

Brooks P. Leitner, PhD

MD/PhD Candidate, Yale School of Medicine

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EDUCATION

MD/PhD Candidate, Yale University School of Medicine — 2018-Present

PhD in Cellular & Molecular Physiology, Yale University — 2022

M.Phil. in Cellular & Molecular Physiology, Yale University — 2022

BS in Kinesiology, with Honors, University of Maryland, College Park — 2015

PROFESSIONAL POSITIONS

Post-Baccalaureate Clinical Research Fellow, National Institute of Diabetes and Digestive and Kidney Diseases — 2015-2018

AWARDS

Keystone Symposia Scholarship Abstract Award, Tumor Metabolism and Immunometabolism at the Crossroads of Obesity and Cancer — Fall 2022

NIH Summer Research Mentor Award — Winter 2017

Best Oral Presentation, NIDDK Scientific Conference — Spring 2016

Undergraduate Researcher of the Year, University of Maryland — Spring 2015

American Kinesiology Association Undergraduate Scholar Award — Spring 2015

Fraleay Award, School of Public Health, University of Maryland — Spring 2015

Dean's Scholar Award, School of Public Health, University of Maryland — Spring 2015

PUBLICATIONS

Total Citations: 944, H-Index: 9 (Google Scholar as of March 14, 2023)

#Corresponding Author

*Equal Contribution

2023

Leitner, B.P., Lee, W.D., Zhu, W., Zhang, X., Gaspar, R.C., Li, Z., Rabinowitz, J.D., Perry, R.J. Tissue-Specific and Interorgan Metabolic Reprogramming Maintains Tolerance to Sepsis. *BioRxiv*. October 9, 2022. 2022.10.08.511411 Preprint at <https://doi.org/10.1101/2022.10.08.511411> (2023) (Under Review)

Singh, I., **Leitner, B.P.**, Wang, Y., Zhang, H., Joseph, P., Lutchmansingh, D., Gulati, M., Possick, J., Damsky, W., Hwa, J., Heerdt, P.M., Chun, H. Proteomic Profiling Demonstrates Inflammatory and Endotheliopathy Signatures Associated with Impaired Cardiopulmonary

Exercise Hemodynamic Profile in Post-Acute Sequelae of SARS-CoV-2 Infection (PASC) syndrome. (2023) (Under Revision at Pulmonary Circulation)

Zhang, X., Lee, W.D., **Leitner, B.P.**, Zhu, W., Li, Z., Gaspar, R., Halberstam, A., Robles, B., Rabinowitz, J., Perry, R.J. Dichloroacetate as a novel pharmaceutical treatment for cancer-related fatigue in melanoma. (2023) (Under Consideration)

Talty, R., Lupica-Tondo, G.L., **Leitner, B.P.**, Flem-Karlsen, K., Micevic, G., Daniels, A., Bosenberg, M.W. BRAFV600E mutations alter melanoma lipid metabolism and ferroptosis sensitivity (2023) (Under Review at Molecular Cancer Therapeutics)

Gaspar, R.C., Lyu, K., Hubbard, B., **Leitner, B.P.**, Luukkonen, P.K., Hirabara, S., Sakuma, I., Nasiri, A., Zhang, D., Kahn, M., Cline, G.W., Pauli, J.R., Perry, R.J., Petersen, K.F., Shulman, G.I. Distinct Subcellular Localization of Intramyocellular Lipids and Lower PKC ϵ /PKC θ Activity Preserve Muscle Insulin Sensitivity in Mice. 2023. *Diabetologia*. Mar;66(3):567-578. doi: 10.1007/s00125-022-05838-8. Epub 2022 Dec 1.

2022

Zhang, X., Halberstam, A., Zhu, W., **Leitner, B.P.**, McGeary, M.K., Bosenberg, M.W., Perry, R.J. Isotope Tracing Reveals Distinct Substrate Preference and Flexibility in Melanoma Subtypes with Differing Anti-Tumor Immunity. *Cancer & Metabolism*. 2022 Dec 1;10(1):21. doi: 10.1186/s40170-022-00296-7.

Akingbesote ND, **Leitner, B.P.**, Jovin DG, Desrouleaux, R., Zhu, W., Li, Z., Pollak, M.N., Perry, R.J. Gene Expression and Tracer-Based Metabolic Flux Analysis Reveals Tissue-Specific Metabolic Scaling in vitro, ex vivo, and in vivo. *BioRxiv*. March 4, 2022. 2022.03.02.482685. doi:10.1101/2022.03.02.482685

Leitner, B.P., Siebel S, Akingbesote ND, Zhang X, Perry RJ. Insulin and cancer: a tangled web. *Biochem J*. 2022;479(5):583-607. doi:10.1042/BCJ20210134

#**Leitner, B.P.**, Givechian, K.B., Ospanova, S., Beisenbayeva, A., Politi, K., Perry, R.J. Multimodal Analysis Suggests Differential Immuno-Metabolic Crosstalk in Lung Squamous Cell Carcinoma and Adenocarcinoma. 2022, *NPJ Precision Oncology*. 2022;6(1):1-10. doi:10.1038/s41698-021-00248-2

Schaubroeck, K.J., **Leitner, B.P.**, Perry, R.J. An Optimized Method for Tissue Glycogen Quantitation. 2022, *Physiological Reports*. 2022;10(4):e15195. doi:10.14814/phy2.15195

Forrest, L.L., **Leitner, B.P.**, Vasquez Guzman, C.E., Brodt, E., Odonkor, C.A. Underrepresentation of American Indian-Alaska Native Trainees, Active Physicians and Faculty Throughout the United States Academic Medicine Pipeline. *JAMA Network Open*. 2022;5(1):e2143398. doi:10.1001/jamanetworkopen.2021.43398

Odonkor, C.A., Tucker-Bartley, A., **Leitner, B.**, Chude, C., Hirani, S., Poree, L. Closing the Gap in Representation of Racial and Ethnic Minorities in Pain Medicine: A 2018-2019 Status Report, *Journal of the National Medical Association* 2022;113(6):612-615. doi:10.1016/j.jnma.2021.05.010

2021

Manoli, I., Pass, A.R., Harrington, E.A., Gagne, J., McCoy, S., Bell, S.L., Hattenbach, J.D., **Leitner, B.P.**, Duckworth, C.J., Fletcher, L.A., Cassimatis, T.M., Galarreta, C.I., Thurm, A., Snow, J., Van Ryzin, C., Ferry, S., Ah Mew, N., Shchelochkov, O.A., Chen, K.Y., Venditti, C.P. 1-¹³C- Propionate Breath Testing as a Surrogate Endpoint to Assess Efficacy of Liver-Directed Therapies in Methylmalonic Acidemia (MMA). *Genetics in Medicine*. 2021;23(8):1522-1533. doi:10.1038/s41436-021-01143-8

Odonkor, C.A., **Leitner, B.P.**, Peju, A., Vwaire, O., Salman, H., Majeed, M., Ike, K., Lee, R., Vanterpool, S., Goree, J.H., Sully, K., Poree, L. Diversity of Pain Medicine Matriculants and Faculty in the United States: An Analysis of Trends in Fellowship Training from 2009-2019. *Pain Medicine*. 2021;22(4):819. doi:10.1093/pm/pnab004

2020

Leitner, B.P. and Perry, R.J. Discrepant Impact of Obesity on Tumor Glucose Uptake in Breast and Lung Cancer. *Journal of the National Cancer Institute, Cancer Spectrum*. 2020;4(2). doi:10.1093/jncics/pkaa007

O'Mara, A.E., Johnson, J.W., Linderman, J.D., Brychta, R.J., McGehee, S.M., Fletcher, L.A., Fink, Y., Kapuria, D., Cassimatis, T.M., Kelsey, N., Cero, C., Abdul-Sater, Z., Piccinini, F., Baskin, A.S., **Leitner, B.P.**, Cai, H., Millo, C.M., Dieckmann, W.D., Walter, M., Javitt, N.B., Rotman, Y., Walter, P.J., Ader, M., Bergman, R.N., Herscovitch, P., Chen, K.Y., Cypess, A.M. Chronic Mirabegron Treatment Increases Human Brown Fat, HDL Cholesterol, and Insulin Sensitivity. *Journal of Clinical Investigation*. 2020;130(5):2209-2219. doi:10.1172/JCI131126

Fletcher, L.A., Kim, K.I., **Leitner, B.P.**, Cassimatis, T.M., O'Mara, A.E., Johnson, J.W., Halprin, M.S., McGehee, S., Brychta, R.J., Cypess, A.M., Chen, K.Y. Sexual Dimorphisms in Adult Human Brown Adipose Tissue. *Obesity*. 2020;28(2):241-246. doi:10.1002/oby.22698

2019

Nasiri, A.R., Rodrigues, M.R., Li, Z, **Leitner, B.P.**, Rabin-Court, A, Perry, R.J. SGLT2 Inhibition Slows Breast and Colon Tumor Growth in Mice by Reversing Hyperinsulinemia. *Cancer & Metabolism*. 2019;7(1):10, doi:10.1186/s40170-019-0203-1

Brychta, R.J., Huang, S., Wang, J., **Leitner, B.P.**, Hattenbach, J.D., Bell, S.L., Fletcher, L.A., Wood, R.P., Idelson, C.R., Duckworth, C.J., McGehee, S., Courville, A.B., Bernstein, S.B., Reitman, M.L., Cypess, A.M., Chen, K.Y. Quantification of the Capacity for Cold-Induced Thermogenesis in Young Lean and Obese Men. *The Journal of Clinical Endocrinology & Metabolism*. 2019 May 24. doi:10.1210/jc.2019-00728

Kim, K.I., Huang, S., Fletcher, L.A., O'Mara, A.E., Tal, I., Brychta, R.J., Cypess, A.M., Chen, K.Y., **#Leitner, B.P.** Whole Body and Regional Quantification of Active Human Brown Adipose Tissue Using ¹⁸F-FDG PET/CT. *Journal of Visualized Experiments*. 2019 (146), e58469, doi:10.3791/58469

2018

Lago, T.R., Hsiung, A., **Leitner, B.P.**, Duckworth, C.J., Balderston, N.L., Chen, K.Y., Grillon, C., Ernst, M. Exercise Modulates the Interaction Between Cognition and Anxiety in Humans. *Cognition and Emotion*. 2018 Jul 23:1-8. PMID: 30032703, DOI: 10.1080/02699931.2018.1500445

Baskin, A.S., Linderman, J.D., Brychta, R.J., McGehee, S., Anflick-Chames, E., Cero, C., Johnson, J.W., O'Mara, A.E., Fletcher, L.A., **Leitner, B.P.**, Duckworth, C.J., Huang, S., Cai, H., Garraffo, H.M., Millo, C.M., Dieckmann, W., Tolstikov, V., Chen, E.Y., Gao, F., Narain, N.R., Kiebish, M.A., Walter, P.J., Herscovitch, P., Chen, K.Y., Cypess, A.M., 2018. Regulation of Human Adipose Tissue Activation, Gallbladder Size, and Bile Acid Metabolism by a β 3-Adrenergic Receptor Agonist. *Diabetes*. 2018 Oct;67(10):2113-2125, Epub 2018 Jul 6. PMID: 29980535, DOI: 10.2337/db18-0462

Leitner, B.P., Weiner, L.S., Desir, M., Kahn, P.A., Selen, D.J., Tsang, C., Kolodny, G.M., Cypess, A.M. Kinetics of Human Brown Adipose Tissue Activation and Deactivation. *International Journal of Obesity*. Epub 2018, May 24. PMID: 29795459, DOI: 10.1038/s41366-018-0104-3

Lago, T.R., Hsiung, A., **Leitner, B.P.**, Duckworth, C.J., Chen, K.Y., Ernst, M., Grillon, C. Exercise Decreases Defensive Responses to Unpredictable, but not Predictable, Threat. *Depression and Anxiety*. 2018 Sep;35(9):868-875, Epub 2018 Apr 10. PMID: 29637654, doi: 10.1002/da.22748

2017

Leitner, B.P.*, Huang, S*, Brychta, R.J., Duckworth, C.J., Baskin, A.S., McGehee, S., Tal, I., Dieckmann, W., Gupta, G., Kolodny, G.M., Pacak, K., Herscovitch, P., Cypess, A.M., Chen, K.Y. Mapping of Human Brown Adipose Tissue in Lean and Obese Young Men. *Proceedings of the National Academy of Sciences*. 2017 Aug 8;114, 8649–8654. Epub 2017 Jul 24. PMID: 28739898, DOI: 10.1073/pnas.1705287114

2016

Alfani, A.J., Weiss, L.R., **Leitner, B.P.**, Smith, T.J., Hagberg, J.M., Smith, J.C., 2016. Hippocampal and Cerebral Blood Flow after Exercise Cessation in Master Athletes. *Frontiers in Aging Neuroscience*. 2016 Aug 5;8:184, PMID: 27547184, DOI: 10.3389/fnagi.2016.00184

BOOK CHAPTERS

#Corresponding Author

2020

#Leitner, BP & Martinez-Tellez, B. (2020) White and Brown Adipose Tissue in Obesity and Diabetes. In S. Faintuch & B. Faintuch (Ed. 2) *Obesity and Diabetes: Scientific Advances and Best Practice*. Springer Nature

PRESENTATIONS

*Indicates Oral Presentation

2023

Leitner, BP, Heerdt, PM, Singh, I. Proteomic and Physiologic Characterization of Patients with Long-Covid Related Exercise Intolerance (2023) *International Anesthesia Research Society, & Society for Critical Care Anesthesiologists*. Denver, CO

2022

***Leitner, BP**, Perry, RJ. Systemic Nutrient Partitioning and Tumor Immunometabolic Reprogramming Underlie Exercise's Anti-Cancer Effects (2022). *2022 Keystone Symposia Conference on Tumor Metabolism*. Keystone, CO

2021

Leitner, BP, Ospanova, S, Beisenbeyava, A, Givechian, KB, Politi, K, Perry, RJ. Multimodal Analysis Reveals Differential Immuno-Metabolic Features in Lung Squamous Cell Carcinoma and Adenocarcinoma (2021). *Fourth Annual Yale Cancer Center Trainee Colloquium*. Online.

2020

***Leitner, BP** and Perry, RJ. Interaction Between Inflammation and Substrate Metabolism During Recovery from an Acute Bout of Treadmill Training (2020). *Oral Presentation at The Integrative Physiology of Exercise Conference*. American Physiological Society. Online.

2019

Leitner, BP and Perry, RJ. Discrepant Impact of Obesity on Tumor Glucose Uptake in Breast and Lung Cancer (2019). *Presentation at Cell Symposia: The Hallmarks of Cancer*, Seattle, WA.

2018

***Leitner, BP**, Martinez-Tellez, B, Sanchez-Delgado, G, Acosta, FM, Alcantra, JMA, Gahete, FJA, Ruiz, JR. (2018). Kinetic Thermoregulatory Responses to Maximal Exercise Depend More on Body Composition than Sex. *Oral Presentation at the New England Chapter of the American College of Sports Medicine Fall Meeting*, Providence, RI.

Fletcher, LA, **Leitner, BP**, Kim, KI, McGehee, S, Brychta, RJ, Cypess, AM, Chen, KY. (2018). The Existence of Superficial Dorsocervical Brown Adipose Tissue in Women. *Presentation at the American Diabetes Association National Meeting*, Orlando, FL.

O'Mara, AE, Cypess, AM, Cero, C, Johnson, JW, Linderman, JD, **Leitner, BP**, Fletcher, LA, Brychta, RJ, Kapuria, D, McGehee, S, Rotman, Y. (2018). Physiological Responses to Daily Use of Beta-Three Adrenergic Receptor Agonist, Mirabegron. *Presentation at the American Diabetes Association National Meeting*, Orlando, FL.

Zhou, MS, Howard, RE, Rabel, A, Sedmak, C, Cai, H, Walter, PJ, Brychta, RJ, Fletcher, LA, **Leitner, BP**, Guo, J, Sikder, S, Courville, A, Bernstein, S, Grewal, S, Muniyappa, R, Chen, KY, Hall, KD. (2018). Differences in Energy Expenditure between Respiratory Chamber and Metabolic Ward in Inpatient Men and Women. *Presentation at the American Diabetes Association National Meeting*, Orlando, FL.

2017

***Leitner, BP**, Hsiung, A, Duckworth, CJ, Lago, T, Grillon, C, Ernst, M, Brychta, RJ, Chen, KY. (2017). Subjective and Physiological Predictors of Anxiety at Rest and During a Working Memory Task. *Oral Presentation at the American College of Sports Medicine Annual Meeting*, Denver, CO.

Hsiung, A, Lago, T, **Leitner, BP**, Chen, KY, Grillon, C, Ernst, M. (2017). Acute Moderate Exercise Improves Working Memory Efficiency in Humans. *Presentation at the American College of Sports Medicine Annual Meeting*, Denver, CO.

Lago, T, Hsiung, A, **Leitner, BP**, Duckworth, CJ, Chen, KY, Grillon, C, Ernst, M. (2017). Acute Exercise Improves Working Memory Without Decreasing Anxiety. *Presentation at the 2017 Anxiety and Depression Association of America Annual Conference, San Francisco, CA.*

Gagne, J, Sloan, JL, Harrington, E, Shchelochkov, OA, **Leitner, BP**, Duckworth, C, Chen, KY, Manoli, I, Venditti, CP. (2017). Liver Transplantation in Methylmalonic Acidemia as a Model for Developing Outcome Parameters for a Gene Therapy Clinical Trial. *Presentation at the American Society of Gene & Cell Therapy Annual Meeting, Washington, DC.*

Ouwerkerk, R, Cypess, AM, Chen, KY, Herscovitch, P, Brychta, RJ, **Leitner, BP**, Gharib, AM. (2017). Spin Densities and Relaxation Parameters of the Spectral Components of Brown Fat and Subcutaneous Fat with Localized ¹H-MRS at 3T. *Presentation at International Society for Magnetic Resonance in Medicine 25th Annual Meeting, Honolulu, HI.*

2016

***Leitner, BP**. (2016). Measuring Brown Adipose Tissue with ¹⁸F-FDG PET/CT: Implications for Obesity and Diabetes. *Oral Presentation at Postbac Seminar Series. National Institutes of Health, Bethesda, MD*

***Leitner, BP**, Huang, S, Duckworth, CJ, Baskin, A, McGehee, MS, Dieckmann, W, Cypess, AM, Brychta, RJ, Chen, KY (2016). Challenges and Advances in Human Brown Adipose Tissue Quantification Using ¹⁸F-FDG PET-CT. *Oral Presentation at NIDDK Scientific Conference. National Institutes of Health, Bethesda, MD.*

Brychta RJ, **Leitner BP**, Huang S, Duckworth CJ, Hattenbach J, Smyth SA, McGehee MS, Baskin A, Cypess A, Chen KY. (2016). Comparing Methods to Define the Lower Critical Temperature in Lean and Obese Men. *Oral presentation at Obesity Week 2016, New Orleans, LA.*

Lago, T, Hsiung, A, **Leitner, BP**, Duckworth, CJ, Chen, KY, Grillon, C, Ernst, M. (2016). Acute Exercise Improves Working Memory While Decreasing Anxiety in Humans. *Presentation at the American College of Neuropsychopharmacology Annual Meeting, Hollywood, FL.*

Leitner, BP, Huang, S, Duckworth, CJ, McGehee, MS, Smyth, S, Hattenbach, J, Chen, KY, Brychta, RJ. (2016). Regional Skin Temperature Responses to Warm vs. Cold in Healthy Lean and Obese Young Men. *Presentation at the Annual Meeting of the American College of Sports Medicine, Boston, MA.*

Smith, JC, **Leitner, BP**, Alfini, AJ, Weiss, LR, Smith, TJ. (2016). Exercise-Induced Changes in Brain Activation During a Simple Motor Task: An fMRI Study. *Presentation at the Annual Meeting of the American College of Sports Medicine, Boston, MA.*

Duckworth, CJ, **Leitner, BP**, Huang, S, McGehee, MS, Cypess, AM, Brychta, RJ, Chen, KY (2016). Is it Cold in Here or is it Just Me? Brown Adipose Tissue Activity as a Potential Predictor of Thermal Comfort in Young Healthy Men. *Presentation at The Diabetes, Endocrinology, and Obesity Branch Retreat. National Institutes of Health, Bethesda, MD.*

Fothergill, E, Howard, L, Guo, J, Kerns, JC, Knuth, ND, Baskin, A, Chen, KY, Duckworth, CJ, **Leitner, BP**, Skarulis, MC, Hall, KD, (2016). Persistent Metabolic Adaptation and Weight Regain 6 Years After The Biggest Loser Weight Loss Competition. *Presentation at International Congress on Obesity. Vancouver, Canada*

2015

Alfini, AJ, Oh, H, Weiss, LR, Smith, TJ, **Leitner, BP**, Toledo, R, Saheb, S, Guth, LM, Landers-Ramos, RQ, Corrigan, K, Spangenburg, EE, Hagberg, JM, Smith, JC. (2015). Effects of Detraining: Resting Cerebral Blood Flow in Master Athletes. *Presentation at the Annual Meeting of the American College of Sports Medicine, San Diego, CA.*

2014

Leitner, BP, Toledo, R, Weiss, L, Smith, TJ, Alfini, AJ, Eslami, K, Kauffman, D, Saheb, S, Schiller, K, Smith, JC, (2014). Changes in Heart Rate Variability and Affect in Response to Low and Moderate Intensity Exercise. *Presentation at Universitas 21 Undergraduate Research Conference, Shanghai Jiao Tong University, Shanghai, China.*

Leitner, BP, Toledo, R, Weiss, L, Smith, TJ, Alfini, AJ, Eslami, K, Kauffman, D, Saheb, S, Schiller, K, Smith, JC. (2014). Changes in Heart Rate Variability and Affect in Response to Low and Moderate Intensity Exercise. *Presentation at the Annual Meeting of the American College of Sports Medicine, Orlando, FL.*

REVIEWER

Obesity

Scientific Reports

Evolutionary Anthropology

Translational Lung Cancer Research

Frontiers in Nutrition

MEDIA PUBLICATIONS

Leitner, B. P. Exercise is Medicine on Campus Profile: Yale University. *ACSM Exercise is Medicine Success Stories* (2019). Available at: https://www.exerciseismedicine.org/support_page.php/stories/?b=859. (Accessed: 23rd September 2019)

GRANTS

Maryland Summer Scholars Award — University of Maryland, College Park (Winter 2013)

Awarded for proposal entitled “Effects of Exercise on Cerebral Blood Flow in Older Adults”

MENTORSHIP

Kyle Schaubroeck— BioMed Amgen Scholar, Yale University (Resulted in First-Author Original Research Paper)

Shyryn Ospanova— High School Student, Kazakhstan (Resulted in Co-Author Original Research Paper)

Aray Beisenbayeva— High School Student, Kazakhstan (Resulted in Co-Author Original Research Paper)

Hailey Edelman — Undergraduate Student, Yale University

Saloni Dalal — American School of Bombay, India (Lumiere Research Scholars Program)

Ananya Sachdev — India (Lumiere Research Scholars Program)

Katherine Kim — Undergraduate Honors Student, University of Maryland, College Park (Resulted in First-Author Original Research Paper)

John Ryan — Undergraduate Student, University of Virginia

Laura Hernandez-Diaz — University of Puerto Rico Graduate and Medical School Applicant

UNIVERSITY POSITIONS

Committee Member: Yale MD/PhD Diversity and Inclusion Committee (2018-Present); MD/PhD Director of Yale PATHS Mentorship Program

Yale School of Medicine

Presenter: Science in The News- Bodybuilding and Building Bodies: Upgrades from Nature and Technology (2018-2019)

Yale Science Diplomats

Founding Member: Exercise is Medicine on Campus at Yale University (2018-Present)

American College of Sports Medicine

Founding Member & President: Preventative Medicine Interest Group (2018-2020)

Yale School of Medicine

Chair: Committee on the Wellbeing of Students (2018-2020)

Yale School of Medicine

PROFESSIONAL AFFILIATIONS

Member, American College of Sports Medicine

Member, New England Chapter of The American College of Sports Medicine

Member, American Association for the Advancement of Science

Member, American Medical Society for Sports Medicine