Gregory J. Baker, PhD, PharmD

Senior Postdoctoral Research Associate

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Laboratory of Systems Pharmacology
Harvard Program in Therapeutic Science (HiTS)
Ludwig Center at Harvard
Harvard Medical School
200 Longwood Avenue, WAB444
Boston, MA 02115 USA

GENERAL RESEARCH INTEREST

Cancer Systems Immunology

SPECIFIC

- Adult glioblastoma and other CNS malignancies
- Highly multiplexed tissue imaging | spatial proteomics | digital pathology
- Systemic immune response profiling | multi-omics data integration
- Preclinical cancer modeling (murine systems)
- Machine/deep learning | computer vision
- Cancer immunotherapy

EDUCATION

2008-2014	**PhD, Department of Molecular and Medical Pharmacology** University of California Los Angeles	Los Angeles, CA
2001-2007	**PharmD, College of Pharmacy** University of Rhode Island	Kingston, RI

ACADEMIC APPOINTMENTS

2021-Present	**Postdoctoral Research Associate** Laboratory of Systems Pharmacology, Harvard Medical School	Boston, MA
2015-Present	**Trainee** Harvard Ludwig Center for Cancer Research	Boston, MA
2015-2021	**American Cancer Society Postdoctoral Fellow** Department of Systems Biology / Laboratory of Systems Pharmacology Harvard Medical School Postdoctoral Advisor: Peter K. Sorger	Boston, MA
2011-2014	**PhD Candidate (Cont.)** Department of Neurosurgery, University of Michigan	Ann Arbor, MI
2008-2011	**PhD Candidate** Department of Molecular and Medical Pharmacology University of California Los Angeles Graduate Adviser: Pedro R. Lowenstein	Los Angeles, CA

FUNDING

2017-2020 **American Cancer Society (ACS) Postdoctoral Fellowship (PF-16-197-01–LIB)**.
Role: PI, Title: "*Systems Biology Approaches to the Study of GBM-induced Immunosuppression*"

EXPERTISE

Experimental

Microscopy: real-time intravital multi-photon, laser-scanning confocal, transmission electron, widefield fluorescence, brightfield | Immunohistochemistry (IHC) | Immunofluorescence (IF) | Immunocytochemistry (ICC) | Flow cytometry | Next generation RNA sequencing | Handling, breeding, and experimental use of mice and rats | *in vivo* luciferase-based bioluminescence imaging | Transcardial perfusion | Tissue harvesting and digestion | shRNA-mediated eukaryotic gene knockdown | FFPE tissue processing and sectioning | Stereotactic brain tumor engraftment | Tissue culture (primary/transformed) | Virus-mediated gene transfer | i*n vivo* immunodepletion | Genetic cloning | ELISA/ELISpot | PCR/RT-PCR | Western blot | Stereology | Fluorimetry

Computational

Python programming (data science libraries: pandas, NumPy, matplotlib, seaborn, plotly, SciPy, Scikit-Learn, Scikit-Image, Zarr, TensorFlow, NetworkX) | Variational autoencoders (VAEs) | Deep convolutional generative adversarial networks (DCGANs) | U-Net | User-interface (UI) software development | Web development (HTML, CSS, Markdown) | Bash command prompt | Git/Github

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PUBLICATIONS

2023 **Baker GJ**, Novikov E, Zhao Z, Vallius T, Davis JA, Lin JR, Muhlich JL, Mittendorf EA, Santagata S, Guerriero JL, Sorger PK. *Quality Control for Single Cell Analysis of High-plex Tissue Profiles using CyLinter.* **bioRxiv DOI: https://doi.org/10.1101/2023.11.01.565120 (in review: Nature Methods)**

Coy S, Cheng B, Lee JS, Rashid R, Browning L, Xu Y, Chakrabarty SS, Yapp C, Chan S, Chan S, Tefft JB, Spektor A, Ligon KL, **Baker GJ**, Pellman D, Sorger PK, Santagata S. *2D and 3D Multiplexed Subcellular Profiling of Nuclear Instability in Human Cancer.* **bioRxiv DOI: https://doi.org/10.1101/2023.11.07.566063**

2022 Notarangelo G, Spinelli JB, Perez EM, **Baker GJ**, Kurmi K, Elia I, Stopka SA, Baquer G, Lin JR, Golby AJ, Joshi S, Baron HF, Drijvers, JM, Georgiev P, Ringel AE, Zaganjor E, McBrayer SK, Sorger PK, Sharpe AH, Wucherpfennig KW, Santagata S, Agar NY, Suvà ML, Haigis MC. *Oncometabolite D-2HG alters T cell metabolism to impair CD8$^+$ T cell function.* **Science** 2022 Sep 30;377(6614):1519-1529. doi: 10.1126/science.abj5104. Epub 2022 Sep 29.

Coy S, Wang S, Stopka SA, Lin JR, Yapp C, Ritch CC, Salhi L, **Baker GJ**, Rashid R, Baquer G, Regan M, Khadka P, Cole KA, Hwang J, Wen PY, Bandopadhayay P, Santi M, De Raedt T, Ligon KL, Agar NY, Sorger PK, Touat M, and Santagata S. *Single cell spatial analysis reveals the topology of immunomodulatory purinergic signaling in glioblastoma.* **Nat Commun** 2022 Aug 16;13(1):4814. doi: 10.1038/s41467-022-32430-w. PMID: 35973991 PMCID: PMC9381513

Schapiro D, Sokolov A, Yapp C, Chen YA, Muhlich JL, Hess J, Creason AL, Nirmal AJ, **Baker GJ**, Nariya MK, Lin JR, Maliga Z, Jacobson CA, Hodgman MW, Ruokonen J, Farhi SL, Abbondanza D, McKinley ET, Persson D, Betts C, Sivagnanam S, Regev A, Goecks J, Coffey RJ, Coussens LM, Santagata S, Sorger PK. *MCMICRO: a scalable, modular image-processing pipeline for multiplexed*

tissue imaging. **Nat Methods** 2022 Mar;19(3):311-315. doi: 10.1038/s41592-021-01308-y. Epub 2021 Nov 25. PMID: 34824477 PMCID: PMC8916956

2021 Shah D, Comba A, Faisal SM, Kadiyala P, **Baker GJ**, Alghamri MS, Doherty R, Zamler D, Nuñez G, Castro MG, Lowenstein PR. *A novel miR1983-TLR7-IFNβ circuit licenses NK cells to kill glioma cells, and is under the control of galectin-1.* **Oncoimmunology** 2021;10(1):1939601. doi: 10.1080/2162402X.2021.1939601. eCollection 2021. PubMed PMID: 34249474; PubMed Central PMCID: PMC8244780.

Iorgulescu JB, Gokhale PC, Speranza MC, Eschle BK, Poitras MJ, Wilkens MK, Soroko KM, Chhoeu C, Knott A, Gao Y, Lim-Fat MJ, **Baker GJ**, Bonal DM, Nguyen QD, Grant GRL, Ligon KL, Sorger PK, Chiocca EA, Anderson AC, Kirschmeier PT, Sharpe AH, Freeman GJ, Reardon DA. *Concurrent Dexamethasone Limits the Clinical Benefit of Immune Checkpoint Blockade in Glioblastoma.* **Clin Cancer Res** 2021 Jan 1;27(1):276-287. doi: 10.1158/1078-0432.CCR-20-2291. Epub 2020 Nov 25. PubMed PMID: 33239433; PubMed Central PMCID: PMC8034990.

2020 **Baker GJ**, Muhlich JL, Palaniappan SK, Moore JK, Davis SH, Santagata S, Sorger PK. *SYLARAS: A Platform for the Statistical Analysis and Visual Display of Systemic Immunoprofiling Data and Its Application to Glioblastoma.* **Cell Syst** 2020 Sep 23;11(3):272-285.e9. doi: 10.1016/j.cels.2020.08.001. Epub 2020 Sep 7. PubMed PMID: 32898474; PubMed Central PMCID: PMC7565356.

Ringel AE, Drijvers JM, **Baker GJ**, Catozzi A, García-Cañaveras JC, Gassaway BM, Miller BC, Juneja VR, Nguyen TH, Joshi S, Yao CH, Yoon H, Sage PT, LaFleur MW, Trombley JD, Jacobson CA, Maliga Z, Gygi SP, Sorger PK, Rabinowitz JD, Sharpe AH, Haigis MC. *Obesity Shapes Metabolism in the Tumor Microenvironment to Suppress Anti-Tumor Immunity.* **Cell** 2020 Dec 23;183(7):1848-1866.e26. doi: 10.1016/j.cell.2020.11.009. Epub 2020 Dec 9. PubMed PMID: 33301708; PubMed Central PMCID: PMC8064125.

Gerosa L, Chidley C, Fröhlich F, Sanchez G, Lim SK, Muhlich J, Chen JY, Vallabhaneni S, **Baker GJ**, Schapiro D, Atanasova MI, Chylek LA, Shi T, Yi L, Nicora CD, Claas A, Ng TSC, Kohler RH, Lauffenburger DA, Weissleder R, Miller MA, Qian WJ, Wiley HS, Sorger PK. *Receptor-Driven ERK Pulses Reconfigure MAPK Signaling and Enable Persistence of Drug-Adapted BRAF-Mutant Melanoma Cells.* **Cell Syst** 2020 Nov 18;11(5):478-494.e9. doi: 10.1016/j.cels.2020.10.002. Epub 2020 Oct 27. PubMed PMID: 33113355; PubMed Central PMCID: PMC8009031.

2019 Nalle SC, Zuo L, Ong MLDM, Singh G, Worthylake AM, Choi W, Manresa MC, Southworth AP, Edelblum KL, **Baker GJ**, Joseph NE, Savage PA, Turner JR. *Graft-versus-host disease propagation depends on increased intestinal epithelial tight junction permeability.* **J Clin Invest** 2019 Feb 1;129(2):902-914. doi: 10.1172/JCI98554. Epub 2019 Jan 22. PubMed PMID: 30667372; PubMed Central PMCID: PMC6355225.

2017 Fallahi-Sichani M, Becker V, Izar B, **Baker GJ**, Lin JR, Boswell SA, Shah P, Rotem A, Garraway LA, Sorger PK. *Adaptive resistance of melanoma cells to RAF inhibition via reversible induction of a slowly dividing de-differentiated state.* **Mol Syst Biol** 2017 Jan 9;13(1):905. doi: 10.15252/msb.20166796. PubMed PMID: 28069687; PubMed Central PMCID: PMC5248573.

2016 Yadav VN, Zamler D, **Baker GJ**, Kadiyala P, Erdreich-Epstein A, DeCarvalho AC, Mikkelsen T, Castro MG, Lowenstein PR. *CXCR4 increases in-vivo glioma perivascular invasion, and reduces radiation Induced apoptosis: A genetic knockdown study.* **Oncotarget** 2016 Dec 13;7(50):83701-83719. doi: 10.18632/oncotarget.13295. PubMed PMID: 27863376; PubMed Central PMCID: PMC5341257.

Baker GJ, Chockley P, Zamler D, Castro MG, Lowenstein PR. *Natural killer cells require monocytic*

Gr-1(+)/CD11b(+) myeloid cells to eradicate orthotopically engrafted glioma cells. **Oncoimmunology** 2016 Jun;5(6):e1163461. doi: 10.1080/2162402X.2016.1163461. eCollection 2016 Jun. PubMed PMID: 27471637; PubMed Central PMCID: PMC4938363.

Kamran N, Candolfi M, **Baker GJ**, Ayala MM, Dzaman M, Lowenstein PR, Castro MG. *Gene Therapy for the Treatment of Neurological Disorders: Central Nervous System Neoplasms.* **Methods Mol Biol** 2016;1382:467-82. doi: 10.1007/978-1-4939-3271-9_31. PubMed PMID: 26611605; PubMed Central PMCID: PMC4677484.

2015 **Baker GJ**, Castro MG, Lowenstein PR. Isolation and Flow Cytometric Analysis of Glioma-infiltrating Peripheral Blood Mononuclear Cells. **J Vis Exp** 2015 Nov 28;(105). doi: 10.3791/53676. PubMed PMID: 26650233; PubMed Central PMCID: PMC4692754.

Calinescu AA, Kamran N, **Baker GJ**, Mineharu Y, Lowenstein PR, Castro MG. *Overview of current Immunotherapeutic strategies for glioma.* **Immunotherapy** 2015;7(10):1073-104. doi: 10.2217/imt.15.75. Review. PubMed PMID: 26598957; PubMed Central PMCID: PMC4681396.

2014 Lowenstein PR, **Baker GJ**, Castro MG. *Cracking the glioma-NK inhibitory code: toward successful innate immunotherapy.* **Oncoimmunology** 2014 Nov;3(11):e965573. doi: 10.4161/21624011.2014.965573. eCollection 2014 Nov. PubMed PMID: 25941594; PubMed Central PMCID: PMC4292565.

Castro MG, **Baker GJ**, Lowenstein PR. *Blocking immunosuppressive checkpoints for glioma therapy: The more the Merrier!* **Clin Cancer Res** 2014 Oct 15;20(20):5147-9. doi: 10.1158/1078-0432.CCR-14-0820. Epub 2014 May 30. PubMed PMID: 24879798; PubMed Central PMCID: PMC4330468.

Baker GJ, Chockley P, Yadav VN, Doherty R, Ritt M, Sivaramakrishnan S, Castro MG, Lowenstein PR. *Natural killer cells eradicate galectin-1-deficient glioma in the absence of adaptive immunity.* **Cancer Res** 2014 Sep 15;74(18):5079-90. doi: 10.1158/0008-5472.CAN-14-1203. Epub 2014 Jul 18. PubMed PMID: 25038230; PubMed Central PMCID: PMC4184887.

Lynes J, Wibowo M, Koschmann C, **Baker GJ**, Saxena V, Muhammad AK, Bondale N, Klein J, Assi H, Lieberman AP, Castro MG, Lowenstein PR. *Lentiviral-induced high-grade gliomas in rats: the effects of PDGFB, HRAS-G12V, AKT, and IDH1-R132H.* **Neurotherapeutics** 2014 Jul;11(3):623-35. doi: 10.1007/s13311-014-0269-y. PubMed PMID: 24752661; PubMed Central PMCID: PMC4121445.

Baker GJ, Yadav VN, Motsch S, Koschmann C, Calinescu AA, Mineharu Y, Camelo-Piragua SI, Orringer D, Bannykh S, Nichols WS, deCarvalho AC, Mikkelsen T, Castro MG, Lowenstein PR. *Mechanisms of glioma formation: iterative perivascular glioma growth and invasion leads to tumor progression, VEGF-independent vascularization, and resistance to antiangiogenic therapy.* **Neoplasia** 2014 Jul;16(7):543-61. doi: 10.1016/j.neo.2014.06.003. PubMed PMID: 25117977; PubMed Central PMCID: PMC4198934.

2012 Assi H, Candolfi M, **Baker GJ**, Mineharu Y, Lowenstein PR, Castro MG. *Gene therapy for brain tumors: basic developments and clinical implementation.* **Neurosci Lett** 2012 Oct 11;527(2):71-7. doi: 10.1016/j.neulet.2012.08.003. Epub 2012 Aug 10. Review. PubMed PMID: 22906921; PubMed Central PMCID: PMC3462660.

2011 Candolfi M, Kroeger KM, Xiong W, Liu C, Puntel M, Yagiz K, Muhammad AG, Mineharu Y, Foulad D, Wibowo M, Assi H, **Baker GJ**, Lowenstein PR, Castro MG. *Targeted toxins for glioblastoma multiforme: pre-clinical studies and clinical implementation.* **Anticancer Agents Med Chem** 2011 Oct;11(8):729-38. doi: 10.2174/187152011797378689. Review. PubMed PMID: 21707497; PubMed Central PMCID: PMC3364590.

2010 Kroeger KM, Muhammad AK, **Baker GJ**, Assi H, Wibowo MK, Xiong W, Yagiz K, Candolfi M, Lowenstein PR, Castro MG. *Gene therapy and virotherapy: novel therapeutic approaches for brain tumors.* **Discov Med** 2010 Oct;10(53):293-304. Review. PubMed PMID: 21034670; PubMed Central PMCID: PMC3059086.

Muhammad AK, Puntel M, Candolfi M, Salem A, Yagiz K, Farrokhi C, Kroeger KM, Xiong W, Curtin JF, Liu C, Lawrence K, Bondale NS, Lerner J, **Baker GJ**, Foulad D, Pechnick RN, Palmer D, Ng P, Lowenstein PR, Castro MG. *Study of the efficacy, biodistribution, and safety profile of therapeutic gutless adenovirus vectors as a prelude to a phase I clinical trial for glioblastoma.* **Clin Pharmacol Ther** 2010 Aug;88(2):204-13. doi: 10.1038/clpt.2009.260. Epub 2010 Feb 17. PubMed PMID: 20164833; PubMed Central PMCID: PMC2908190.

2006 Meneni SR, D'Mello R, Norigian G, **Baker GJ**, Gao L, Chiarelli MP, Cho BP. *Sequence effects of aminofluorene-modified DNA duplexes: thermodynamic and circular dichroism properties.* **Nucleic Acids Res** 2006;34(2):755-63. doi: 10.1093/nar/gkj480. Print 2006. PubMed PMID: 16449208; PubMed Central PMCID: PMC1356535.

BOOK CHAPTERS

2016 Kamran N, Candolfi M, **Baker GJ**, Ayala MM, Dzaman M, Lowenstein PR, Castro MG. *Gene Therapy for the Treatment of Neurological Disorders: Central Nervous System Neoplasms.* **Methods Mol Biol** 2016;1382:467-82.

MANUSCRIPTS IN SUBMISSION

Baker GJ, Novikov E, Chen YA, Hug CB, Cajas SA, Huang S, Yapp C, Coy S, Pfister H, Sokolov A Sorger PK. *Multiscale Histological Characterization of Human Colorectal Cancer with Variational Autoencoders.*

Iorgulescu JB, Ruthen N, Ahn R, Panagioti E, Gokhale PC, Neagu M, Speranza M, Eschle BK, Soroko KM, Piranlioglu R, Datta M, Krishnan S, Yates B, **Baker GJ**, Jain RK, Suvà ML, Neuberg D, White FM, Chiocca EA, Freeman GJ, Sharpe AH, Wu CJ, Reardon DA. *Antigen presentation deficiency and mesenchymal differentiation underlie immunotherapy resistance in the murine syngeneic CT2A tumour model.*

MANUSCRIPTS IN PREPARATION

Guerriero JL*, Baker GJ*, Lin JR, Pastorello R, Chen YA, Vallius T, Davis J, Yapp C, Church SE, Miller E, Färkkilä A, Vinayak S, Telli ML, Fulci G, Tolaney SM, Lynce F, Brugge JS, D'Andrea A, Shapiro GI, Santagata S, Sorger PK, Mittendorf EA *High-dimensional, single-cell analysis and transcriptional profiling reveal novel correlatives of response to PARP inhibition plus PD-1 blockade in triple-negative breast cancer.*
***These authors contributed equally to this work.**

SELECTED SEMINARS AND CONFERENCE PROCEEDINGS

06/2023 **Baker GJ**. *Contextual Cell State Inference in Whole-slide Multiplex Images of Tissue with Deep Convolutional Neural Networks.* **NIH Human Tumor Atlas Network (HTAN) Spring Face-to-Face Meeting**, The Broad Institute, Cambridge, MA

03/2023 Invited speaker, **Society for the Immunotherapy of Cancer (SITC) Spring Scientific**, *Integrating Spatial-Omics in IO/Single Cell Analysis.* Denver, CO

10/2022 **Baker GJ**, Baquer G, Stopka SA, Regan M, Lin JR, Santagata S, Agar NY. *Integration of MALDI-MSI with Multiplexed Tissue Immunofluorescence Enables Correlative Analysis of Cells and Molecules in the Glioblastoma Microenvironment.* **37th Asilomar Conference on Mass Spectrometry**, Asilomar Lodge, Pacific Grove, CA

11/2021 **Baker GJ**, Vallius T, Davis JA, Lin JR, Guerriero JL, Mittendorf EA, Sorger PK. *CyLinter: An Interactive Segmentation Filter for Multiplex Microscopy.* **Human Tumor Atlas Network (HTAN) Fall F2F** (virtual)

07/2021 Invited speaker, **2nd International Conference on Cell and Experimental Biology (CEB)**, *Experimental and Computational Tools for Acquiring and Analyzing Fluidics and Microscopy-based Single-cell Data.* Houston, TX (virtual)

11/2019 **Baker GJ**, Muhlich JL, Palaniappan SK, Moore JK, Davis SH, Sorger PK. *Systemic Immune Response Profiling with SYLARAS Implicates a Role for CD45R/B220$^+$ CD8$^+$ T Cells in Glioblastoma Immunology.* **AACR Tumor Immunology and Immunotherapy**, Boston, MA

02/2017 Invited speaker, **Quantitative Systems Pharmacology—Systems Biology (QSP-SB) Industry and Academia Symposium**, *Systems Biology Approaches to the Study Glioblastoma-induced Immune Suppression.* Boston, MA

02/2014 Invited Speaker, **Department of Pediatrics Immuno-Hematology Symposium**, *Glioma-derived Galectin-1 is a Potent Suppressor of NK Immunosurveillance.* University of Michigan, Ann Arbor, MI

11/2014 **Baker GJ**, Yadav VN, Motsch S, Koschmann CJ, Calinescu A, Mineharu Y, Camelo-Piragua S, Orringer D, Bannykh SI, Nichols WS, deCarvalho AC, Mikkelsen T, Castro MG, Lowenstein PR. *Mechanisms of Glioma Formation: Perivascular Glioma Invasion is a VEGF-independent Mechanism of Tumor Vascularization.* **19th Annual Scientific Meeting of the Society for Neuro-Oncology (SNO),** Miami, FL

05/2014 **Baker GJ**, Yadav VN, Motsch S, Koschmann CJ, Calinescu A, Mineharu Y, Camelo-Piragua S, Orringer D, Bannykh SI, Nichols WS, deCarvalho AC, Mikkelsen T, Castro MG, Lowenstein PR. *Investigating the neoangiogenic consequences of the perivascular growth pattern in malignant brain tumors.* **50th Annual Meeting of the American Society of Clinical Oncology (ASCO)**, Chicago, IL

11/2015 **Baker GJ**, Chockley P, Zamler D, Castro MG, Lowenstein PR. *Gr-1$^+$/CD11b$^+$ Myeloid Cells are Required for Natural Killer Cell-mediated Eradication of Galectin-1-deficient Glioma.* **20th Annual Scientific Meeting of the Society for Neuro-Oncology (SNO)**, San Antonio, TX

04/2014 **Baker GJ**, Chockley P, Yadav VW, Doherty R, Ritt M, Sivaramakrishnan S, Castro MG, Lowenstein PR. *Natural Killer Cells Eradicate Galectin-1 Deficient Glioma in the Absence of Adaptive Immunity.* **American Association for Cancer Research (AACR) Annual Meeting**, San Diego, CA

ACADEMIC PARTICIPATION / TEACHING EXPERIENCE

02/2022 **Cancer Systems Biology Consortium (CSBC)/Physical Sciences in Oncology (PS-ON) Image Analysis Hackathon**
Served as a challenge champion for this 3-day image analysis hackathon centered on solving problems in multiplex imaging of human cancer tissue using techniques in machine learning and computer vision (virtual)

11/2021 **Data Viz + Cancer Innovation Lab 2021: Visualizing Data in Context for Novel Insights**
Participant in this National Cancer Institute (NCI)-sponsored, 5-day innovation lab to generate creative data visualization strategies for cancer research (virtual)

10/2019 **Python Training Workshop**
Co-instructor for this intensive, 5-day Python programming course sponsored by the Harvard Program in Therapeutics Science (HiTS), Boston, MA

2014 **Graduate Student Mentor**
Graduate Program in Immunology, University of Michigan, Ann Arbor, MI

2013 **Graduate Student Mentor**
Program in Biomedical Sciences, University of Michigan, Ann Arbor, MI

2006 **Undergraduate Tutor**
Clinical Pharmacology, University of Rhode Island, Kingston, RI

HONORS AND DISTINCTIONS

2023-Present	Peer review service: Cell Reports Medicine
2022-Present	Peer review service: Frontiers: Immunology and Neurology sections
2020-Present	Peer review service: Clinical Cancer Research
2014-Present	Peer review service: PLoS ONE
2022	Grand prize winner, CSBC/PS-ON Image Analysis Hackathon
2021	Best abstract, CSBC/PS-ON/BD-STEP Junior Investigator (JI) Meeting
2017	Best abstract, Harvard Program in Therapeutic Sciences Symposium, Cambridge, MA
2014	Guest lecturer, Immuno-Hematology Symposium, Dept. of Pediatrics, U of M
2014	Poster session winner, Annual Meeting of the Society for Neuro-Oncology, Miami, FL
2014	Summa cum laude honors, Dept. of Molecular and Medical Pharmacology, UCLA
2012	Graduate Student Travel Award, Dept. of Molecular and Medical Pharmacology, UCLA
2007	Summa cum laude honors (second in class), College of Pharmacy, URI
2007	Recipient of "*Outstanding Achievement in Biomedical Sciences Research*" award, College of Pharmacy, URI

PROFESSIONAL AFFILIATIONS AND SERVICE

2015-Present	Trainee, Ludwig Center, Harvard Medical School
2013-Present	Associate Member, American Association for Cancer Research (AACR)
2017-2020	American Cancer Society (ACS) Postdoctoral Fellow
2012-2014	Associate Member, American Society of Gene and Cell Therapy (ASGCT)
2005-2006	Executive Board Treasure, Rho Chi Society, Beta Pi Chapter, URI
2004-2009	Member, American Pharmacists Association (APhA)
2004-2007	Member, Academy of Student Pharmacists (ASP)
2007-2009	Rhode Island Pharmacists Association (RIPA)
2003-2007	Member, National Society of Collegiate Scholars
2003-2007	Member, Honor Society of Phi Kappa Phi

PATENTS

- "*Ligand Binding Stabilization Method for Drug Target Identification*", U.S. Patent No. 8,703,438,

date of patent: April 22, 2014

- "*B220^{+} CD8T cells: A Novel Cell Target for Cancer Immunotherapy*", prov. patent: January 18, 2019

LICENSURE

- Registered Pharmacist (RPH), state of Rhode Island (active status)
- Registered Pharmacist (RPH), state of California (active status)

REFERENCES

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PUBLICATION HIGHLIGHT 1

Mechanisms of Glioma Formation: Iterative Perivascular Glioma Growth and Invasion Leads to Tumor Progression, VEGF-Independent Vascularization, and Resistance to Antiangiogenic Therapy

Gregory J. Baker[*,†,‡], Viveka Nand Yadav[*,†], Sebastien Motsch[§,¶], Carl Koschmann[*,†], Anda-Alexandra Calinescu[*,†], Yohei Mineharu[*,†], Sandra Ines Camelo-Piragua[#], Daniel Orringer[*], Serguei Bannykh[**], Wesley S. Nichols[**], Ana C. deCarvalho[††], Tom Mikkelsen[††], Maria G. Castro[*,†] and Pedro R. Lowenstein[*,†]

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††Depts. of Neurology and Neurosurgery, Henry Ford Hospital, Detroit, MI 48202, USA

Significance. This paper, published in the journal Neoplasia, demonstrates that glioblastoma (GBM) brain tumors hijack the space between the neuropil and abluminal blood vessel wall as a conduit for tumor growth and invasion which renders these tumors resistant to angiogenesis inhibitors. Work in this paper shows that preexisting blood vessel integrity is stabilized by these drugs to facilitate widespread perivascular invasion of GBM cells. The paper's findings contradict the concept that angiogenesis is a requirement for tumor progression and helped to explain why two multi-center Phase III clinical trials, RTOG 0825 and AVAGlio, failed to demonstrate significant extensions in the overall survival of patients with newly diagnosed GBM treated with angiogenesis inhibitors. The paper was featured as the cover article and its results are well-cited in the field.

PUBLICATION HIGHLIGHT 2

Natural Killer Cells Eradicate Galectin-1–Deficient Glioma in the Absence of Adaptive Immunity

Gregory J. Baker[1,2], Peter Chockley[1,2], Viveka Nand Yadav[1,2], Robert Doherty[1,2], Michael Ritt[2], Sivaraj Sivaramakrishnan[2,3], Maria G. Castro[1,2], and Pedro R. Lowenstein[1,2]

[1]Department of Neurosurgery, University of Michigan Medical School, Ann Arbor, Michigan.
[2]Department of Cell and Developmental Biology, University of Michigan Medical School, Ann Arbor, Michigan.
[3]Department of Biomedical Engineering, University of Michigan, Ann Arbor, Michigan.

Significance. This paper, published in the journal Cancer Research, reveals a novel role for the β-galactoside–binding lectin, galectin-1 (LGALS1), in subverting anti-GBM immune surveillance by natural killer (NK) cells. Its findings show that galectin-1-producing tumors are infiltrated by fewer granzyme B^+ NK cells and are intrinsically resistant to NK-mediated cell lysis. Conversely, it shows that experimental shRNA-mediated galectin-1 knockdown in GBM cells leads to the eradication of these tumors by NK cells prior to the initiation of adaptive cytotoxic T cell responses. Thw paper was the first to implicate galectin-1 as an innate cancer immune checkpoint and a potential target for GBM immunotherapy. This work has helped invigorate the study of glioma-mediated regulation of innate anti-tumor immune activity.

PUBLICATION HIGHLIGHT 3

SYLARAS: A Platform for the Statistical Analysis and Visual Display of Systemic Immunoprofiling Data and Its Application to Glioblastoma

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Significance. This paper, published in the journal Cell Systems, is the first to demonstrate the breadth of impact intracranial glioblastoma (GBM) brain tumors have on immune cells residing in primary and secondary lymphoid organs throughout the body and has implications for the importance of peripheral immune activity in shaping disease outcomes. The paper also provides technical innovations relevant to the field of cancer systems immunology through its detailed experimental protocol and software algorithm for collecting, analyzing, and visualizing large and complex single-cell datasets. This paper also describes a conceptual framework for how coordinated immune activity among divergent cell states residing in distant lymphoid organs can be revealed and compared in the presence and absence of immune perturbation by studying correlated variation in immune cell frequency among biologically replicate mice.