

RACHANA VAIDYA

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Professional Summary

- Bioengineer with 4+ years' experience in cell and molecular biology and biomechanics
- Strong communication skills (written and oral), resulting in 2 publications in peer-reviewed journals, 2 book chapters, 5 conference papers, and 4 awards.
- Experienced in developing and optimizing in-vitro assays and cell culture methods using a broad range of approaches to elucidate the role of molecular pathways contributing to diabetes-associated bone loss.
- Demonstrated abilities to collaborate and take leadership within and outside academic setting through teamwork, project management, and volunteer activities.

Education

Ph.D. in Biomedical Engineering and Biotechnology (in progress) **2021**
University of Massachusetts Dartmouth, Dartmouth, MA, USA

MS in Biotechnology **2014**
St. Xavier's College, Mumbai, India

Research Experience

Graduate Research Assistant **2017-2021**
University of Massachusetts Dartmouth, Dartmouth, MA, USA

Project Management and Leadership

- Spearheaded and multi-tasked on several molecular biology and biomechanics projects.
- Utilized project management software such as Trello and Microsoft project to plan and organize multiple projects effectively.
- Managed, organized, and maintained a BSL2 laboratory, including chemical and supply inventory, equipment troubleshooting, implementing SOPs, and budgeting for different projects.
- Analyzed research data using different statistical analysis and visualization software such as SPSS and SigmaPlot, and Tableau.
- Effectively communicated and presented data and concepts verbally and orally at internal meetings, symposiums, and external conferences.
- Mentored and assisted undergraduate and graduate students as well as senior capstone design teams.

Molecular Biology and Cell culture

- Elucidated the molecular mechanisms underlying bone quality changes under the influence of chronic hyperglycemia, inflammation, and protein glycation using qPCR and immunoassays.

- Identified markers associated with bone remodeling, inflammation, and glycation pathways in bone using murine cell line OCY454.
- Collaborated with other teams and professors within and outside the university to acquire cell lines and train on various instruments and processes.
- Trained and mentored undergraduates and graduates in cell culture, qPCR, and biochemical assays.
- Published a book chapter on the effect of diabetes on bone cell behavior in Elsevier

Biomechanics

- Conducted in vitro incubation studies on human bone samples and performed various assessments, including biomechanical tests, immunoassays, scanning electron microscopy and microCT imaging, immunohistochemistry, and HPLC.
- Experienced in handling and processing human and mouse bone samples, including cutting, sectioning, staining, imaging, and performing mechanical tests and biochemical assays.
- Developed and optimized HPLC and biochemical assays for the identification of glycation markers in bone tissue.
- Investigated the role of non-enzymatic glycation markers on mechanical properties of cortical and trabecular bone.
- Trained and mentored undergraduates and graduates in bone tissue handling and processing, HPLC, SEM, and immunohistochemistry.
- Published a review article, primary article (co-author) in peer-reviewed journals, and a book chapter in Elsevier.

Research Student

2013 – 2014

Indian Institute of Technology (IITB), Mumbai, India

Genomics and Bioinformatics

- Conducted Genome-wide analysis to identify translatable uORFs based on conservation within species and presence of signal peptides using Signal P4.1, PATS, PlasmoAP, PlasMIT, cNLS Mapper, and NMT scores.
- Investigated the role of predicted translatable uORF in localization of differentially spliced proteins using cell culture, RT-PCR, gel electrophoresis, TA vector cloning, primer design and sequencing, GFP screening, and fluorescence microscopy.

Research Student

2012 – 2013

St. Xavier's College, Mumbai, India

Biopolymers

- Isolated and identified highest polyhydroxybutyrate (PHB) producer microorganism from soil using bacterial culture, staining, and identification techniques.
- Optimized strength and yield of PHB using co-culture, media formulation, and copolymerization methods.
- Assessed elasticity and usability of the PHB as a biodegradable polymer using different chemical and mechanical tests.
- Copolymerized with other polymers such as hydroxyvaleric acid to increase the elasticity of PHB and increase its yield and usability as a biodegradable polymer

Teaching and Mentorship Experience

2017-Present

Mentored 6 undergraduate students, 6 graduate students, and 3 senior capstone teams in a research laboratory setting, University of Massachusetts Dartmouth,

Work Experience

Document Specialist

2015 – 2017

Tata Consultancy Services (TCS), Mumbai, India

Teamwork and Time Management

- Worked in a fast-paced environment, effectively handled multiple detail-oriented tasks, established priorities, and met tight deadlines.
- Contributed to quality of Trial Master Files (TMF) by performing routine quality checks and reviewing metadata contents for TMF documents.
- Acquired knowledge of FDA, MHRA, and other regulations relevant to clinical study document creation, processing, management, and archival.

Technical skills

- *Mammalian Cell Culture*
- *3D cell culture*
- *Real-Time qPCR (RT-qPCR)*
- *Gene expression and cloning*
- *Immunoassays*
- *High-Pressure Liquid Chromatography (HPLC)*
- *Cyclic reference point indentation (cRPI)*
- *microCT*
- *Biomechanical testing (bending tests)*
- *Fluorescent Microscopy*
- *Confocal Microscopy*
- *Scanning electron microscopy (SEM)*
- *Statistical Analysis*
- *Grant and Manuscript Writing*
- *Science Illustrations*
- *Public Speaking and Science communication*
- *Mentoring*
- *Project management*
- *Independent and teamwork*
- *Multi-tasking*
- *Time Management*

Publications

Peer-reviewed journal articles

1. Merlo K, Aaronson J, **Vaidya R**, Rezaee T, Chalivendra V, Karim L (2020). In Vitro-Induced High Sugar Environments Deteriorate Human Cortical Bone Elastic Modulus and Fracture Toughness. *J Orthop Res.* 2020 May;38(5):972-983. PMID: 31793028; PMCID: PMC7162721.
2. Karim L, Rezaee T, **Vaidya R**. (2019) The Effect of Type 2 Diabetes on Bone Biomechanics. *Current Osteoporosis Rep*, 17(5):291-300, 2019. PMID 31392668. PMCID: PMC6819250.

Book chapters

1. **Vaidya R**, Church A, Karim L. Effect of Type 2 Diabetes on Bone Cell Behavior. Gefen A (Ed.) The Science, Etiology and Mechanobiology of Diabetes and its Complications, ISBN 978-0-12-821070-3, London: Academic Press (Elsevier) 2021.
2. Karim L, Hussein A, **Vaidya R**, Morgan E, Bouxsein M. (2020) Mechanical Behavior of bone, in Dempster D, Cauley J, Bouxsein M, Cosman F (Ed) Marcus And Feldman' Osteoporosis (5th Edition, Vol 1, 283-307), Elsevier.

Peer-reviewed conference proceedings

1. **Vaidya R**, Karim L, "N ϵ -carboxymethyl-Lysine (CML) Alters Gene Expression of Bone Remodelling, Glycation, and Inflammation Markers in OCY454-12H Osteocytes", Transactions of the 68th Annual Meeting of the Orthopaedic Research Society, 2022.
2. **Vaidya R**, Karim L, "TNF- α in Presence of High Glucose Affects Bone Remodeling Markers in Ocy454 Cells", Transactions of the 67th Annual Meeting of the Orthopaedic Research Society (Virtual), 2021.
3. **Vaidya R**, Aaronson J, Pajevic PD, Karim L, "Hyperglycemia and collagen Glycation Alters Expression of Sclerostin and RANKL in Ocy454 Osteocytes", Abstracts of the 42nd Annual Meeting for the American Society for Bone and Mineral Research, Seattle, WA (Virtual), 2020.
4. Rezaee T, **Vaidya R**, Aaronson J, Karim L, "Effects of In Vitro Vitamin B Treatment on Advanced Glycation End-Products and Human Cortical Bone Mechanical Properties", Abstracts of the 42nd Annual Meeting for the American Society for Bone and Mineral Research, Seattle, WA (Virtual), 2020.
5. Rezaee T, **Vaidya R**, Aaronson J, Riordan J, Karim L. "Effects of In Vitro Vitamin B Treatment on Human Bone Mechanical Properties," Transactions of the 66th Annual Meeting of the Orthopaedic Research Society, Phoenix, AZ, 2020.
6. **Vaidya R**, Aaronson A, Bouxsein ML, Pajevic PD, Karim L, "Hyperglycemia Alters Expression of Sclerostin but not RANKL in Ocy454 Osteocytes", Abstracts of the 41st Annual Meeting for the American Society for Bone and Mineral Research, Orlando, FL, 2019.

Other conference abstracts

1. Rezaee T, **Vaidya R**, Aaronson J, Chalivendra V, Karim L, "Effect of Vitamin B on Human Cortical Bone Mechanical Properties," Virtual Northeastern Regional Student Conference of the Society for Experimental Mechanics, 2020.
2. Aaronson J, **Vaidya R**, Karim L, "Effect of Hyperglycemia on Sclerostin Expression in Osteocyte-like Ocy454 Cells", 25th Annual Research Exhibit of Sigma Xi, University of Massachusetts Dartmouth chapter, Dartmouth, MA, 2019. Received 1st place in the graduate student category for best presentation.

Manuscripts in preparation

1. **Vaidya R**, Edwards T, Karim L. Accumulation of Carboxymethyl lysine in Cortical and Trabecular Bone, to be submitted to Bone
2. Duclos O, **Vaidya R**, Karim L. Review on Dietary AGEs and their role in Diabetes and Bone health, to be submitted to Journal of Bone and Mineral Research
3. **Vaidya R**, Conlon LM, Karim L. Effect of Hyperglycemia versus Carboxymethyl lysine on Bone Remodeling, Glycation, and Inflammation Markers in OCY454 Osteocytes, to be submitted to Journal of Orthopaedic Research
4. **Vaidya R**, Karim L. Effect of Metformin on OCY454 Osteocytes Exposed to Hyperglycemia and Carboxymethyl lysine, to be submitted to Journal of Bone and Mineral Research

Honors and Awards

- ASBMR Young Investigator Travel Grant, ASBMR, 2021
- Four graduate travel awards from University of Massachusetts Dartmouth Graduate Student Senate, Department of Bioengineering, and Office of the Provost, 2021
- Student Trainee Award from Orthopedic Research Society, 2021
- Gibco Cell Culture Hero Award, 2020
- Finalist, Biorender graphical abstract contest (science illustration), 2020
- 1st place poster presentation, Graduate Division, Sigma Xi Annual Research Symposium, 2019
- 2nd place, Graduate Division, 3 Minute Thesis competition (oral presentation), 2019

Invited Talks

- “Investigating Altered Osteocyte Function in Diabetes,” American Society for Bone and Mineral Research Spotlight Series, 2020
- “Effect of Diabetes on Osteocyte Bone Cell Behavior in Context of Bone Fragility,” Biomedical Engineering and Biotechnology seminar series, University of Massachusetts Dartmouth, 2019