

## Michael T. Dellinger, Ph.D.

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### A. POSITIONS AND APPOINTMENTS

2011 - Present Research Director, The Lymphatic Malformation Institute ([www.lmiresearch.org](http://www.lmiresearch.org))  
 2014 - Present Assistant Professor, Department of Surgery, UT Southwestern Medical Center

### B. EDUCATION

1999 - 2002 Bachelor of Science, Molecular and Cellular Biology, University of Arizona  
 2002 - 2008 Doctor of Philosophy, Molecular and Cellular Biology, University of Arizona

### C. TRAINING

1999 - 2002 Undergraduate Research Assistant, Plant Sciences, University of Arizona  
*Mentor: Dr. Jian-Kang Zhu*  
 2002 - 2008 Graduate Research Assistant, Molecular and Cellular Biology, University of Arizona  
*Mentors: Dr. Robert Erickson and Dr. Marlys Witte*  
 2008 - 2014 Postdoctoral Researcher, Surgical Oncology, UT Southwestern Medical Center  
*Mentor: Dr. Rolf Brekken*

### D. EXPERIENCE AND HONORS

#### Professional Memberships

2005 - Present Member, International Society of Lymphology  
 2014 - Present Member, International Society for the Study of Vascular Anomalies  
 2012 - Present Member, NAVBO

#### Honors

2002 Graduated Magna cum laude from University of Arizona  
 2005 International Society of Lymphology Presidential Prize for Outstanding Basic Research in Lymphology  
 2006 Lymphatic Research Foundation-Susan G. Komen Breast Cancer Foundation Scholarship  
 2007 International Society of Lymphology Presidential Prize for Outstanding Basic Research in Lymphology  
 2008 Lymphatic Research Foundation Travel Award  
 2008 Young Investigator Award, 3<sup>rd</sup> Mayo Clinic Angiogenesis Symposium  
 2010 Best Basic Science Award, UT Southwestern Department of Surgery Research Symposium  
 2011 Best Basic Science Award, UT Southwestern Department of Surgery Research Symposium  
 2012 Outstanding Poster Award, NAVBO Developmental Vascular Biology Workshop  
 2016 John Mulliken Award for Best Scientific Paper, 21st International Workshop on Vascular Anomalies  
 2017 Invited Speaker Selected by Graduate Students in the Cell Biology Program at the University of Oklahoma Health Science Center (April 5, 2017; Oklahoma City, OK)

#### Service

2011 - Present Ad-hoc reviewer for several journals: *Lymphology*, *PLoS ONE*, *Cancer Research*, *The Journal of Clinical & Cellular Immunology*, *OMICS Group International*, *BMC Cancer*, *Nature Communications*, *The New England Journal of Medicine*, *Journal of Pediatric Hematology and Oncology*, *British Journal of Pharmacology*

2013	<u>Conference Organizer</u> , First International Conference on Generalized Lymphatic Anomaly and Gorham-Stout Syndrome. (June 7-8, 2013; Bethesda, MD)
2014 – Present	Member of Editorial Board, <i>Lymphology</i>
2014 – Present	Organizer of the Harold C. Simmons Cancer Center Angiogenesis Seminar Series (UT Southwestern Medical Center)
2014 – 2016	Organizer of the Department of Surgery Research Seminar Series (UT Southwestern Medical Center)
2014 – Present	Member, Development and Cancer Program in the Harold C. Simmons Cancer Center
2015 – Present	Member, Genes, Development, and Disease Graduate Program (UT Southwestern Medical Center)
2015 – Present	Member, Hamon Center for Regenerative Science and Medicine
2015	Member of the organizing committee of the 25 <sup>th</sup> World Congress of Lymphology
2016	<u>Conference Organizer</u> , 2nd International Conference on Generalized Lymphatic Anomaly and Gorham-Stout Syndrome. (June 10-11, 2016; Atlanta, GA)
2017 – Present	Member, Education Committee for NAVBO
2017 – Present	Member, Steering Committee for the Genes, Development, and Disease Graduate Program (UT Southwestern Medical Center)

### Invited Speaker

2009	3 <sup>rd</sup> International Symposium on Cancer Metastasis and the Lymphovascular System: Basis for rational therapy (May 6-9, 2009; San Francisco, CA)
2011	4 <sup>th</sup> International Symposium on Cancer Metastasis and the Lymphovascular System: Basis for rational therapy (May 12-14, 2011; New York, NY)
2013	Joint International Oncology (Sentinel Node and Cancer Metastasis) Congress (May 27-29, 2013; San Francisco, CA)
2013	1 <sup>st</sup> International Conference on Generalized Lymphatic Anomaly and Gorham-Stout Syndrome (June 7-8, 2013; Bethesda, MD)
2014	American Society of Pediatric Hematology Oncology (May 14-17, 2014; Chicago, IL)
2014	Inaugural International Lymphangiomas & Gorham's Disease Alliance Patient & Family Conference (June 13-14, 2014; Dallas, TX)
2015	Pathway to Excellence Seminar Series; Baylor College of Dentistry (July 1, 2015; Dallas, TX)
2015	American Thoracic Society Rare Lung Disease Webinar (August 5, 2015)
2015	25 <sup>th</sup> World Congress of Lymphology (September 7-11, 2015; San Francisco, CA)
2015	Genes, Development and Disease Graduate Student Retreat; UT Southwestern Medical Center (October 2, 2015; Dallas, TX)
2015	Cell Biology and Immunology Departmental Seminar; UNT Health Science Center (November 12, 2015; Fort Worth, TX)
2016	2nd International Conference on Generalized Lymphatic Anomaly and Gorham-Stout Syndrome (June 10-11, 2016; Atlanta, GA)
2017	Invited Speaker Selected by Graduate Students in the Cell Biology Program at University of Oklahoma Health Science Center (April 5, 2017; Oklahoma City, OK)
2017	Cancer Metastasis Through the Lymphovascular System: Biology and Treatment. (April 20-22, 2017; San Francisco, CA)
2017	Lymphatic Forum 2017: Exploring the lymphatic continuum. (June 8-10, 2017; Chicago, IL)
2018	45 <sup>th</sup> Annual Meeting of the Texas Genetics Society. (March 22-24, 2018; College Station, TX)
2018	International Symposium on Somatic Mosaicism in Vascular Malformations (May 10-11, 2018; Madrid, Spain)
2018	20 <sup>th</sup> International Vascular Biology Meeting. (June 3-7, 2018; Helsinki, Finland)
2018	Medical, Surgical, and Minimally Invasive Management of Vascular Anomalies and Overgrowth Syndromes (September 28-29, 2018; Atlanta, GA)

## E. PUBLICATIONS

### Peer Reviewed Publications

1. **Dellinger MT**, Hunter RJ, Bernas MJ, Witte MH, Erickson RP. 2007. *Chy-3* mice are *Vegfc* haploinsufficient and exhibit defective dermal superficial to deep lymphatic transition and dermal lymphatic hypoplasia. *Developmental Dynamics* 236, 2346-2355. PMID: 17584866.
2. **Dellinger MT**, Hunter RJ, Bernas MJ, Erickson RP, Gale NW, Yancopoulos GD, Witte MH. 2008. Defective remodeling of the lymphatic vasculature in Angiopoietin-2 knockout mice. *Developmental Biology* 319, 309-320.

PMCID: PMC2536689.

3. **Dellinger MT**, Thome K, Bernas MJ, Erickson RP, Witte MH, 2008. Novel *FOXC2* missense mutation identified in a patient with lymphedema-distichiasis syndrome and review. *Lymphology* 41, 98-102. PMID: 19013876.
4. Witte MH, Erickson RP, Khalil M, **Dellinger M**, Bernas M, Grogan T, Nitta H, Feng J, Duggan D, Witte CL. 2009. Lymphedema-distichiasis syndrome without *FOXC2* mutation: evidence for chromosome 16 duplication upstream of *FOXC2*. *Lymphology* 42, 152-160. PMID: 20218083.
5. Roland CL, Dineen SP, Lynn KD, Sullivan LA, **Dellinger MT**, Sadegh L, Sullivan JP, Shames DS, Brekken RA. 2009. Inhibition of vascular endothelial growth factor reduces angiogenesis and modulates immune cell infiltration of orthotopic breast cancer xenografts. *Molecular Cancer Therapeutics* 8, 1761-1771. PMID: 19567820.
6. Zhu J, Lee BH, **Dellinger M**, Cui X, Zhang C, Wu S, Nothnagel EA, Zhu JK. 2010. A cellulose synthase-like protein is required for osmotic stress tolerance in Arabidopsis. *The Plant Journal* 63, 128-140. PMID: PMC3061338.
7. Kanady JD, **Dellinger MT**, Munger SJ, Witte MH, Simon AM. 2011. Connexin37 and Connexin43 deficiencies in mice disrupt lymphatic valve development and result in lymphatic disorders including lymphedema and chylothorax. *Developmental Biology* 354, 253-266. PMID: PMC3134316.
8. **Dellinger MT** and Brekken RA. 2011. Phosphorylation of Akt and ERK1/2 is required for VEGF-A/VEGFR2-induced proliferation and migration of lymphatic endothelium. *PLoS ONE* 6(12):e28947. PMID: PMC3236226.
9. Gerber DE, Gupta P, **Dellinger MT**, Toombs JE, Peyton M, Duignan I, Malaby J, Bailey T, Burns C, Brekken RA, Loizos N. 2012. Stromal platelet-derived growth factor receptor  $\alpha$  (PDGFR $\alpha$ ) provides a therapeutic target independent of tumor cell PDGFR $\alpha$  expression in lung cancer xenografts. *Molecular Cancer Therapeutics* 11, 2473-2482. PMID: PMC3495993.
10. Li X, Zhou Q, Hanus J, Anderson C, Zhang H, **Dellinger M**, Brekken R, Wang S. 2013. Inhibition of multiple pathogenic pathways by histone deacetylase inhibitor SAHA in a corneal alkali-burn injury model. *Molecular Pharmaceutics* 10, 307-318. PMID: PMC3697033.
11. Konstantinidou G, Ramadori G, Torti F, Kangasniemi K, Ramirez RE, Cai Y, Behrens C, **Dellinger MT**, Brekken RA, Wistuba II, Heguy A, Teruya-Feldstein J, Scaglioni PP. 2013. RHOA-FAK is a required signaling axis for the maintenance of KRAS-driven adenocarcinomas. *Cancer Discovery* 3, 444-457. PMID: PMC3625467.
12. Bennett KM, Afanador MD, Lal CV, Xu H, Persad E, Legan SK, Chenuaux G, **Dellinger M**, Savani RC, Dravis C, Henkemeyer M, Schwarz MA. 2013. Ephrin-B2 Reverse Signaling Increases  $\alpha 5\beta 1$  Integrin Mediated Fibronectin Deposition and Reduces Distal Lung Compliance. *Am J Respir Cell Mol Biol*. 49, 680-687. PMID: PMC3824044 [Available on 2014/10/1].
13. Wang L, Chang J, Varghese D, **Dellinger M**, Kumar S, Best AM, Ruiz J, Bruick R, Peña-Llópez S, Xu J, Babinski DJ, Frantz DE, Brekken RA, Quinn AM, Simeonov A, Easmon J, Martinez ED. 2013. A small molecule modulates Jumonji histone demethylase activity and selectively inhibits cancer growth. *Nature Communications*. 4:2035. PMID: PMC3724450.
14. **\*Dellinger MT**, Meadows SM, Wynne K, Cleaver O, Brekken RA. 2013. VEGFR2 directly regulates the development of the lymphatic vasculature. *PLoS ONE* 8(9):e74686. PMID: PMC3759473. (\* corresponding author)
15. Aguilera KY, Rivera LB, Hur H, Carbon JG, Toombs JE, Goldstein CD, **Dellinger MT**, Castrillon DH, Brekken RA. 2013. Collagen signaling enhances tumor progression after anti-VEGF therapy in a murine model of pancreatic ductal adenocarcinoma. *Cancer Research* 74, 1032-1044. PMID: PMC3944405 [Available on 2015/2/15].
16. Dbouk HA, Weil LM, Perera GK, **Dellinger MT**, Pearson G, Brekken RA, Cobb MH. 2014. Actions of the protein kinase WNK1 on endothelial cells are differentially mediated by its substrate kinases OSR1 and SPAK. *Proc Natl Acad Sci USA* 111, 15999-6004. PMID: 25362046.
17. Kirane A, Ludwig KF, Sorrelle N, Haaland G, Sandal T, Ranaweera R, Toombs JE, Wang M, Dineen SP, Micklem D, **Dellinger MT**, Lorens JB, Brekken RA. 2015. Warfarin blocks Gas6-mediated Axl activation required for pancreatic cancer epithelial plasticity and metastasis. *Cancer Research* 75, 3699-36705. PMID: 26206560.
18. Regan E, Sibley RC, Cenik BK, Silva A, Girard L, Minna JD, **Dellinger MT**. 2016. Identification of Gene Expression Differences between Lymphangiogenic and Non-Lymphangiogenic Non-Small Cell Lung Cancer Cell Lines. *PLoS One*. 2016. 11(3):e0150963. PMID: PMC4780812.
19. Lammoglia GM, Van Zandt CE, Galvan DX, Orozco JL, **Dellinger MT**, Rutkowski JM. 2016. Hyperplasia, de novo lymphangiogenesis, and lymphatic regression in mice with tissue-specific, inducible overexpression of murine VEGF-D. *Am J Physiol Heart Circ Physiol*. [Epub ahead of print] PubMed PMID: 27342876.
20. Ludwig KF, Slone T, Cederberg KB, Silva AT, **Dellinger MT**. 2016. A new case and review of chylothorax in generalized lymphatic anomaly and Gorham-Stout disease. *Lymphology* 49:73-84.
21. Wang W, Wang H, Zhou X, Li X, Sun W, **Dellinger M**, Boyce BF, Xing L. 2017. Lymphatic endothelial cells produce M-CSF, causing massive bone loss in mice. *J Bone Miner Res*. 32:939-950.
22. Kontarakis Z, Rossi A, Ramas S, **Dellinger MT**, Stainier DYR. 2018. Mir-126 is a conserved modulator of lymphatic development. *Dev Biol*. 437, 120-130.

23. Hominick D, Silva A, Khurana N, Liu Y, Dechow PC, Feng JQ, Pytowski B, Rutkowski JM, Alitalo K, **Dellinger MT**. 2018. VEGF-C promotes the development of lymphatics in bone and bone loss. *eLIFE*. eLife 2018;7:e34323

### **Review Articles**

1. Witte MH, Bernas M, **Dellinger MT**, Duggan D, Erickson RP. 2006. Genetics of childhood lymphedema-angiodyplasia syndromes. *National Lymphedema Network* 18, 25-27.
2. Witte MH, **Dellinger MT**, McDonald D, Boccardo F, Campisi C, Sleeman J, Gershenwald J. 2011. Lymphangiogenesis and Hemangiogenesis: Potential Targets for Therapy. *Journal of Surgical Oncology* 103, 489-500. PMID: 21480241.
3. Witte MH, **Dellinger MT**, Papendieck CM, Boccardo F. 2012. Overlapping biomarkers, pathways, processes and syndromes in lymphatic development, growth and neoplasia. *Clinical and Experimental Metastasis*. 29, 707-727. PMID: 22798218.
4. **\*Dellinger MT**, Garg N, Ferry T, Kelly J, Olsen BR. 2013. First International Conference on Generalized Lymphatic Anomaly and Gorham-Stout Syndrome. *BoneKey* doi:10.1038/bonekey.2013.210. (\*corresponding author)
5. **\*Dellinger MT**, Garg N, Olsen BR. 2014. Viewpoints on vessels and vanishing bones in Gorham-Stout disease. *Bone* 63, 47-52. PMID: 24583233. (\*corresponding author)
6. Iacobas I, Klepper L, Kelly J, Ferry T, **Dellinger MT**. 2016. Meeting report for the 2<sup>nd</sup> International Conference on Generalized Lymphatic Anomaly and Gorham-Stout Disease. *IBMS Bone Key (In Press)*.

### **Book Chapters**

1. Witte MH, **Dellinger MT**, Bernas MJ, Jones KA, Witte CL. 2007. Molecular lymphology and genetics of lymphedema-angiodyplasia syndromes. In: Földi M, Földi E, (Eds.). Földi's Textbook of Lymphology. Urban & Fischer. p. 497-523.
2. Witte MH, **Dellinger MT**, Bernas MJ, Witte CL. 2009. Heme/Lymphvasculogenesis, Hem/Lymphangiogenesis, Hem/Lymphangiotumorigenesis, and Tumor Hem/Lymphangiogenesis: Need for a Terminology Adjustment. In: Leong SL (Ed.). From Local Invasion to Metastatic Cancer. Humana Press. p. 77-92.
3. **Dellinger MT**, Bernas MJ, Witte MH. 2011. Lymphatic Biology and Pathobiology. Dieter RS, Dieter RA, Dieter RA, (Eds.). Venous and Lymphatic Diseases. McGraw-Hill Professional. p. 17-35.

### **Meeting Abstracts (Oral Presentations)**

1. **Dellinger MT**, Hunter RJ, Bernas MJ, Erickson RP, Witte MH. Lymphatic phenotype of *Chy-3* mice: comparison to *Vegfc*<sup>-/-</sup> mice. *20<sup>th</sup> International Congress of Lymphology* (September 26-October 1, 2005; Salvador, Brazil).
2. **Dellinger MT**, Hunter RJ, Bernas MJ, Erickson RP, Witte MH. Lymphatic phenotype of Angiopoietin-2 knockout mice. *21<sup>st</sup> International Congress of Lymphology* (September 26-29, 2007; Shanghai, China).
3. **Dellinger MT**. Overexpression of VEGF-C in bone causes a phenotype that resembles Gorham-Stout disease. Gordon Research Conference: Basic Science and Disease Mechanisms in Multiple Organ Systems (March 20-25, 2016; Ventura, CA)
4. **Dellinger MT**. Overexpression of VEGF-C in bone causes a phenotype that resembles Gorham-Stout disease. *21<sup>st</sup> International Workshop on Vascular Anomalies* (April 26-29, 2016; Buenos Aires, Argentina).
5. **Dellinger MT**. Overexpression of VEGF-C in bone causes a phenotype that resembles Gorham-Stout disease. *19<sup>th</sup> International Vascular Biology Meeting* (October 30 – November 3, 2016; Boston, MA).
6. **Dellinger MT**. Excessive PI3K/mTOR signaling causes lymphatic hyperplasia and dysfunction in mice. *22<sup>nd</sup> International Workshop on Vascular Anomalies* (May 29 – June 1, 2018; Amsterdam, Netherlands).

### **Meeting Abstracts (Poster Presentations)**

1. Hunter RJ, Witte MH, **Dellinger MT**, Kriederman B, Zeigler R, Suri C, Gale N, Yancopoulos G. The generalized hypo-dysplastic lymphatic phenotype of *Ang2*<sup>-/-</sup> mice persists throughout adulthood and is fully rescued by Angiopoietin-1 knock-in. *20<sup>th</sup> International Congress of Lymphology* (September 26-October 1, 2005; Salvador, Brazil).

2. Zhu J, Lee BH, **Dellinger MT**, Nothagel EA, Zheng X, Zhu JK. A cellulose synthase-like protein, SOS6 is required for osmotic stress tolerance in *Arabidopsis*. *Plant Biology* (August 5-9, 2006; Boston, MA).
3. **Dellinger MT**, Hunter RJ, Bernas MJ, Erickson RP, Witte MH. Lymphatic phenotype of *Chy-3* mice. *Gordon Research Conference: Molecular mechanisms in lymphatic function and disease* (September 3-8, 2006; Les Diablerets, Switzerland).
4. Bernas MJ, Witte MH, **Dellinger MT**, Liu LC, Jenkins T, Garrafa EM, Caruso A, Leong SPL. Isolation of human lymphatic endothelial cells. *2<sup>nd</sup> International Symposium on Cancer Metastasis and the Lymphovascular System* (May 2-5, 2007; San Francisco, CA).
5. **Dellinger MT**, Hunter RJ, Bernas MJ, Erickson RP, Gale NW, Yancopoulos GD, Witte MH. Defective remodeling of the lymphatic vasculature in Angiopoietin-2 knockout mice. *2<sup>nd</sup> International Symposium on Cancer Metastasis and the Lymphovascular System* (May 2-5, 2007; San Francisco, CA).
6. **Dellinger MT**, Witte MH, Simon AM. Lymphatic defects and chylothorax in mice deficient in Cx37 and Cx43. *International Gap Junction Conference* (August 4-9, 2007; Copenhagen, Denmark).
7. **Dellinger MT**, Hunter RJ, Bernas MJ, Erickson RP, Gale NW, Yancopoulos GD, Witte MH. Defective remodeling of the lymphatic vasculature in Angiopoietin-2 knockout mice. *Gordon Research Conference: Molecular mechanisms in lymphatic function and disease* (March 2-7, 2008; Ventura, CA).
8. Dineen SP, Roland CL, Lynn KD, Payton LA, **Dellinger MT**, Carbon JG, Toombs JE, Brekken RA. Novel anti-VEGF therapy affects stroma in orthotopic breast cancer xenografts. *3<sup>rd</sup> Mayo Clinic Angiogenesis Symposium* (October 24-26, 2008; Rochester, MN).
9. Simon AM, **Dellinger MT**, Kanady JD, Munger SJ, Witte MH, Sellitto C. Cx37 and Cx43 are necessary for lymphatic valve development. *International Gap Junction Conference* (July 25-30, 2009; Sedona, AZ).
10. **Dellinger MT**, Dineen S, Roland C, Brekken RA. Inhibition of VEGF-A activation of VEGFR2 blocks lymphangiogenesis by preventing the activation of ERK. *Metastasis and the Tumor Microenvironment* (September 12-15, 2010; Philadelphia, PA).
11. **Dellinger MT** and Brekken RA. Phosphorylation of Akt and ERK1/2 is required for VEGF-A/VEGFR2-induced proliferation and migration of lymphatic endothelium. *Gordon Research Conference: Molecular Mechanisms in Lymphatic Function & Disease* (March 4-9, 2012; Ventura, CA).
12. **Dellinger MT**, Hirashima M, Brekken RA. VEGFR2 directly regulates the development of the lymphatic vasculature. *NAVBO Developmental Vascular Biology Workshop V* (October 14-18, 2012; Pacific Grove, CA).

## F. RESEARCH SUPPORT

### Ongoing Research Support

Dellinger, Michael (PI) 1/1/2015 - unspecified  
 Foster Family Foundation Donation  
 Role: PI  
 Amount: \$45,000

Dellinger, Michael (PI) 2/1/2014-1/31/2017  
 Start-up package UT Southwestern Medical Center  
 Role: PI  
 Amount: \$350,000

### Completed Research Support

Dellinger, Michael (PI) 3/1/2016 – 2/28/2018  
 Lymphatic Malformation Institute  
 The major goal of this project is to develop an animal model of Gorham-Stout disease  
 Role: PI  
 Amount: \$277,147

Dellinger, Michael (PI) 9/1/2014 – 8/31/2015  
 NIH Lung Cancer SPORE  
 Career Development Award  
 Role: PI  
 Amount: \$25,000

Dellinger, Michael (PI) 1/1/2015 – 12/31/2015  
Lymphatic Malformation Institute  
The major goal of this project is to develop an animal model of Gorham-Stout disease  
Role: PI  
Amount: \$80,925

Dellinger, Michael (PI) 1/1/2010-12/31/2012  
W81XWH-10-1-0052  
Department of Defense Breast Cancer Research Program Postdoctoral Fellowship  
The major goal of this project was to characterize the effect of an anti-VEGF-A antibody on tumor lymphangiogenesis and metastasis  
Role: PI

Terada, Lance (PI) 09/01/2009-08/31/2014  
5 T32 HL098040 05  
Training Program In Lung Biology and Disease  
The major goal of this project is to train basic and clinical researchers to perform pulmonary biology research.  
Role: Trainee