

Courtney Copeland, Ph.D.

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EDUCATION

2011-2017 Vanderbilt University, Nashville TN, Department of Molecular Physiology and Biophysics
Degree: Ph.D in Molecular Physiology and Biophysics

2004-2008 University of Tennessee, Knoxville TN, Department of Biology
Degree: B.S. in Biochemistry and Cellular and Molecular Biology

RESEARCH EXPERIENCE

2017-Current Brigham & Women's Hospital, Harvard Medical School, Boston MA

Postdoctoral Research Fellow; PI: William M. Oldham M.D., Ph.D.

Investigating the differential effects of taurine supplementation in different rodent models of pulmonary arterial hypertension.

- Cell culture of human vascular cell lines
- *In vitro* and *in vivo* taurine treatment and collection of conditioned media, rat plasma, rat tissues
- Examination of various measurements and analytes via mass spectrometry, right- and left-heart catheterization, and qRT-PCR, RNAseq, Western blotting, histology and metabolomic profiling.

2017 Vanderbilt University Medical Center, Nashville TN

Postdoctoral Research Fellow; PI: James D. West, Ph.D.

Investigating the role of a novel pulmonary arterial hypertension-associated caveolin-1 mutant in a knock-in mouse model.

- The caveolin-1 mutation was knocked-in to mice to generate heterozygous and homozygous animals expressing the gene.
- Characterized the development of disease histologically, and hemodynamically by right heart catheterization *in vivo*.
- Detected expression of the mutant protein using targeted mass spectrometry.

2011-2017 Vanderbilt University, Nashville TN

Graduate Student; Advisor: Anne K. Kenworthy, Ph.D.

Characterizing novel caveolin-1 mutations associated with pulmonary arterial hypertension and congenital generalized lipodystrophy in heterozygous patient-derived cell lines.

- Characterized the protein expression levels and subcellular distribution of endogenous caveolin-1 in patient fibroblasts using western blotting, confocal and transmission electron microscopy.
- Generated plasmids encoding tagged caveolin-1 mutants to independently assess the trafficking and localization of the mutant protein in caveolin-1 KO murine embryonic fibroblasts.
- Identified abnormal mutant trafficking at the cellular level, unstable caveolin-1 complexes containing the mutant by BN-PAGE and co-immunoprecipitation and caveolae with abnormal biochemical properties were also observed by buoyant density centrifugation detergent-resistant membranes (caveolae).

2009-2011 University of Tennessee, Knoxville TN

Research Specialist II; Mentor: Timothy E. Sparer, Ph.D.

- Investigated the role of viral chemokines in secondary dissemination *in vivo* in a murine model of cytomegalovirus using recombinant viruses and viral titering in tissues of infected mice

SKILLS AND TECHNIQUES

Molecular cloning, site-directed mutagenesis, RFLP, RT- and q-PCR, protein/DNA/RNA extractions, gel electrophoresis (agarose, polyacrylamide and blue-native), immunoprecipitations (protein), immunocyto/histochemistry (tissue slices, mammalian cells), Western blotting, RNA-seq, data analysis, statistical analysis, confocal microscopy, electron microscopy mammalian (primary and transformed), insect and bacterial cell culture, rat and mouse handling and procedures (portal vein exsanguination, retro-orbital bleed, intubation, lung perfusion and inflation, footpad, intraperitoneal, subcutaneous injections, necropsy and organ removal).

Training Courses

2009: *An Introduction to Cell Culture: An Introductory Lesson on How to Culture and Handle Mammalian cells* Hosted by Corning, ATCC, and SIVB

2009-Present: Blood Borne Pathogens Awareness

2009-Present: BSL-2 Trained

2009-Present: *Working with the IACUC on the AALAS Learning Library* in animal handling

AWARDS AND ACHIEVEMENTS

Academic and Professional Honors:

- Spring 2019 Minority Trainee Development Scholarship, *American Thoracic Society*
- Spring 2018 Research feature in BRET: Results and Discussion: [Cell membrane dynamics offer critical insights into pulmonary arterial hypertension](#), *Vanderbilt University*
- 2015 1st Place, Graduate Student Category Poster Session, *2nd Midwest Membrane Trafficking and Signaling Symposium*
- 2015 Vanderbilt Graduate School student travel award, *Vanderbilt University*
- 2014 Student travel award, Department of Molecular Physiology and Biophysics, *Vanderbilt University*
- 2014 Intensive Course in Quantitative Fluorescence Microscopy
- 2011-2016 Initiative for Maximizing Student Diversity, *Vanderbilt University*
- 2004-2008 African-American Achievers Scholarship, *University of Tennessee*

Funding Awarded

2018-2019 Ruth L. Kirschstein National Research Service Award

Grant NO. 5T32HL007633-33

Sponsoring Institution: Brigham and Women's Hospital and Harvard Medical School

Type: T32 Institutional postdoctoral training grant

2017-2018 Ruth L. Kirschstein National Research Service Award

Grant NO. 6T32HL094296-09

Sponsoring Institution: Vanderbilt University Medical Center

Type: T32 Institutional postdoctoral training grant

2012-2016 Diversity Supplement

Grant NO. R01HL111259-01S1

2009-2011 Diversity supplement

Grant NO. R01A1071042-02S2

PUBLICATIONS

1. D'Amico, R., Gladson, S., Shay, S. **Copeland, C. A.**, West, J. D. (2018). Saracatinib and Dasatinib fail to prevent heritable pulmonary arterial hypertension. *bioRxiv* 345447. doi:<https://doi.org/10.1101/345447>.
2. ***Copeland, C. A.**, *Han, B., Tiwari, A., Austin, E. D., Loyd, J. E., West, J. D., & Kenworthy, A. K. (2017). A disease-associated frameshift mutation in caveolin-1 disrupts caveolae formation and function through introduction of a *de novo* ER retention signal. *MBoC*.
3. Tiwari, A., **Copeland, C. A.**, Han, B., Hanson, C. A., Raghunathan, K., & Kenworthy, A. K. (2016). Caveolin-1 is an aggresome-inducing protein. *Sci Rep*, 6, 38681. doi:10.1038/srep38681
4. *Han, B., ***Copeland, C. A.**, Kawano, Y., Rosenzweig, E. B., Austin, E. D., Shahmirzadi, L., Kenworthy, A. K. (2016). Characterization of a caveolin-1 mutation associated with both pulmonary arterial hypertension and congenital generalized lipodystrophy. *Traffic*. doi:10.1111/tra.12452
5. Dogra, P., Miller-Kittrell, M., Pitt, E., Jackson, J. W., Masi, T., **Copeland, C.**, Sparer, T. (2016). A little cooperation helps murine cytomegalovirus (MCMV) go a long way: MCMV co-infection rescues a chemokine salivary gland defect. *J Gen Virol*, 97(11), 2957-2972. doi:10.1099/jgv.0.000603
6. Han, B., **Copeland, C. A.**, Tiwari, A., & Kenworthy, A. K. (2016). Assembly and Turnover of Caveolae: What Do We Really Know? *Frontiers in Cell and Developmental Biology*, 4, 68. doi:10.3389/fcell.2016.00068
7. Day, C. A., Baetz, N. W., **Copeland, C. A.**, Kraft, L. J., Han, B., Tiwari, A., Drake, K. R., Luca, H., Chinnapen, D. J., Davidson, D. W., Holmes, R. K., Jobling, M. G., Schroer, T. A., Lencer, W. I., & Kenworthy, A. K. (2015). Microtubule motors power plasma membrane tubulation in clathrin-independent endocytosis. *Traffic*, 16(6):572-90. doi:10.1111/tra.12269.
8. Doyle, J. D., Stencel-Baerenwald, J. E., **Copeland, C. A.**, Rhoads, J. P., Brown, J. J., Boyd, K. L., Dermody, T. S. (2015). Diminished Reovirus Capsid Stability Alters Disease Pathogenesis and Littermate Transmission. *PLoS Pathogens*, 11(3), e1004693. doi:10.1371/journal.ppat.1004693
9. Nicholas, K. J., Zern, E. K., Barnett, L., Smith, R. M., Lorey, S. L., **Copeland, C. A.**, Kalams, S. A. (2013). B Cell Responses to HIV Antigen Are a Potent Correlate of Viremia in HIV-1 Infection and Improve with PD-1 Blockade. *PLoS One*, 8(12), e84185. doi:10.1371/journal.pone.0084185

SELECTED PRESENTATIONS

Model-dependent effects of taurine supplementation in experimental pulmonary hypertension. Poster presentation. *American Thoracic Society International Conference*. Dallas, TX, May 2019

Impact of a caveolin-1 frameshift mutant on caveolae assembly and function. Poster presentation. *Cell and Developmental Biology Retreat*. Nashville, TN, April 2016.

Clarifying the role of caveolae in pulmonary vascular homeostasis by characterizing a PAH-associated CAV1 mutant. Poster presentation. *ASCB 2nd Midwest Membrane Trafficking and Signaling Symposium*. Louisville, KY, July 2015.

Clarifying the role of caveolae in pulmonary vascular homeostasis by characterizing a PAH-associated CAV1 mutant. Oral Presentation. *Cell and Developmental Biology Retreat*. Nashville, TN, April 2015.

A newly identified mutation in caveolin-1 associated with pulmonary arterial hypertension regulates the expression level of caveolin-1 and affects the stability of caveolin oligomers. Oral and poster presentation. *FASEB Protein Lipidation, Signaling and Membrane Domains*. Saxtons River, VT, July 2013

The role of chemokines in dissemination of Cytomegalovirus. Oral presentation. *University of Tennessee, Department of Microbiology Colloquium*. Knoxville, TN, March 2011.

Use of the BAC System for Generation of Mouse CMVs that Overexpress Host and Viral Chemokines. Oral presentation, *11th Southeastern Regional Virology Conference*. Atlanta, GA, March 2010.

REFERENCES

William M. Oldham, M.D., Ph.D., Current advisor

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Anne K. Kenworthy, Ph.D., Ph.D. Advisor

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