

Laura-Isobel McCall

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Research Interests:

My research focuses on applications of metabolomics to study host-microbe communication and disease pathogenesis. I apply a novel integration of analytical chemistry and 3-dimensional modeling ("chemical cartography") to characterize in situ tissue damage, an approach that enables me to identify local disease associated alterations that would be missed by standard bulk tissue or biofluid analyses. This approach is also revealing novel aspects of healthy organ physiology. In addition, I use metabolomics tools to identify biomarkers of tissue damage in clinically-accessible biofluids and in feces. Metabolomics data are then combined with in vitro and in vivo genomic, proteomic and molecular biology tools to validate new mechanisms of pathogenesis, and integrated into a systems view of disease that considers the role of environmental exposures and of the host microbiome in disease progression. Finally, I investigate new methods to target the pathways identified by metabolomics approaches, to inform drug development.

Education:

2017: Post-Doctoral Fellow, Metabolomics/Drug Development, University of California, CA

2014: Post-Doctoral Fellow, Parasitology, University of California, CA

2013: Post-Doctoral Fellow, Microbiology and Immunology/Proteomics, McGill University, Canada

2013: Microbiology and Immunology Ph.D., McGill University, Canada

2009: Microbiology and Immunology B.S., McGill University, Canada

Academic Appointments:

2017-Present: Assistant Professor, University of Oklahoma, OK

2014-2017: Postdoctoral Fellow, University of California San Diego, CA

2013-2014: Postdoctoral Fellow, University of California San Francisco, CA

2013: Postdoctoral fellow, McGill University, Canada

Awards and Honors:

2019: Co-chair, Gordon Research Seminar on Tropical Infectious Diseases, Gordon Research Conferences

2015: SAGE Scholar, SAGE Bionetworks

2011: Provost's Graduate Fellowship, McGill University

2011: Principal's Graduate Fellowship, McGill University

2009: Provost's Graduate Fellowship, McGill University

2009: Principal's Graduate Fellowship, McGill University

2009: E.G.D. Murray Prize in Microbiology, McGill University

2009: McGill Alumnae Society Prize, McGill University

2009: Major Hiram Mills Medal for Biological sciences, McGill University

Research Support:

- 08/16/17-08/31/20: 122722501, The Board of Regents of the University of Oklahoma, "Host-microbe interactions in the context of parasitic diseases", Role: PI
- 11/30/16-08/15/17: SG_B0013, UCSD Center for Microbiome Innovation, Role: PI
- 06/01/15-08/15/17: 338511, Canadian Institutes of Health Research, "Determinants of American trypanosomiasis disease tropism and severity", Role: PI

Selected Publications:

1. McCall LI, Anderson VM, Fogle RS, Haffner JJ, Hossain E, Liu R, Ly AH, Ma H, Nadeem M, Yao S. Characterization of the workplace chemical exposome using untargeted LC-MS/MS: a case study. *bioRxiv*. 541813 [Preprint]. February 5 th 2019. Available from: [https://doi: 10.1101/541813](https://doi.org/10.1101/541813).
2. McCall LI, Tripathi A, Vargas F, Knight R, Dorrestein PC, Siqueira-Neto JL. Experimental Chagas disease-induced perturbations of the fecal microbiome and metabolome. *PLoS Negl Trop Dis*. 2018 Mar;12(3):e0006344. PubMed PMID: 29529084; PubMed Central PMCID: PMC5864088.
3. McCall LI, Morton JT, Bernatchez JA, de Siqueira-Neto JL, Knight R, Dorrestein PC, McKerrow JH. Mass Spectrometry-Based Chemical Cartography of a Cardiac Parasitic Infection. *Anal Chem*. 2017 Oct 3;89(19):10414-10421. PubMed PMID: 28892370.
4. Petras D, Nothias LF, Quinn RA, Alexandrov T, Bandeira N, Bouslimani A, Castro-Falcón G, Chen L, Dang T, Floros DJ, Hook V, Garg N, Hoffner N, Jiang Y, Kapono CA, Koester I, Knight R, Leber CA, Ling TJ, Luzzatto-Knaan T, McCall LI, McGrath AP, Meehan MJ, Merritt JK, Mills RH, Morton J, Podvin S, Protsyuk I, Purdy T, Satterfield K, Searles S, Shah S, Shires S, Steffen D, White M, Todoric J, Tuttle R, Wojnicz A, Sapp V, Vargas F, Yang J, Zhang C, Dorrestein PC. Mass Spectrometry-Based Visualization of Molecules Associated with Human Habitats. *Anal Chem*. 2016 Nov 15;88(22):10775- 10784. PubMed PMID: 27732780.
5. McCall LI, Tripathi A, Vargas F, Knight R, Dorrestein PC, Siqueira-Neto JL. Experimental Chagas disease-induced perturbations of the fecal microbiome and

- metabolome. *PLoS Negl Trop Dis*. 2018 Mar;12(3):e0006344. PubMed PMID: 29529084; PubMed Central PMCID: PMC5864088.
6. McCall LI, Morton JT, Bernatchez JA, de Siqueira-Neto JL, Knight R, Dorrestein PC, McKerrow JH. Mass Spectrometry-Based Chemical Cartography of a Cardiac Parasitic Infection. *Anal Chem*. 2017 Oct 3;89(19):10414-10421. PubMed PMID: 28892370.
 7. McCall LI, Anderson VM, Fogle RS, Haffner JJ, Hossain E, Liu R, Ly AH, Ma H, Nadeem M, Yao S. Characterization of the workplace chemical exposome using untargeted LC-MS/MS: a case study. *bioRxiv*. 541813 [Preprint]. February 5th 2019. Available from: [https://doi: 10.1101/541813](https://doi.org/10.1101/541813).
 8. Petras D, Nothias LF, Quinn RA, Alexandrov T, Bandeira N, Bouslimani A, Castro-Falcón G, Chen L, Dang T, Floros DJ, Hook V, Garg N, Hoffner N, Jiang Y, Kapono CA, Koester I, Knight R, Leber CA, Ling TJ, Luzzatto-Knaan T, McCall LI, McGrath AP, Meehan MJ, Merritt JK, Mills RH, Morton J, Podvin S, Protsyuk I, Purdy T, Satterfield K, Searles S, Shah S, Shires S, Steffen D, White M, Todoric J, Tuttle R, Wojnicz A, Sapp V, Vargas F, Yang J, Zhang C, Dorrestein PC. Mass Spectrometry-Based Visualization of Molecules Associated with Human Habitats. *Anal Chem*. 2016 Nov 15;88(22):10775-10784. PubMed PMID: 27732780.
 9. Otilie S, Goldgof GM, Calvet CM, Jennings GK, LaMonte G, Schenken J, Vigil E, Kumar P, McCall LI, Lopes ES, Gunawan F, Yang J, Suzuki Y, Siqueira-Neto JL, McKerrow JH, Amaro RE, Podust LM, Durrant JD, Winzeler EA. Rapid Chagas Disease Drug Target Discovery Using Directed Evolution in Drug-Sensitive Yeast. *ACS Chem Biol*. 2017 Feb 17;12(2):422-434. PubMed PMID: 27977118; PubMed Central PMCID: PMC5649375.
 10. McCall LI, El Aroussi A, Choi JY, Vieira DF, De Muylder G, Johnston JB, Chen S, Kellar D, Siqueira-Neto JL, Roush WR, Podust LM, McKerrow JH. Targeting Ergosterol biosynthesis in *Leishmania donovani*: essentiality of sterol 14 alpha-demethylase. *PLoS Negl Trop Dis*. 2015 Mar;9(3):e0003588. PubMed PMID: 25768284; PubMed Central PMCID: PMC4359151.
 11. Ekins S, de Siqueira-Neto JL, McCall LI, Sarker M, Yadav M, Ponder EL, Kallel EA, Kellar D, Chen S, Arkin M, Bunin BA, McKerrow JH, Talcott C. Machine Learning Models and Pathway Genome Database for *Trypanosoma cruzi* Drug Discovery. *PLoS Negl Trop Dis*. 2015;9(6):e0003878. PubMed PMID: 26114876; PubMed Central PMCID: PMC4482694.
 12. McCall LI, Zhang WW, Ranasinghe S, Matlashewski G. Leishmanization revisited: immunization with a naturally attenuated cutaneous *Leishmania donovani* isolate from Sri Lanka protects against visceral leishmaniasis. *Vaccine*. 2013 Feb 27;31(10):1420-5. PubMed PMID: 23219435.
 13. McCall LI, Zhang WW, Dejgaard K, Atayde VD, Mazur A, Ranasinghe S, Liu J, Olivier M, Nilsson T, Matlashewski G. Adaptation of *Leishmania donovani* to cutaneous and

visceral environments: in vivo selection and proteomic analysis. *J Proteome Res.* 2015 Feb 6;14(2):1033-59. PubMed PMID: 25536015.

14. Zhang WW, Ramasamy G, McCall LI, Haydock A, Ranasinghe S, Abeygunasekara P, Sirimanna G, Wickremasinghe R, Myler P, Matlashewski G. Genetic analysis of *Leishmania donovani* tropism using a naturally attenuated cutaneous strain. *PLoS Pathog.* 2014 Jul;10(7):e1004244. PubMed PMID: 24992200; PubMed Central PMCID: PMC4081786.
15. McCall LI, Matlashewski G. Involvement of the *Leishmania donovani* virulence factor A2 in protection against heat and oxidative stress. *Exp Parasitol.* 2012 Oct;132(2):109-15. PubMed PMID: 22691540.
16. McCall LI, Matlashewski G. Localization and induction of the A2 virulence factor in *Leishmania*: evidence that A2 is a stress response protein. *Mol Microbiol.* 2010 Jul;77(2):518-30. PubMed PMID: 20497497.