

Curriculum vitae

Rachelle W. Johnson

Basic Life Science Research Associate
Stanford University
1250 CCSR South
Stanford, CA 94305
+1 (650) 725-6418
rwj@stanford.edu

A. Education and Training

INSTITUTION AND LOCATION	DEGREE earned (if applicable)	YEAR(s)	FIELD OF STUDY
Stanford University, Stanford, CA	Research Assoc	2015-present	Radiation Oncology and Cancer Biology
Stanford University, Stanford, CA	Post-doc	2014-2015	Radiation Oncology and Cancer Biology
St. Vincent's Institute, Melbourne, VIC	Post-doc	2011-2013	Bone Cell Biology and Disease
Vanderbilt University, Nashville, TN	PhD	2007-2011	Cancer Biology
University of Georgia, Athens, GA	BS	2003-2007	Biochemistry and Molecular Biology

B. Employment and Research Experience

- 2014-present Basic Life Science Research Associate (Advanced post-doc position; 8/3/2015-present)/Post-doctoral Scholar (1/1/2014-8/2/2015), Radiation Oncology and Cancer Biology, Stanford University Medical Center, Stanford, CA
Mentor: Amato Giaccia
Project Title: *Characterization of breast cancer dormancy in bone*
Project Summary: The primary project is to characterize dormant breast cancer cells residing in the bone by using RNA sequencing to compare gene expression profiles of breast cancer cells that reside as dormant or proliferative cells in the bone depending on their leukemia inhibitor factor (LIF) signaling status. This work also examines the role of hypoxic signaling and LIF signaling in the primary tumor and bone metastatic site in promoting breast cancer bone metastasis and the role of LIF as a dormancy-promoting factor produced by bone cells.
- 2011-2013 Post-doctoral Research Officer, Bone Cell Biology and Disease Unit, St. Vincent's Institute of Medical Research, Melbourne, VIC, Australia
Mentors: Natalie A. Sims and T. John Martin
Project Title: *The role of Interleukin-6 family cytokines in bone formation and resorption*
Project Summary: The primary project was to characterize the skeletal phenotype of glycoprotein130 conditional knockout mice in the osteoclast, osteoblast and osteocyte lineages (specialized techniques acquired: bone histomorphometry and microCT applicable to physiological and bone metastasis models). This work also examined the role of suppressor of cytokines 3 (SOCS3) signaling in bone formation (specialized techniques acquired: primary mouse osteoblast collection, culture, differentiation, and mineralization *in vitro*). Collectively these projects allowed me to gain considerable experience in many aspects of bone cell biology applicable to cancer cell growth in bone.
- 2007-2011 Graduate Student, Department of Cancer Biology and Vanderbilt Center for Bone Biology, Vanderbilt University, Nashville, TN, USA
Mentors: Gregory R. Mundy, Lynn M. Matrisian, Julie A. Sterling
Dissertation Title: *Molecular mechanisms of Gli2 regulation in osteolytic bone disease*
Project Summary: The goal of this project was to understand the autocrine and paracrine signaling pathways that regulate Gli2 and PTHrP in bone metastatic breast cancer cells, with an emphasis on TGF- β and Wnt signaling pathways. This work also examined the role of stromal cells as a paracrine source of Wnts that promote breast cancer growth in bone.

2005-2007 Web Administrator, Discover Life (<http://www.discoverlife.org>), University of Georgia, Athens, GA, USA
Mentor: John Pickering

2005-2007 Undergraduate Student Researcher, Department of Biochemistry and Molecular Biology, Complex Carbohydrate Research Center, University of Georgia, Athens, GA, USA
Mentors: Michael Pierce and Karen Abbott

C. Teaching Experience and Mentoring

2013 Co-supervisor, Aurelius Sladen, Honors student (H1 graduate), La Trobe University
2012 Co-supervisor, Kwan Shuen Chan, Undergraduate student, University of Melbourne, Subject: Advanced Investigation of Disease (Pathology 30004)
2012 Mentor, Bachelor of Biomedicine Mentor Program, University of Melbourne

D. Honors and Awards

2015 ANZBMS Kaye Ibbertson Award for Bone and Mineral Medicine
2015 NIH Pathway to Independence Award
2015 ASBMR Young Investigator Travel Grant
2015 Stanford Cancer Institute Fellowship Award
2015 John Haddad Young Investigator Award, AIMM-ASBMR
2013 Best Moderated Oral Poster Presentation, St. Vincent's Research Week
2013 ASBMR Young Investigator Travel Grant
2012 ASBMR Young Investigator Award
2012 ASBMR Young Investigator Travel Grant
2012 Junior Investigator Award, St. Vincent's Research Week
2012 Outstanding Abstract Award, ANZBMS 22nd Annual Scientific Meeting
2012 Travel Award, ANZBMS 22nd Annual Scientific Meeting
2011-2012 Sir Keith Murdoch Fellowship Award, The American Australian Association
2011 Travel Award, 11th International Conference on Cancer-Induced Bone Disease
2010 New Investigator Award, Cancer and Bone Society
2010 Travel Award, 10th International Conference on Cancer-Induced Bone Disease
2009-2010 President, Cancer Biology Student Association, Vanderbilt University
2007 Cum Laude, University of Georgia
2007 CURO Scholar Distinction, University of Georgia
2003-2007 Honors Program, University of Georgia
2003-2007 Hope Scholarship, University of Georgia

E. Other professional activities

Ad Hoc Reviewer

2014-present Bone
2013-present Clinical and Experimental Metastasis
2013-present Osteoporosis International
2013-present Calcified Tissue International

Professional Memberships

2013-present International Bone and Mineral Society (IBMS)
2012-present Australian and New Zealand Bone and Mineral Society (ANZBMS)
2008-present American Society for Bone and Mineral Research (ASBMR)
2008-2011 Cancer and Bone Society (CABS; merged with IBMS)

Committees

2015-present IBMS Young Investigators Committee

F. Independent funding

Current

9/1/2015-8/31/2017 K99 CA194198 (Johnson) \$114,447
NIH/NCI (K99+R00 period 9/1/2015-8/31/2020)
Characterization of breast cancer dormancy in bone
The major goals of this project are to characterize the molecular differences between dormant, transitioning, and proliferative tumor cells disseminated to the bone marrow, and to determine the role of hypoxia and leukemia inhibitory factor signaling in promoting breast cancer metastasis to and colonization of bone.
Role: PI

Completed

7/1/2015-9/1/2015 Stanford Cancer Institute Fellowship Award
Stanford Cancer Institute Salary + fringe benefits
12 month award, deferred after 9/1/2015 due to K99 award
Project: Understanding the role of LIF signaling in breast cancer dormancy in bone and characterization of the pathways regulating tumor cells disseminated to the bone marrow
Role: Fellow

1/1/2012-12/31/2012 Sir Keith Murdoch Fellowship
American Australian Association \$30,000
Project: Identifying the signaling pathways that drive bone cell function and how these pathways can be targeted to restore bone quality in degenerative bone diseases such as osteoporosis and osteoarthritis.
Role: Fellow

G. Publications

Peer-Reviewed Articles (15)

1. **Rachelle W. Johnson**, Narelle E. McGregor, Holly J. Brennan, Ingrid J. Poulton, T. John Martin, Natalie A. Sims. Glycoprotein130 (Gp130) / Interleukin-6 (IL-6) signalling in osteoclasts promotes bone formation in periosteal and trabecular bone. *Bone*. 2015 Aug 7;81:343-351.
2. **Rachelle W. Johnson**, Ernestina Schipani, Amato J. Giaccia. HIF targets in bone remodeling and metastatic disease. *Pharmacology & Therapeutics*. 2015 Jun;150:169-177.
3. **Rachelle W. Johnson** and Natalie A. Sims. Embedded in bone, but looking beyond: osteocalcin, epigenetics and ectopic bone formation (ASBMR 2014). *IBMS BoneKEy*. 2014 11:613.
4. **Rachelle W. Johnson**, Alyssa R. Merkel, Jonathan M. Page, Nazanin S. Ruppender, Scott A. Guelcher, Julie A. Sterling. Wnt signaling induces gene expression of factors associated with bone destruction in lung and breast cancer. *Clinical & Experimental Metastasis*. 2014 Dec;31(8):945-59.
5. Therese Standal, **Rachelle W. Johnson**, Narelle E. McGregor, Ingrid J. Poulton, Patricia W. M. Ho, T. John Martin, Natalie A. Sims. gp130 in late osteoblasts and osteocytes is required for PTH-induced osteoblast differentiation. *J Endocrinol*. 2014 Nov;223(2):181-90.
6. **Rachelle W. Johnson**, Jason D. White, Emma C. Walker, T. John Martin, Natalie A Sims. Myokines (muscle-derived cytokines and chemokines) including ciliary neurotrophic factor (CNTF) inhibit osteoblast differentiation. *Bone*. 2014 Jul;64:47-56.

7. Erin H. Seeley, Kevin J. Wilson, Thomas E. Yankeelov, **Rachelle W. Johnson**, John Gore, Richard M. Caprioli, Lynn M. Matrisian, Julie A. Sterling. Co-registration of multi-modality imaging allows for comprehensive analysis of tumor-induced bone disease. *Bone*. 2014 Apr;61:208-16.
8. **Rachelle W. Johnson**, Holly J. Brennan, Christina Vrahnas, Ingrid J. Poulton, Narelle E. McGregor, Therese Standal, Emma C. Walker, Thuan-Tzen Koh, Huynh Nguyen, Nicole C. Walsh, Mark R. Forwood, T. John Martin, Natalie A. Sims. The primary function of gp130 signaling in osteoblasts is to maintain bone formation and strength, rather than promote osteoclast formation. *J Bone Miner Res*. 2014 Jun;29(6):1492-505.
9. Sabrina Danilin, Alyssa Merkel, Joshua Johnson, **Rachelle Johnson**, James Edwards, Julie Sterling. Myeloid-Derived Suppressor Cells expand during breast cancer progression and promote tumor-induced bone destruction. *Oncoimmunology*. 2012 Dec 1;1(9):1484-1494.
10. Natalie A. Sims and **Rachelle W. Johnson**. Leukemia inhibitory factor: A paracrine mediator of bone metabolism. *Growth Factors*. 2012 Apr;30(2):76-87.
11. Swati Biswas, Jeffrey S. Nyman, JoAnn Alvarez, Anwesa Chakrabarti, Austin Ayers, Julie Sterling, James Edwards, Tapasi Rana, **Rachelle Johnson**, Daniel S. Perrien, Scott Lonning, Yu Shyr, Lynn M. Matrisian, Gregory R. Mundy. Anti-transforming growth factor β antibody treatment rescues bone loss and prevents breast cancer metastasis to bone. *PLoS One*. 2011;6(11):e27090.
12. **Rachelle W. Johnson**, Alyssa R. Merkel, Sabrina Danilin, Mai P. Nguyen, Gregory R. Mundy, Julie A. Sterling. 6-Thioguanine Inhibition of Parathyroid Hormone-related Protein Expression Is Mediated by GLI2. *Anticancer Res*. 2011 Sep;31(9):2705-12.
13. **Rachelle W. Johnson**, Mai P. Nguyen, Susan S. Padalecki, Barry G. Grubbs, Alyssa R. Merkel, Babatunde O. Oyajobi, Lynn M. Matrisian, Gregory R. Mundy, Julie A. Sterling. TGF-beta promotion of Gli2-induced expression of parathyroid hormone-related protein, an important osteolytic factor in bone metastasis, is independent of canonical Hedgehog signaling. *Cancer Res*. 2011 Feb 1;71(3):822-31.
14. Lindsay C. Johnson*, **Rachelle W. Johnson***, Steve A. Munoz, Gregory R. Mundy, Todd E. Peterson, Julie A. Sterling. Longitudinal live animal microCT allows for quantitative analysis of tumor-induced bone destruction. *Bone*. 2011 Jan 1;48(1):141-51. ***These authors contributed equally**. Cover article.
15. Abbott KL, Aoki K, Lim JM, Porterfield M, **Johnson R**, O'Regan RM, Wells L, Tiemeyer M, Pierce M. Targeted glycoproteomic identification of biomarkers for human breast carcinoma. *Proteome Res*. 2008 Apr;7(4):1470-80.

Book Chapters (2)

Rachelle W. Johnson and Julie A. Sterling. Metastatic Tumors to Bone in C.J Rosen (ed): Primer on the Metabolic Diseases and Disorders of Mineral Metabolism (8th Edition). Chapter 83. John Wiley and Sons, Inc. 2013. **Peer-reviewed**.

Julie A. Sterling and **Rachelle W. Johnson**. Emerging imaging techniques for the detection and examination of breast cancer metastasis to bone. *Horizons in Cancer Research*. Volume 46. 2011 (*in press*). Nova Science Publishers, Inc.

H. Invited presentations

Oral Presentations (15)

1. **Rachelle W. Johnson**, Alyssa R. Merkel, Julie A. Sterling, Joshua R. Johnson, Joy Y. Wu, Amato J. Giaccia. Leukemia Inhibitory Factor Receptor (LIFR) Signaling Regulates Breast Cancer Cell Dormancy and Bone Colonization. American Society for Bone and Mineral Research Annual Meeting. October 2015. *Selected oral presentation*.

2. **Rachelle W. Johnson**, Marta Vilalta-Colomer, Mihalis Kariolis, Amato J. Giaccia. The role of LIFR:STAT3 signaling in tumor dormancy and colonization of bone. *Advances in Mineral Metabolism/American Society for Bone and Mineral Research John Haddad Young Investigators Meeting*. April 2015. *Selected oral presentation*. ***John Haddad Young Investigator Award**.
3. **Rachelle W. Johnson**, Holly J. Brennan, Emma C. Walker, Joshua R. Johnson, Yifang Hu, Gordon K. Smyth, Nicos Nicola, T. John Martin, Natalie A. Sims. Socs3 is a target of oncostatin M in osteocytes that is required for normal bone formation. *Frontiers in Skeletal Biology Conference (Garvan Institute, Sydney)*. November 2013. *Selected oral presentation*.
4. **Rachelle W. Johnson**, Christina Vrahnas, Huynh Nguyen, Holly J. Brennan, Therese Standal, Nicole C. Walsh, Mark R. Forwood, T. John Martin, Natalie A. Sims. Interleukin-6 family cytokines maintain bone material strength through osteocyte gp130 signalling. *Australian and New Zealand Bone and Mineral Society Annual Meeting*. September 2013. *Selected oral presentation*.
5. **Rachelle W. Johnson**, Jason D. White, Emma C. Walker, T. John Martin, Natalie A. Sims. Muscle-derived Cytokines and Chemokines Inhibit Osteoblast Function. August 2013. *Selected oral poster presentation*. ***Best Moderated Oral Poster Presentation**.
6. **Rachelle W. Johnson**. The physiological role of IL-6 family cytokines/gp130 signalling in bone formation and osteoclastogenesis. The Garvan Institute, Sydney, Australia. July 2013. **Invited oral presentation**.
7. **Rachelle W. Johnson**, Holly J. Brennan, Ingrid J. Poulton, Marelle E. McGregor, Thuan-Tzen Koh, Muhammad Z. Zainuddin, Emma C. Walker, T. John Martin, Natalie A. Sims. Conditional deletion of gp130 in osteoblasts and osteocytes has divergent effects on trabecular and cortical bone. *American Society for Bone and Mineral Research Annual Meeting*. October 2012. *Selected oral presentation*. ***Young Investigator award**.
8. **Rachelle W. Johnson**, Holly J. Brennan, Ingrid J. Poulton, Narelle E. McGregor, Thuan-Tzen Koh, Mohammed Z. Zainuddin, Emma C. Walker, T. John Martin, Natalie A. Sims. Osteoblastic lineage deletion of gp130 has divergent effects on trabecular and cortical bone. *Australian and New Zealand Bone and Mineral Society Annual Meeting*. September 2012. *Selected oral presentation*. ***Outstanding Abstract award**.
9. **Rachelle W. Johnson**, Holly J. Brennan, Ingrid J. Poulton, Narelle E. McGregor, Thuan-Tzen Koh, Mohammed Z. Zainuddin, Emma C. Walker, T. John Martin, Natalie A. Sims. Conditional deletion of glycoprotein130 in osteoblasts and osteocytes has divergent effects on trabecular and cortical bone. *St. Vincent's Research Week*. August 2012. *Selected oral presentation*. ***Junior Investigator award**.
10. **Rachelle W. Johnson**, Holly J. Brennan, Ingrid J. Poulton, Narelle E. McGregor, Thuan-Tzen Koh, Mohammed Z. Zainuddin, Emma C. Walker, T. John Martin, Natalie A. Sims. Osteoblastic lineage deletion of gp130 has divergent effects on trabecular and cortical bone. *Australian Rheumatology Association Victoria, Annual Scientific Meeting*. August 2012. *Selected oral presentation*.
11. **Rachelle W. Johnson**, Alyssa R. Merkel, Nazanin S. Ruppender, Scott A. Guelcher, Lynn M. Matrisian, Gregory R. Mundy, Julie A. Sterling. Bone stiffness drives Wnt signaling regulation of Gli2 in osteolytic breast cancer cells. *11th International Conference on Cancer-Induced Bone Disease*. November 2011. *Selected oral presentation*.
12. **Rachelle W. Johnson**, Alyssa R. Merkel, Nazanin S. Ruppender, Scott A. Guelcher, Lynn M. Matrisian, Gregory R. Mundy, Julie A. Sterling. Bone stiffness drives Wnt signaling regulation of Gli2 in osteolytic breast cancer cells. *Inaugural Oz Metastasis Research Society Metastasis Symposium*. October 2011. *Selected oral presentation*.
13. **Rachelle W. Johnson**, Mai P. Nguyen, Susan Padalecki, Barry Grubbs, Alyssa R. Merkel, Babatunde Oyajobi, Gregory R. Mundy, Julie A. Sterling. TGF- β promotion of Gli2 induced PTHrP expression is independent of canonical Hedgehog signaling. *10th Annual Host-Tumor Interactions Program and Cancer Biology Joint Retreat*. November 2010. *Selected oral presentation*.
14. **Rachelle W. Johnson**, Mai P. Nguyen, Susan Padalecki, Barry Grubbs, Alyssa R. Merkel, Babatunde Oyajobi, Gregory R. Mundy, Julie A. Sterling. TGF- β promotion of Gli2 induced PTHrP expression is independent of canonical Hedgehog signaling. *10th International Conference on Cancer-Induced Bone Disease*. September 2010. *Selected oral presentation*. ***New Investigator award**.
15. **Rachelle W. Johnson**, Aubie K. Shaw, Omar E. Franco, Bojana Jovanovic, Alyssa R. Merkel, Gregory R. Mundy, Julie A. Sterling. A Novel Role for Fibroblasts: Mediators of Parathyroid Hormone-related Protein in Breast Cancer-induced Bone Destruction. *9th Annual Host-Tumor Interactions Program and Cancer Biology Joint Retreat*. November 2009. *Selected oral presentation*.

Poster Presentations (11)

1. **Rachelle W. Johnson**, Narelle E. McGregor, Holly J. Brennan, Ingrid J. Poulton, T. John Martin, Natalie A. Sims. Deletion of the glycoprotein130 co-receptor in osteoclasts reduces cortical bone formation. American Society for Bone and Mineral Research Annual Meeting. October 2013. **Plenary poster presentation.**
2. **Rachelle W. Johnson**, Jason D. White, Emma C. Walker, T. John Martin, Natalie A. Sims. Muscle-derived cytokines and chemokines inhibit osteoblast function. American Society for Bone and Mineral Research Annual Meeting. October 2013. *Selected poster presentation.*
3. **Rachelle W. Johnson**, Narelle E. McGregor, Holly J. Brennan, Ingrid J. Poulton, T. John Martin, Natalie A. Sims. Osteoclast gp130 signalling stimulates periosteal bone formation. Australian and New Zealand Bone and Mineral Society Annual Meeting. September 2013. *Selected poster presentation.*
4. **Rachelle W. Johnson**, Lindsay C. Johnson, Don Nolting, Steve A. Munoz, Gregory R. Mundy, H. Charles Manning, Todd E. Peterson, Julie A. Sterling. Combined *in vivo* microCT and Near-Infrared imaging allows for quantitative analyses of the tumor microenvironment. 32nd annual meeting of American Society for Bone and Mineral Research. October 2010. *Selected poster presentation.*
5. **Rachelle W. Johnson**, Mai P. Nguyen, Susan Padalecki, Barry Grubbs, Alyssa R. Merkel, Babatunde Oyajobi, Gregory R. Mundy, Julie A. Sterling. Targeted inhibition of Gli2 blocks cancer bone disease *in vivo*. 32nd annual meeting of American Society for Bone and Mineral Research. October 2010. *Selected poster presentation.*
6. **Rachelle W. Johnson**, Aubie K. Shaw, Omar E. Franco, Bojana Jovanovic, Alyssa R. Merkel, Gregory R. Mundy, Julie A. Sterling. A Novel Role for Fibroblasts: Mediators of Parathyroid Hormone-related Protein Expression in Osteolytic Breast Cancer. Tumor Microenvironment Network Steering Committee Meeting. January 2010. *Selected poster presentation.*
7. **Rachelle W. Johnson**, Aubie K. Shaw, Omar E. Franco, Bojana Jovanovic, Alyssa R. Merkel, Gregory R. Mundy, Julie A. Sterling. A Novel Role for Fibroblasts: Mediators of Parathyroid Hormone-related Protein Expression in Osteolytic Breast Cancer. IX International Meeting on Cancer Induced Bone Disease. October 2009. *Selected poster presentation.*
8. **Rachelle W. Johnson**, Aubie K. Shaw, Omar E. Franco, Bojana Jovanovic, Alyssa R. Merkel, Gregory R. Mundy, Julie A. Sterling. Fibroblasts Induce PTHrP Expression in Metastatic Breast Cancer. 31st annual meeting of American Society for Bone and Mineral Research. September 2009. *Selected poster presentation.*
9. **Rachelle W. Johnson**, Aubie K. Shaw, Omar E. Franco, Bojana Jovanovic, Alyssa R. Merkel, Gregory R. Mundy, Julie A. Sterling. A Novel Role for Fibroblasts: Mediators of Parathyroid Hormone-related Protein Expression in Osteolytic Breast Cancer. Tumor Microenvironment Network Steering Committee Meeting. June 2009. *Selected poster presentation.*
10. Julie A. Sterling, **Rachelle Johnson**, Xiaohong Li, Alayna J. Roberts, Neil Bhowmick, Gregory R. Mundy. Wnt Signaling Regulates Gli2 Expression in Human Breast Cancer Cells that cause Osteolysis. 30th annual meeting of American Society for Bone and Mineral Research. September 2008. *Selected poster presentation.*
11. **Rachelle W. Johnson**, Julie A. Sterling, Xiaohong Li, Alayna Roberts, Neil Bhowmick, Gregory R. Mundy. Wnt Signaling Regulates Gli2 and PTHrP Expression in Human Breast Cancer Cells that cause Osteolysis. VII International Meeting on Cancer Induced Bone Disease. June 2008. *Selected poster presentation.*

I. Personal Information

Citizenship: United States of America