Friday, January 14, 2022

Quarterly update from the DMRC

Colleagues,

2021 was a year full of challenges and successes. We welcomed new members to our community, educated exceptional trainees, and pursued exciting new avenues of research. All the while, we supported each other as we dealt with the burden of the pandemic both at home and at work. **We continue to be grateful to be part of such a supportive community.**

We are proud that in 2021, the DMRC:

- Submitted our 2nd application to be an NIDDK-funded Diabetes Research Center (P30)
- Hosted exceptional speakers at our Seminars in Metabolism, Health Behaviors Seminar Series, and the Diabetes and Metabolism Research Retreat
- Published 470+ papers
- Received support from 130+ grants
- Presented our science at hundreds of internal and external venues

While 2022 is starting off with some uncertainty, **we can be certain our community will continue to excel**. We are excited about the submission of our Diabetes Research Center proposal this spring, a second class of students in the new BRIDGE UP-HBCU program (spearheaded by Keke Fairfax), and the inevitable new scientific discoveries from our investigators.

We are wishing you all a happy 2022!

Take care,
Jared Rutter & Scott Summers, DMRC Co-Directors

Diabetes and U

Scott Summers and Angie Fagerlin hosted a show - in the U's new studio - featuring the Driving Out Diabetes Initiative on Wednesday, 11/17. You can watch the show here!

And enjoy Angie's blog in GOOD NOTES about the 100th anniversary of insulin.

Pictured from left to right: Julie Metos, PhD, Madeleine French, MS, Angie Fagerlin, PhD, and Scott Summers, PhD

Good News

The Wellness Bus

$3M Challenge Opportunity from the Larry H. and Gail Miller Family Foundation

We are grateful to the Larry H. and Gail Miller Family Foundation who will provide a $3M matching grant to fund the Driving Out Diabetes Initiative for the next three years. Over the next few months, the University of Utah is aggressively working to match this commitment. Learn more about the challenge opportunity here.

Jared Rutter, PhD

Jared Rutter renewed as Howard Hughes Medical Institute Investigator

The Howard Hughes Medical Institute (HHMI) has renewed Jared Rutter's status as an HHMI investigator. Jared Rutter is one of four investigators at the University of Utah to hold this prestigious position.

Building Sustainable Equity, Diversity, and Inclusion (EDI) Initiatives

The DMRC continues to support efforts to build sustainable EDI programing. Keke Fairfax, PhD and Scott Summers, PhD will submit an R25 application to the NIDDK at the end of January 2022 to support the summer program, titled: "Biomedical Research Inclusion & Diversity to Grow

Excellence in Science – Undergraduate Program for HBCUs (BRIDGE UP–HBCU)." This program piloted in summer 2021, and will continue in the summer of 2022.

If you have suggestions for how to increase EDI programing within the DMRC, please reach out to Sara.

Biomedical Research Inclusion & Diversity to Grow Excellence in Science – Undergraduate Program for HBCUs (BRIDGE UP–HBCU)

Opportunities

Would you like feedback on an upcoming grant submission?

- The DMRC is willing to pay external investigators to review your grant! Check out the process here, and reach out to Sara with any questions.

Are you interested in developing new methodology in metabolism?

- Take advantage of the Metabolomics Core Support Program!

Did you know we have clinical serum samples from 5,000+ people?

- Thanks to the Division of Cardiovascular Genetics, the DMRC has clinical serum samples relating to: body habitus (e.g. studies of extreme familial thinness, familial obesity, gastric bypass), premature coronary artery disease, heart failure, diabetes, etc.
- The samples are indexed with electronic health records and contain extensive information about clinical outcomes.
- Reach out to Scott Summers if you want to learn more!

Research Highlights

Three DMRC investigators featured in Vitae 2021

Improving Access to Diabetes Care

Michelle Litchman, PhD, Assistant Professor, College of Nursing

34 million Americans live with diabetes. Even with amazing advancements in diabetes care, many people still do not have access to the diabetes education, prescriptions, and support they need to be successful. My research examines the challenges, consequences, and solutions related to accessing diabetes care.

My work centers around infoveillance of do-it-yourself solutions to understand diabetes management in the real-world. It also explores the development and delivery of integrated behavioral interventions for underserved and underrepresented populations with diabetes and the social context of diabetes management in online and family environments. My work has influenced local health policy to improve access to insulin.

Watch the video here.

Fibrosis: From Deciphering the Mechanisms to Developing Medicines

Patrice Mimche, PhD, Assistant Professor, Department of Pathology, School of Medicine

Fibrosis is an excessive wound healing response after chronic tissue injury. Unchecked, it will destroy organ architecture, eventually leading to organ dysfunction and failure. Fibrosis can affect any organ in the human body and is responsible for up to 45% of all deaths in developed nations. Unfortunately, therapeutic options for managing fibrotic diseases are severely limited.

My lab focuses on deciphering the molecular mechanisms of pathological organ inflammation and fibrosis. Previously, while seeking to understanding the role of axonal guidance cues in the pathogenesis of cerebral malaria infection, I discovered that a member of the Ephrin neuronal guidance system could contribute to tissue inflammation and fibrosis. This discovery has shaped my current research program seeking to elucidate how the Ephrin signaling pathway promotes pathological inflammation and fibrosis across multiple organs—skin, lung, liver, and kidney. The work in my lab could lead to the discovery/development of novel Ephrin-based therapeutics for treating fibrotic disorders. Fibrotic diseases my lab is currently working on include scleroderma, idiopathic pulmonary fibrosis, chronic kidney diseases, and non-alcoholic steatohepatitis (NASH), and associated metabolic disorders.

Watch the video here.

A Bottom-up Approach to Discovering Drugs for Chronic Disease

Raphael Franzini, PhD, Assistant Professor, Department of Medicinal Chemistry, College of Pharmacy

Treatment of many diseases primarily relies on small-molecule drugs. However, drugs remain elusive for many conditions because their development is challenging, laborious, and expensive. To address this issue, we pursue a bottom-up approach towards discovering and

delivering drugs. My group advances a technology that miniaturizes drug discovery by attaching DNA-barcodes to libraries of compounds.

With such DNA-encoded libraries, one can simply “fish” for drug candidates, greatly simplifying the discovery of new candidate molecules. My lab aims to discover new chemical entities that can restore healthy processes and lead to medicines for cardiovascular disease, neurodegeneration, and cancer. We also are interested in using chemical reactions to deliver drugs specifically to the site of disease. Towards this goal, we have developed drug-release reactions that are compatible with living organisms. With these capabilities in hand, we are actively moving new therapeutic approaches from the early stages towards translation.

Watch the video here.

New Publications (abridged)

Allen NA, Litchman ML, Neller S, Tracy EL, de Grey RGK, Grigorian E, Helgeson VS, Berg CA., Couples Managing Type 1 Diabetes Using Diabetes Technology, Diabetes Spectr. 2021 Nov;34(4):378-387. doi: 10.2337/ds20-0045. Epub 2021 Jun 3.

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Farhoudi N, Laurentius LB, Magda JJ, Reiche CF, Solzbacher F., In Vivo Monitoring of Glucose Using Ultrasound-Induced Resonance in Implantable Smart Hydrogel Microstructures, ACS Sens. 2021 Oct 22;6(10):3587-3595. doi: 10.1021/acssensors.1c00844. Epub 2021 Sep 20.

Ferrara PJ, Verkerke ARP, Maschek JA, Shahtout JL, Siripoksup P, Eshima H, Johnson JM, Petrocelli JJ, Mahmassani ZS, Green TD, McClung JM, Cox JE, Drummond MJ, Funai K., Low lysophosphatidylcholine induces skeletal muscle myopathy that is aggravated by high-fat diet feeding, FASEB J. 2021 Oct;35(10):e21867. doi: 10.1096/fj.202101104R.

Litchman ML, Ng A, Sanchez-Birkhead A, Allen NA, Rodriguez-Gonzales B, Iacob E, Greenwood DA., Combining CGM and an Online Peer Support Community for Hispanic Adults with T2D: A Feasibility Study, J Diabetes Sci Technol. 2021 Aug 20:19322968211032278. doi: 10.1177/19322968211032278. Online ahead of print.

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Porter G, Michaud TL, Schwab RJ, Hill JL, Estabrooks PA., Reach Outcomes and Costs of Different Physician Referral Strategies for a Weight Management Program Among Rural Primary Care Patients: Type 3 Hybrid Effectiveness-Implementation Trial, JMIR Form Res. 2021 Oct 20;5(10):e28622. doi: 10.2196/28622.

Porter ME, Litchman ML, Grigorian EG, Blanchette JE, Allen NA., Who Needs Diabetes Education? A Qualitative Analysis of Emerging Adults With Type 1 Diabetes, Sci Diabetes Self Manag Care. 2021 Dec;47(6):436-446. doi: 10.1177/26350106211051297.

Schuler MH, English AM, Xiao T, Campbell TJ, Shaw JM, Hughes AL., Mitochondrial-derived compartments facilitate cellular adaptation to amino acid stress, Mol Cell. 2021 Sep 16;81(18):3786-3802.e13. doi: 10.1016/j.molcel.2021.08.021.

Shields KL, Broxterman RM, Jarrett CL, Bisconti AV, Park SH, Richardson RS., The passive leg movement technique for assessing vascular function: the impact of baseline blood flow, Exp Physiol. 2021 Oct;106(10):2133-2147. doi: 10.1113/EP089818. Epub 2021 Sep 4.

Shimura D, Nuebel E, Baum R, Valdez SE, Xiao S, Warren JS, Palatinus JA, Hong T, Rutter J, Shaw RM., Protective mitochondrial fission induced by stress-responsive protein GJA1-20k, Elife. 2021 Oct 5;10:e69207. doi: 10.7554/eLife.69207.

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For questions, contact Sara.Salmon@hsc.utah.edu

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