R01 AT004361, Hodge (Primary Investigator), 01/01/09-12/31/14. National Institutes of Health. Mechanisms of Lymphatic Pump-Enhancement of Immune Function. The goal of this project is to define and evaluate the effectiveness and mechanisms by which osteopathic manipulative medicine enhances the lymphatic system and immunity.

AOA 10-11-609, Hodge (Primary Investigator), 09/01/10-08/31/12. American Osteopathic Association. The Effect of Lymphatic Pump Treatment on the Clearance of Influenza and Influenza Complicated by Bacterial Pneumonia. The objective of this proposal is to determine if LPT provides protection against influenza and pneumococcal pneumonia.