

BIOGRAPHICAL SKETCH

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NAME: Joseph T. E. Roland

eRA COMMONS USER NAME (credential, e.g., agency login): ROLANDJ1

POSITION TITLE: Research Assistant Professor

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 (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of Illinois at Urbana-Champaign	BS	01/1998	Cell and Structural Biology/Chemistry
University of Illinois at Urbana-Champaign	Ph.D.	05/2004	Cell and Structural Biology
Vanderbilt University Medical Center (Post Doctorate)		12/2008	Surgical Research

A. Personal Statement

Dr. Roland is an expert in cell and molecular biology. His research has helped him develop a deep, practical understanding of microscopic techniques. He is currently the managing director of the Digital Histology Shared Resource (DHSR) at Vanderbilt University Medical Center (VUMC). He has over 10 years of experience managing light microscopes and has been the Managing Director of the DHSR at VUMC since its launch in January of 2009. While he is well versed in many forms of microscopy, he has become a specialist in the field of whole-slide imaging and quantification. He is regularly contacted by external institutions for advice and guidance on the use of automated microscopes and has been involved in development and beta-testing of commercial scanning and analysis systems. Since 2012, he has been part of a group of researchers at VUMC working with engineers and computer scientists at General Electric's (GE) Global Research Center to develop and validate a novel automated multiplexed imaging platform designed to identify large numbers of biomarkers in-situ.

B. Positions and Honors

1996 – 1997	Undergraduate Student, Department of Cell and Structural Biology, University of Illinois at Urbana-Champaign <u>Research:</u> The identification of novel microtubule motors, their function and regulation.
1997 – 2004	Graduate Student, Department of Cell and Structural Biology, University of Illinois at Urbana-Champaign <u>Research:</u> Identification of putative receptors for cytoskeletal motors. Molecular regulation of cytoskeletal motors. Role of myosin motors in organelle transport
1999 – 2000	<u>Manager of Light and Confocal Microscopes:</u> Beckman Institute, University of Illinois at Urbana-Champaign. <u>Role:</u> Instructed users in the operation of equipment in a large, multi-user facility. Maintained and operated confocal and light microscopes for the Beckman Institute's Imaging Technology Group
2004 – 2008	Postdoctoral Researcher, Department of Surgery, Vanderbilt University Medical Center

Research: Mechanisms of cytoskeletal motor regulation governing organelle trafficking. Identification of protein members of large motor complexes. Determination of the biochemical interactions between motors and their binding partners

2005 NIH Research Fellowship Awarded: F32 DK072789-01 (Roland) 12/01/05-11/30/08; Myosin Vb involvement in plasma membrane recycling

2009 – Present Managing Director, Epithelial Biology Center Imaging Resource (Digital Histology Shared Resource), Vanderbilt University Medical Center. Role: Manage a multi-user facility of automated light microscopes, train and support users, and assist with experimental design, prepare budgets, and billing.

C. Contributions to Science

1. Identification of Rab8 and Rab10 as Myosin V-interacting proteins. Class V unconventional myosin motors are critical for proper plasma membrane trafficking and recycling. The original dogma concerning these motor proteins centered on each motor being regulated by a single Rab GTPase. Dr. Roland determined that both Myosin Va and Myosin Vb interact with multiple Rab GTPases, including Rab11a, Rab11b, Rab8a and Rab10, and that these interactions were dependent on alternative splicing within the cargo-binding domains of the Myosin motor. Further studies revealed that the Myosin Vb/ Rab11a and Myosin Vb/Rab8a complexes regulate the establishment of apical polarity in epithelial cells, as well as determined that a number of other proteins were able to interact with alternatively spliced Myosin Vb.
 - Roland JT, Kenworthy AK, Peranen J, Caplan S, & Goldenring JR. **Myosin Vb interacts with Rab8a on a tubular network containing EHD1 and EHD3.** Mol Biol Cell. Aug (2007). PMID: 17507647
 - Roland JT, Lapierre LA, & Goldenring JR. **Alternative splicing in class V myosins determines association with RAB10.** J Biol Chem. Jan (2009). PMID: 19008234
 - Roland JT, Bryant DM, Datta A, Itzen A, Mostov KE, Goldenring JR. **Rab GTPase-Myo5B complexes control membrane recycling and epithelial polarization.** PNAS. Jan 31 (2011). PMID: 21282656
2. Study of the role of Myosin Vb uncoupling from Rab8a and Rab11a in the initiation of microvillus inclusion disease. Due in part to Dr. Roland's finding that Rab8a interacts with a splice-variant of Myosin Vb, other researchers around the world were able to identify loss or loss-of-function mutations in Myosin Vb as the cause of a fatal childhood affliction, Microvillus Inclusion Disease (MVID). Following this, Dr. Roland has been involved in research centered on determining how, at the molecular level, loss of Myosin Vb function, which is normally involved in plasma membrane recycling, can lead to fatal diarrhea in newborns. This work has demonstrated the importance of proper Myosin Vb function and regulation the establishment of polarity in epithelial cells.
 - Knowles BC, Roland JT, Krishnan M, Tyska MJ, Lapierre LA, Dickman PS, Goldenring JR, Shub MD. **Myosin Vb uncoupling from RAB8A and RAB11A elicits microvillus inclusion disease.** J Clin Invest. Jul (2014) PMID: 24892806
 - Knowles BC, Weis VG, Yu S, Roland JT, Williams JA, Alvarado GS, Lapierre LA, Shub MD, Gao N, Goldenring JR. **Rab11a regulates syntaxin 3 localization and microvillus assembly in enterocytes.** J Cell Sci. Apr 15 (2015) PMID: 25673875
 - Weis VG, Knowles BC, Choi E, Goldstein AE, Williams JA, Manning EH, Roland JT, Lapierre LA, Goldenring JR. **Loss of MYO5B in mice recapitulates Microvillus Inclusion Disease and reveals an apical trafficking pathway distinct to neonatal duodenum.** Cell Mol Gastroenterol Hepatol. Feb 1 (2016) PMID: 27019864
3. Advancing imaging and analysis of cells and tissue samples. Dr. Roland has been actively involved with advancing whole-slide imaging and analysis for researchers both at VUMC and outside of the institution. He has worked with hardware and software engineers to push for better and more advanced systems. He has dedicated considerable time to image analysis and to improving analytical techniques of researchers in an effort to improve the data reliability.

- McKinley ET, Sui Y, Al-Kofahi Y, Millis BA, Tyska MJ, Roland JT, Santamaria-Pang A, Ohland CL, Jobin C, Franklin JL, Lau KS, Gerdes MJ, Coffey RJ. **Optimized multiplex immunofluorescence single-cell analysis reveals tuft cell heterogeneity.** *JCI Insight.* 2017 Jun 2;2(11). PMID: 28570279; PMCID: PMC5453701
- Harlow ML, Maloney N, Roland J, Guillen Navarro MJ, Easton MK, Kitchen-Goosen SM, Boguslawski EA, Madaj ZB, Johnson BK, Bowman MJ, D'Incalci M, Winn ME, Turner L, Hostetter G, Galmarini CM, Aviles PM, Grohar PJ. **Lurbinectedin Inactivates the Ewing Sarcoma Oncoprotein EWS-FLI1 by Redistributing It within the Nucleus.** *Cancer Res.* Oct 3 (2016) PMID: 27697767
- Goldstein J, Goyal R, Roland JT, Gellert LL, Clark PE, Hameed O, Giannico GA. **MAGI-2 Is a Sensitive and Specific Marker of Prostatic Adenocarcinoma: A Comparison With AMACR.** *Am J Clin Pathol.* Sep (2016). PMID: 27543977.
- Goldstein J, Borowsky AD, Goyal R, Roland JT, Arnold SA, Gellert LL, Clark PE, Hameed O, Giannico GA. **MAGI-2 in prostate cancer: an immunohistochemical study.** *Hum Pathol.* Jun (2016) PMID: 26980016
- Choi E, Roland JT, Barlow BJ, O'Neal R, Rich AE, Nam KT, Shi C, Goldenring JR. **Cell lineage distribution atlas of the human stomach reveals heterogeneous gland populations in the gastric antrum.** *Gut.* Jan 31. (2014). PMID: 24488499
- Wilson AJ, Liu AY, Roland JT, Adebayo OB, Fletcher SA, Slaughter JC, Saskowski J, Crispens MA, Jones HW 3rd, James S, Fadare O, Khabele D. **TR3 modulates platinum resistance in ovarian cancer.** *Cancer Res.* May 29 (2013). PMID: 23720056

Bibliography A complete list of my published work can be found here:

<https://www.ncbi.nlm.nih.gov/sites/myncbi/joseph.roland.1/bibliography/52415464/public/?sort=date&direction=descending>

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

Active Support

5R01 CA174377-02 (Coffey/GE) 09/26/12 - 08/31/17
NIH/NCI VUMC40639 \$495,000

Validation of a single cell multiplexed in-situ biomarker analysis platform for...

A multidisciplinary team from GE (engineers, computer scientists, biologists, and statisticians) will partner with cancer experts from Vanderbilt University to validate a novel automated platform that can probe and analyze more than 60 biomarkers in-situ in a single tissue section. Analysis will be conducted at the single cell level, enabling individual cells to be examined in their native tissue context. These studies will advance our understanding of how individual stem cells contribute to tumor formation and progression.

Completed Support

F32 DK072789-01 (Roland) 12/01/05-11/30/08

Myosin Vb involvement in plasma membrane recycling

Research Fellowship Award: The identification of proteins which interact with and regulate Myosin Vb in multi-member motor complexes.

Role: PI