Jessica Castrillon Lal

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Education

2018-2023 Doctor of Philosophy Candidate, Molecular Medicine, Case Western Reserve University, Cleveland, OH
2015-2017 Master of Science, Biomedical Science, Tufts University School of Medicine, Boston, MA
2008-2012 Bachelor of Arts, Biology, Medical Humanities, Chemistry (minor), Baylor University, Waco, TX

Research Experience

2023-Present MD Anderson Cancer Center, Gastrointestinal Medical Oncology
TRIUMPH Postdoctoral Fellow
Exploring the intersection of tumor evolutionary genomics and the tumor microenvironment influencing colorectal cancer outcomes

2020-2023 Lerner Research Institute, Genomic Medicine Institute, Cleveland, OH
Doctoral candidate, Cheng laboratory
Thesis: Network-based Multi-Omics Approaches for Precision Cardio-Oncology: Pathobiology, Drug Repurposing and Functional Testing

2019-2020 Lerner Research Institute, Translational Hematology & Oncology Research, Cleveland, OH
Pre-doctoral candidate, Abazeed laboratory
Research topic: Functional annotation of cancer somatic variants to guide radiotherapeutic decisions

2016-2018 Dana-Farber Cancer Institute, Medical Oncology, Boston, MA
Sr. Research Tech, Letai laboratory
Mentor: Jennifer L. Guerriero, PhD
Evaluate novel epigenetic and immunomodulatory treatment combinations to modulate macrophage activity in murine breast cancer models.

2013-2018 TEEEN® Program, Brighton, MA
Director of Parental Curriculum, Research Associate
Managed two longitudinal clinical trials to assess efficacy of TEEEN ® program, the use of 'Motivational Interviewing', and parental involvement to influence changes in BMI and lifestyle changes by collecting qualitative data on 24-hour food log, activity log, exercise testing, and quantifying biometric data.

2015-2016 Broad Institute of Harvard and MIT, Stanley Center for Psychiatric Research, Cambridge, MA
Research Associate II, Translational Biochemistry Group
Identify proteins that are putative substrates for the E3 ligases in the ubiquitin proteasome pathway that are genetically associated with schizophrenia and autism.

2014-2015 Tufts University, Biomedical Engineering Department, Medford, MA
Graduate researcher, Black laboratory
Thesis: Characterizing implantation of c-kit+ cardiac progenitor cells within an *in vitro* infarct environment and assessment of ion channels to enhance differentiation of c-kit+ cardiac progenitor cells.

2010 Baylor University, Department of Biology, Waco, TX
Undergraduate Researcher, Waco Wetland Research Group
Research topic: Hypoxia in a freshwater ecosystem related to varying levels of nutrients

2009-2010 Baylor University, Waco, TX
Undergraduate Researcher, Baylor Mind Body Medicine laboratory
Screened potential candidates for clinical study that assessed the efficacy of using physician-guided and self-guided meditation as an intervention for hot flash symptoms in post-menopausal women and conducted follow-up interviews with participants.

Honors

2023	TRIUMPH Postdoctoral Fellowship (CPRIT Research Training Program)
2023	Doctoral Excellence Award in Molecular Medicine, Case Western Reserve University
2022	The Mary B. Stark Travel Award
2021-2023	Howard Hughes Medical Institute Gilliam Fellowship
2021	Predoctoral Semifinalist, Charles J. Epstein Trainee Awards for Excellence in Human Genetics Research
2018-2019	T32 training grant fellowship
2010-2012	Beta Beta Beta Biological Honors Society, Beta Tau Chapter
2010-2012	Baylor Student Foundation

Training

2022	Editorial Training Program, Communications Biology Journal
2020	Case Western Reserve University Graduate Student Leadership Coaching Program
2018	Writing in the Sciences, Stanford University, virtual

Professional Affiliations

2019-	American Society of Human Genetics
2017-2018	The American Association of Cancer Research
2016-2017	The Obesity Society

Community Outreach

2024	Cientifico Latino Graduate Student Mentorship Initiative, mentor
2022	The Research-Intensive Summer Experience (RISE) program, mentor
2021	Lerner Research Institute Student Showcase committee
2020-21	Lerner Research Institute Molecular Medicine Program interview committee

Administrative & Committee Activities

2023-Present	Colorectal Cancer Integromics Seminar Series, coordinator

Publications

1. **Lal JC**, Fang M, Hussain M, Abraham A, Hou Y, Kuji R, Collier P, Cheng F. Plasma multi-omics profiling of cardiotoxicity in pancancer patients. (*under consideration Cardio-Oncology*).
2. **Lal JC**[#], Huang Y[#], Yu X, Han Z, Gupta A, Hou Y, Xu J, Zhou Y, Hussain M, Smith JD, Chung MK, Collier P, Cheng F. Defects in the ranched chain amino acid pathway is associated with doxorubicin-induced cardiotoxicity and is rescued with metformin. *(in preparation*).
3. Brown SA, Sparapani R, Osinski K, Zhang J, Blessing J, Cheng F, Hamid A, Bagher M, Pour M, **Lal JC**, Kothari AN, Caraballo P, Noseworthy P, Johnson RH, Hansen K, Sun LY, Crotty B, Cheng YC, Echefu G, Doshi K, Olson J, for the Cardio-Oncology Artificial Intelligence Informatics & Precision (CAIP) Research Team Investigators. Team principles for successful interdisciplinary research teams. ***American Heart Journal Plus: Cardiology Research and Practice*** (in press).
4. Rennison JH, Ph.D, Lal JC, Zhou Y, Lovano BS, Castel L, Cantlay PJ, Das M, Laurita KR, Moudgil R, Prasad SVN, Schumacher SM, Smith JD, Cheng F, Barnard J, Chung MK, Van Wagoner DR. Ibrutinib Decreases Oxidative Phosphorylation and Metabolic Gene Expression in Atrial-like Engineered Heart Tissues. ***Journal of the American College of Cardiology: CardioOncology*** (in review).
5. **Lal JC**, Margai L, Zitkovsky H, Price LL, Gonzalez S. Improving health behaviors and weight parameters with motivational interviewing and the TEEEN® program in an ethnically and socioeconomic diverse pediatric population. ***American Journal of Medicine Open***, 100042 (2023). https://doi.org:https://doi.org/10.1016/j.ajmo.2023.100042.
6. **Lal, J.C.,** Cheng, F. (2023). Artificial Intelligence for Risk Assessment of Cancer Therapy-Related Cardiotoxicity and Precision Cardio-Oncology. In: Hong, H. (eds) Machine Learning and Deep Learning in Computational Toxicology. **Computational Methods in Engineering & the Sciences**. Springer, Cham. https://doi.org/10.1007/978-3-031-20730-3_24.

7. **Lal JC**. Deconvoluting cellular neighborhoods in pancreatic ductal adenocarcinoma. **Commun Biol**. 2022 Oct 17;5(1):1099. doi: 10.1038/s42003-022-04032-1. PMID: 36253462; PMCID: PMC9576745.
8. **Lal JC**[#], Mao C[#], Zhou Y, Gore-Panter SR, Rennison JH, Lovano BS, Castel L, Shin J, Gillinov AM, Smith JD, Barnard J, Van Wagoner DR, Luo Y, Cheng F, Chung MK. Transcriptomics-based network medicine approach identifies metformin as a repurposable drug for atrial fibrillation. **Cell Rep Med**. 2022 Oct 18;3(10):100749. doi: 10.1016/j.xcrm.2022.100749. Epub 2022 Oct 11. PMID: 36223777; PMCID: PMC9588904.
9. Gopal P, Yard BD, Petty A, **Lal JC**, Bera TK, Hoang TQ, Buhimschi AB, Abazeed ME. The mutational landscape of cancer's vulnerability to ionizing radiation. **Clin Cancer Res**. 2022 Oct 12:CCR-22-1914. doi: 10.1158/1078-0432.CCR-22-1914. Epub ahead of print. PMID: 36222846.
10. Brown SA, Sparapani R, Osinski K, Zhang J, Blessing J, Cheng F, Hamid A, Berman G, Lee K, BagheriMohamadiPour M, **Lal JC**, Kothari AN, Caraballo P, Noseworthy P, Johnson RH, Hansen K, Sun LY, Crotty B, Cheng YC, Olson J; Cardio-Oncology Artificial Intelligence Informatics & Precision (CAIP) Research Team Investigators. Establishing an interdisciplinary research team for cardio-oncology artificial intelligence informatics precision and health equity. Am Heart J Plus. 2022 Jan;13:100094. doi: 10.1016/j.ahjo.2022.100094. Epub 2022 Feb 5. PMID: 35434676; PMCID: PMC9012235.
11. **Lal JC**, Townsend MG, Mehta AK, Oliwa M, Miller E, Sotayo A, Cheney E, Mittendorf EA, Letai A, Guerriero JL. Comparing syngeneic and autochthonous models of breast cancer to identify tumor immune components that correlate with response to immunotherapy in breast cancer. ***Breast Cancer Res***. 2021 Aug 5;23(1):83. doi: 10.1186/s13058-021-01448-1. PMID: 34353349; PMCID: PMC8340363.
12. **Lal JC**, Brown SA, Collier P, Cheng F. A retrospective analysis of cardiovascular adverse events associated with immune checkpoint inhibitors. ***CardioOncology***. 2021 May 28;7(1):19. doi: 10.1186/s40959-021-00106-x. PMID: 34049595; PMCID: PMC8161966.
13. Cheng F, Zhao J, Wang Y, Lu W, Liu Z, Zhou Y, Martin WR, Wang R, Huang J, Hao T, Yue H, Ma J, Hou Y, **Castrillon JA**, Fang J, Lathia JD, Keri RA, Lightstone FC, Antman EM, Rabadan R, Hill DE, Eng C, Vidal M, Loscalzo J. Comprehensive characterization of protein-protein interactions perturbed by disease mutations. ***Nat Genet***. 2021 Mar;53(3):342-353. doi: 10.1038/s41588-020-00774-y. Epub 2021 Feb 8. PMID: 33558758; PMCID: PMC8237108.
14. Mehta AK, Cheney EM, Hartl CA, Pantelidou C, Oliwa M, **Castrillon JA**, Lin JR, Hurst KE, Oliveira Taveira M, Johnson NT, Oldham WM, Kalocsay M, Berberich MJ, Boswell SA, Kothari A, Johnson S, Dillon DA, Lipschitz M, Rodig S, Santagata S, Garber JE, Tung N, Yelamos J, Thaxton JE, Mittendorf EA, Sorger PK, Shapiro GI, Guerriero JL. Targeting immunosuppressive macrophages overcomes PARP inhibitor resistance in BRCA1-associated triple-negative breast cancer. ***Nat Cancer*** 2, 66–82 (2021). https://doi.org/10.1038/s43018-020-00148-7.
15. **Castrillon JA**, Eng C, Cheng F. Pharmacogenomics for immunotherapy and immune-related cardiotoxicity**.** ***Hum Mol Genet***. 2020 Oct 20;29(R2):R186-R196. doi: 10.1093/hmg/ddaa137. PMID: 32620943; PMCID: PMC7574958.
16. Hockings JK, **Castrillon JA**, Cheng F. Pharmacogenomics meets precision cardio-oncology: is there synergistic potential? ***Hum Mol Genet.*** 2020 Oct 20;29(R2):R177-R185. doi: 10.1093/hmg/ddaa134. PMID: 32601683; PMCID: PMC7574955.
17. Gopal P*, **Castrillon JA*,** Abazeed ME. Cartography of the radiogenome of human cancers. ***Molecular Targeted Radiosensitizers: Opportunities and Challenges*** 2020.
18. Perez-Palma E, May P, Iqbal S, Niestroj LM, Du J, Heyne H, **Castrillon J**, O'Donnell-Luria A, Nurnberg P, Palotie A, Daly M, Lal D.Identification of pathogenic variant enriched regions across genes and gene families. ***Genome Res***. 2020;30(1):62-71. doi:10.1101/gr.252601.119
19. Pentelidou C*, Sonzogni O*, De Oliveira Taveira M, Mehta AK, Kothari A, Wang D, Visal T, Li MK, Pinto J, **Castrillon JA**, Cheney EM, Bouwman P, Jonkers J, Rottenberg S, Guerriero JL, Wulf GM, Shapiro GI. PARP Inhibitor Efficacy Depends on CD8+ T-cell Recruitment via Intratumoral STING Pathway Activation in BRCA-Deficient Models of Triple-Negative Breast Cancer. ***Cancer Discov***. 2019;9(6):722-737. doi:10.1158/2159-8290.CD-18-1218
20. Guerriero JL, Sotayo A, Ponichtera HE, **Castrillon JA**, Pourzia A, Schad S, Johnson SF, Carrasco RD, Lazo S, Bronson RT, Davis SP, Lobera M, Nolan MA, Letai A. Class IIa HDAC inhibition reduces breast tumours and metastases through anti-tumour macrophages. ***Nature***. 2017;543(7645):428-432. doi:10.1038/nature21409
21. Adeegbe DO, Liu Y, Lizotte PH, , Kamihara Y, Aref AR, Almonte C, Dries R, Li Y, Liu S, Wang X, Warner-Hatten T, **Castrillon J,** Yuan GC, Poudel-Neupane N, Zhang H, Guerriero JL, Han S, Awad MM, Barbie DA, Ritz J, Jones SS, Hammerman PS, Bradner JE, Quayle SN, Wong KK. Synergistic Immunostimulatory Effects and Therapeutic Benefit of Combined Histone Deacetylase and Bromodomain Inhibition in Non-Small Cell Lung Cancer. ***Cancer Discov***. 2017;7(8):852-867. doi:10.1158/2159-8290.CD-16-1020
22. Han S, **Castrillon JA**, Guerriero JL. Isolation and purification of tumor associated macrophages utilizing UltraPure MicroBeads. ***Miltenyi Methods*** 2017.

Oral Presentations

1. *Harnessing the Power of Genomics and RNA in Biomarker Identification.* MD Anderson Cancer Center CPRIT Trainee Seminar Series, 2023
2. *Network-Based Multi-omic Network-Based Multi-Omics Approaches for Cancer Therapy-Related Cardiotoxicity: Pathobiology, Drug Repurposing and Functional Testing.* ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM BCB) Artificial Intelligence and Machine Learning for Predictive Toxicology Workshop, 2023.
3. *Defects In The Branch-chain Amino Acid Pathway Is Associated With Doxorubicin-induced Cardiotoxicity And Preventable With A Bckdk Inhibitor Or Metformin.* American Heart Association, From Bench to Bedside: A Potpourri of Novel Concepts in Cardio-Oncology, 2022.
4. *Using multi-omic approaches and hiPSC-cardiomyocytes for drug discoveries in Cardiovascular diseases.* Lerner Research Institute Molecular Medicine Student Seminar Series, 2022.
5. *Biomarker discovery for cancer therapy related cardiotoxicity using multi-omic approaches and hiPSC-cardiomyocytes.* Genomic Medicine Institute Seminar Series, 2022
6. *Biomarker discovery for cancer therapy related cardiotoxicity using multi-omic approaches and hiPSC-cardiomyocytes.* Lerner Research Institute Molecular Medicine Student Seminar Series, 2022.
7. *What is Precision Medicine?* Medical Interest Group for high-school students, 2022.
8. *Network Medicine-Based Multimodal Omics Discovery and iPSC-Based Validation of Metformin for Potential Treatment of Atrial Fibrillation*, American Heart Association, Managing Atrial Fibrillation in 2021: Omics, Drugs, and Care Pathways, 2021.
9. *Network Medicine-Based Multimodal Omics Discovery and iPSC-Based Validation of Metformin for Potential Treatment of Atrial Fibrillation,* American Society of Human Genetics Conference, Genetic and functional insights into cardiovascular disease, 2021
10. *Impaired branched-chain amino acid catabolism and anthracycline-induced cardiotoxicity in cancer patients.* Genomic Medicine Institute Seminar Series, 2021.
11. *Impaired branched-chain amino acid catabolism and anthracycline-induced cardiotoxicity in cancer patients.* Lerner Research Institute Molecular Medicine Student Seminar Series, 2021.
12. *Pharmacogenomics for immune-related cardiotoxicity.* Lerner Research Institute Molecular Medicine Student Seminar Series, 2020.

Posters

1. *Machine Learning models identify tumor cell gene expression profiles of the colorectal cancer CMS subtypes associated with disease progression;* ACM Conference on Bioinformatics, Computational Biology, and Health Informatics (ACM BCB)*, Shenzen, China, 2024*
2. *Impaired branch-chain amino acid (BCAA) catabolism and doxorubicin induced toxicity in hiPSC-CMs;* HHMI Gilliam Annual Meeting, Bethesda, MA, 2023.
3. *Impaired branch-chain amino acid (BCAA) catabolism and doxorubicin induced toxicity in hiPSC-CMs;* Lerner Research Institute Student Showcase, 2022.
4. *Impaired branch-chain amino acid (BCAA) catabolism and doxorubicin induced toxicity in hiPSC-CMs;* HHMI Molecular Biology of the Cell meeting, Virtual, 2021.
5. *Impaired branch-chain amino acid (BCAA) catabolism and doxorubicin induced toxicity in hiPSC-CMs;* HHMI Gilliam Annual Meeting, Virtual, 2021.
6. *Cardiovascular adverse events associated with immune checkpoint blockade: Analysis of FDA-adverse events database;* American Association for Cancer Research Annual Meeting, Virtual, 2021.
7. *Cardiovascular adverse events associated with immune checkpoint blockade: Analysis of FDA-adverse events database;* Lerner Research Institute Student Showcase, Virtual 2020.
8. *Functional Annotation of Cancer Somatic Variants to Guide Radiotherapeutic Decisions: The Radiogenomic Atlas;* American Society of Human Genetics, Houston, TX 2019
9. *Functional Annotation of Cancer Somatic Variants to Guide Radiotherapeutic Decisions: The Radiogenomic Atlas;* Lerner Research Institute Student Showcase, Cleveland, OH 2019
10. *Characterizing the immune cellular components of the tumor microenvironment to identify suitable syngeneic breast cancer models for pre-clinical investigations using immunomodulators*; American Association for Cancer Research Conference on Tumor Immunology and Immunotherapy, Boston, MA 2017
11. *Parental Nutrition and Physical Activity Patterns in Sample of Overweight Pediatric Patients Attending a Community Obesity Program;* Obesity Week 2016, New Orleans, LA 2016

12. *Parental Nutrition and Physical Activity Patterns in Sample of Overweight Pediatric Patients Attending a Community Obesity Program;* Childhood Obesity in the Community: Turning Science to Care, Boston, MA 2016
13. *Hypoxia in a Freshwater Ecosystem Related to Varying Levels of Nutrition,* Scholars Week Undergraduate Research and Scholarly Achievement, Waco, TX 2011