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Research Foundation

Pathway to Stop Diabetes®

Pathway *newsletter*

ADA Announces 2019 Pathway Awardees

On February 15th, 2019 the American Diabetes Association announced the 2019 recipients of our Pathway to Stop Diabetes awards. This year, we welcome three new brilliant scientists with projects dedicated to improving the lives of people with diabetes through research. Each will receive \$1.625 million over a five year period to pursue transformational diabetes research. These three awardees were selected by the Mentor Advisory Group from 89 nominations received.

The three 2019 Pathway awardees bring the total number of scientists supported by the initiative to 32. Our

new awardees include Ebony B. Carter, MD, of Washington University in St. Louis, who will be conducting a clinical trial to determine how best to prevent gestational diabetes; Sarah A. Tishkoff, PhD, of the University of Pennsylvania, who will research disparities in diabetes risk by understanding the genetics of three different indigenous populations in Cameroon; and Matthew J. Webber, PhD, of Notre Dame University, who is developing a novel approach to prevent hypoglycemia. See pages 5-8 for more on what motivates our 2019 awardees.

Our press release announcing the new awardees can be viewed [here](#).



Ebony B. Carter, MD
2019 Accelerator Awardee

May 2019

Pathway Scientists Collaborate

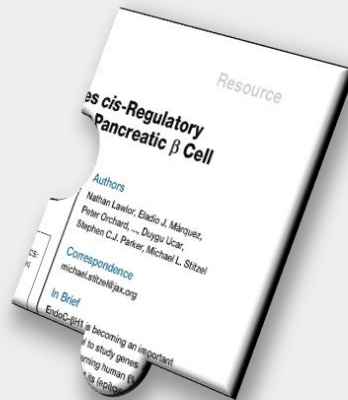
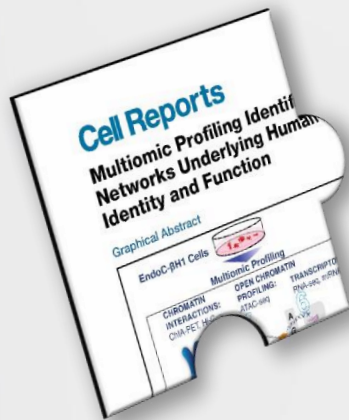
In 2013, the American Diabetes Association launched Pathway to Stop Diabetes, a bold program with a simple idea: Bring 100 brilliant new scientists to diabetes research. We sought to give them the freedom, financial resources, expert mentoring and collaboration opportunities to ensure success. Recently, three Pathway scientists contributed to a paper comparing the genomic signature of the first human beta cell line to actual human islets. "Our results lay the groundwork for targeted and hypothesis-driven research projects that could ultimately reveal the connections linking a person's genetics, beta-cell failure, and type 2 diabetes," stated Drs. Stitzel, Parker and Sethupathy. See their article published in the journal [Cell Reports](#) and our accompanying [press release](#).



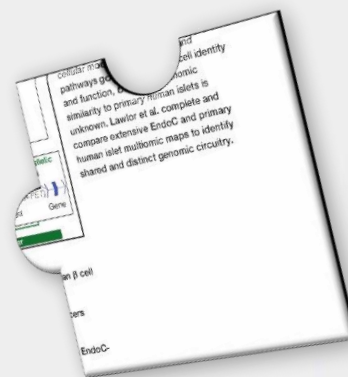
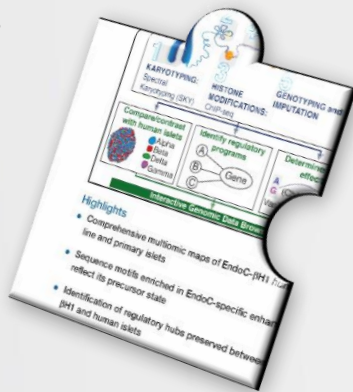
Michael Stitzel, PhD
2018 Accelerator awardee



Praveen Sethupathy, PhD
2016 Accelerator awardee



Stephen Parker, PhD
2014 Initiator awardee



PATHWAY TO STOP DIABETES
THE PROBLEM IS UNPRECEDENTED.
THE SOLUTION MUST MATCH IT.

Pathway Scientist Submits Patent Application


In the summer of 2015, Dr. Sumita Pennathur's four-year old daughter was diagnosed with type 1 diabetes. She wondered what she – an established Professor in Mechanical Engineering – could possibly do to help her and other people dealing with the burden of diabetes. “After my daughter’s diagnosis, I realized that I had the passion and the expertise to solve her problems. However, I did not have the academic track record. How could I possibly convince a funding agency to invest in me?”

The Pathway to Stop Diabetes program is unique in that it embraces scientists from other disciplines who want to use their expertise to pursue advances in diabetes prevention, treatment and care. Dr. Pennathur submitted an application to leverage her engineering background to create a disposable patch capable of continuously monitoring glucose in an easy and painless manner. Her long-term goal is to increase usage of continuous glucose monitoring systems to improve glucose control in people with type 1 and type 2 diabetes, including her own daughter.

Dr. Pennathur is now carrying out her vision to make continuous glucose monitoring more accessible to people with diabetes. This year, she submitted a patent application related to a significant advancement conducted as part of her Pathway award. Together with her team at University of California, Santa Barbara, Dr. Pennathur has developed a new molecule that enables glucose monitoring using measurements of solution conductivity.

Most continuous glucose monitoring systems are dependent on the activity of enzymes and use electrochemical sensing methods that drift over time and thus require frequent calibration. The advantage of the conductimetric method is that it is stable over long-term periods, thus potentially eliminating the requirement for frequent calibrations. Additionally, this method offers the potential for miniaturization at low-cost.

The intellectual property disclosure was made available to qualified Pathway sponsors for an exclusive first option to negotiate licensing. We look forward to continued progress from Dr. Pennathur as she and the members of her laboratory work to help reduce the burden of diabetes.



*Sumita Pennathur, PhD
2017 Visionary awardee*

Pathway Scientist Spotlight:

Phillip James White, PhD

When Dr. Phillip James White was looking to build upon his physiology training as a graduate student at Université Laval in Quebec City, Canada, he had one strongly held belief: *research questions stemming from unbiased human observations hold the most promise for future translation.* It was for this reason that Dr. White decided to pursue a postdoctoral position in Dr. Christopher Newgard's lab at Duke University. His goal was to characterize the underlying systems biology of an intriguing cluster of branched chain amino acid-related metabolites that had been recently described by Dr. Newgard's group and others to be the most accurate predictive index of insulin sensitivity and future diabetes risk in humans.

Fast forward four years into his fellowship and Dr. White had secured the training he sought with the productivity to match it: 15 publications in leading journals and a patent. He believed he was ready to become an independent investigator, but he didn't have the financial backing to justify this career-defining transition for an academic scientist.

That all changed when he received his Pathway to Stop Diabetes award from the American Diabetes Association. With this funding and a strong track record of productivity, Dr. White secured a junior faculty position at Duke University. "It is noteworthy that the conditions stipulated by my Pathway award strengthened my ability to negotiate strong institutional support from Duke University that has further enhanced the experimental capabilities and resources available to my group as we work to develop new approaches to improve the health span of people with diabetes," stated Dr. White.

Now, his group has uncovered a potential key network of metabolic regulation which links branch-chained amino acid metabolism to excessive lipid accumulation in the liver, also known as non-alcoholic fatty liver disease (NAFLD). NAFLD affects almost 25% of people worldwide and 70% of people with type 2 diabetes. "We believe the characterization of this network and its precise role as a master regulator of metabolism will uncover novel targets for interventions that have strong translational potential," explained Dr. White.

His *Cell Metabolism* article, titled "The BCKDH Kinase and Phosphatase Integrate BCAA and Lipid Metabolism via Regulation of ATP-Citrate Lyase," is available [here](#).

“ My Pathway to Stop Diabetes award came at a critical time in my career development, as I prepared to launch my own independent laboratory. The substantial mentoring and financial support served as a strong foundation on which I could begin to build my research group. ”

-Dr. Phillip James White,
2016 Pathway Initiator awardee



Ebony B. Carter, MD

Washington University in St. Louis

Targeted lifestyle change group prenatal care for obese women at high risk for gestational diabetes: a randomized controlled trial

How will your project help people with diabetes in the future?

The diagnosis of gestational diabetes is scary and requires lifestyle changes that can be difficult and overwhelming to achieve. The silver lining in receiving this diagnosis is that, while the risk of developing type 2 diabetes is high, it is not a foregone conclusion and steps can be taken to delay or prevent this long-term diagnosis all together. TLC Group Care focuses on a cohort of women who are at high risk for developing gestational diabetes (and therefore, type 2 diabetes) and provides tools and support for diabetes prevention during pregnancy. Hopefully, with the help of TLC, these changes can be carried forward after delivering the infant with the potential to impact diet, nutrition, and exercise choices for mom, baby and the entire family.

Why is it important for you, personally, to become involved in diabetes research?

As a high-risk obstetrician, I know that women who have adverse pregnancy outcomes, such as gestational diabetes, hypertensive disorders in pregnancy, preterm birth and low birthweight, are more likely to develop cardiovascular disease later in life than women without these complications. I discuss these risks with my patients, but I love diabetes research because it also allows me to share a message of hope. I'm excited to be joining the Pathway program because it will allow me to apply a promising intervention to women who have not yet developed diabetes with the potential to prevent or delay the onset of diabetes and associated complications.

What direction do you see the future of diabetes research going?

I believe the future of diabetes research is in prevention. We've made great strides in treating diabetes in recent years, but this is a largely preventable disease. I'm excited to move my research program from secondary prevention strategies to control diabetes during pregnancy to primary prevention strategies that address insulin resistance before the disease threshold is met.



Project Description

Medical complications that develop during pregnancy, such as gestational diabetes, can affect the long-term health of mothers and their children. While most women with gestational diabetes return to normal immediately after delivering their babies, they remain at significantly higher risk of developing type 2 diabetes in the years immediately following pregnancy. Dr. Carter has designed an innovative and practical intervention, called Targeted Lifestyle Change Group Prenatal Care (TLC), that can be integrated in routine prenatal care. She will compare this approach to traditional prenatal care in a community of women who are predominantly low-income, African American, have high levels of obesity, and are at high-risk for developing gestational diabetes, to determine whether it improves health outcomes for both women and their children. If successful, this effort has the potential to mitigate the transgenerational risk for type 2 diabetes in high-risk populations.

Sarah A. Tishkoff, PhD

University of Pennsylvania

Genetic risk factors for diabetes in populations of African Ancestry

How will your project help people with diabetes in the future?

The prevalence of diabetes is increasing globally, from 415 million in 2015 to a projected 642 million in 2040. The highest rate of increase is in Africa, where the prevalence of diabetes is predicted to more than double within the same period. The disproportionate increase in diabetes and cardiovascular disease risk amongst Africans has been influenced by westernization of dietary habits and sedentary lifestyles in a population that likely has a higher genetic risk. By understanding the contribution of genetics and lifestyle, my project could provide information on the causes for increased risk of diabetes in African-Americans and lead to more effective treatments.

Why is it important for you, personally, to become involved in diabetes research?

Individuals of African ancestry in the U.S. have a high prevalence of diabetes, which is also on the rise in Africa. I am fundamentally motivated by my sincere concern that the scientific community needs to do more to alleviate health disparities. I have devoted my career to being an advocate for inclusion of minority populations in human genomics research. Given the high prevalence of diabetes in African-Americans, I want to devote my future research toward studies that will help elucidate the causes of diabetes, and facilitate development of therapeutics, in ethnically diverse populations. This award will enable me to establish collaborations with interdisciplinary scientists and clinicians, both in the U.S. and in Africa, to conduct research that could impact developing more effective treatment for patients with diabetes from globally diverse populations.

What direction do you see the future of diabetes research going?

I see the future of diabetes research focusing on identifying individual risk factors for disease and development of personalized therapeutics. As we develop more cost effective genomic screening technologies, it will be possible to integrate genomic data with detailed information about cardio-metabolic traits obtained from wearable devices or electronic health records and with information about behavior and diet so that we can better understand the factors influencing risk of diabetes at an individual level. Inclusion of ethnically diverse individuals will be important for developing diagnostic markers and treatments that will be effective in global populations.



Project Description

Populations of African descent, including African-Americans, have high rates of type 2 diabetes, but we don't yet understand exactly why. Dr. Sarah Tishkoff will use her expertise in the genetics of Africans to unravel the mysteries underlying this health disparity. She has identified three separate ethnically diverse African populations living indigenous lifestyles with widely different rates of diabetes. Through analyzing the differences in their DNA, immune systems and metabolism, Dr. Tishkoff seeks to understand why some indigenous populations are protected from diabetes, while others are at high risk. Understanding the risk factors for diabetes in populations of African ancestry is critical for developing better, more precise diagnostics and therapeutics and eliminating disparities in diabetes.

“
I’m so honored and excited to be a recipient of a Pathway award which will enable my lab to pursue innovative approaches for understanding causes and treatments for adult onset diabetes in globally diverse populations.”

-Sarah A. Tishkoff, PhD
2019 Visionary awardee



Matthew J. Webber, PhD

University of Notre Dame

Hypoglycemic rescue with glucose-responsive glucagon delivery devices

How will your project help people with diabetes in the future?

Our team seeks to improve the quality of life of people with type 1 diabetes through more autonomous therapeutic solutions. Our vision through this work is to replace rescue glucagon kits with “smart” alternatives that keep the hormone at the ready in the event it is needed. In so doing, this approach will allow people with diabetes to live their lives without the need for constant vigilance by altering the traditional paradigm of self-managed blood glucose control.

Why is it important for you, personally, to become involved in diabetes research?

As a chemical engineer, I am passionate about engineering new materials and devices to combat disease. The unique challenges presented by diabetes, specifically in the requirement that a therapy must address and adjust to normal fluctuations in blood glucose in real time, makes this disease the ultimate challenge in the context of engineering responsive therapies. This award will enable us to assemble a team and mount a sustained effort toward new technology addressing one of the most pressing unmet needs in the therapeutic arsenal for diabetes.

What direction do you see the future of diabetes research going?

The research being done by my team and others seeks to improve the management of diabetes through better therapies. This body of work does not constitute a “cure” for this disease, but instead seeks better and safer routes to address the complications and insufficiencies of present approaches. My hope is that next-generation approaches may benefit from genomics and genetic engineering to better predict, prevent, or reverse onset of diabetes. I am also hopeful that efforts in immuno-engineering may yield successful routes to reprogram the body to induce tolerance and prevent or reverse the auto-immune drivers of diabetes.



Project Description

Low blood glucose levels are a serious threat to people with diabetes—especially during sleep, when they are less aware of the condition and less able to safely counteract it by ingesting glucose. This danger leads to sleepless nights for patients and their caregivers. Using his background in materials science, Dr. Webber has outlined an innovative approach to proactively prevent the threat of low-blood glucose. His idea centers around the development of materials that can both sense glucose levels and respond to low glucose by automatically releasing the hormone glucagon. This approach will be automated and integrated into patient-friendly delivery devices, offering promise to provide a safe and care-free way to prevent potentially lethal glucose lows while mitigating a serious physical and psychological burden for people with diabetes.

Upcoming Pathway to Stop Diabetes Events

BRIDGING DIABETES RESEARCH WITH
GROUNDBREAKING DISCOVERIES

SAN FRANCISCO, CA • JUNE 7 - 11, 2019

American
Diabetes
Association
79TH SCIENTIFIC
SESSIONS

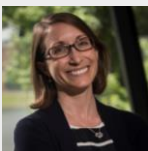
Pathway Poster Reception:



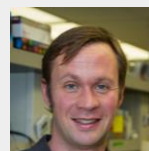
Please join us to meet the Pathway scientists and to hear about their exciting research
Date: Friday, June 7th; Time: 6:30 P.M.-9:00 P.M.; Location: West building, 2nd level lobby
Poster presenters:



Marie-France Hivert, MD
Accelerator '15
Gestational Diabetes



Maureen Monaghan,
PhD
Accelerator '18
Type 1 Diabetes



Thomas Delong, PhD
Accelerator '15
Type 1 Diabetes



Phillip James White, PhD
Initiator '16
Type 2 Diabetes



Jonathan Flak, PhD
Initiator '17
Complications



David A. Spiegel, PhD
Visionary '17
Complications



Praveen Sethupathy, PhD
Accelerator '16
Type 2 Diabetes



Stephen Parker, PhD
Initiator '14
Type 2 Diabetes



Michael Stitzel, PhD
Accelerator '18
Type 2 Diabetes

Invited Lectures by Pathway Scientists at Scientific Sessions:



Maureen Monaghan, PhD; 2019 Pathway Accelerator awardee
"Leveraging Appointments with Certified Diabetes Educators to Build Skills Towards Successful Transition"
Session: Transition from Pediatric to Adult Diabetes Care – What's Really Working?
Friday, June 7th, 12:45-1:45 PM; Location: S-203



Sarah A. Stanley, MB, BCh, PhD; 2017 Pathway Accelerator awardee
"Remote Cell Activation to Investigate Glucose Metabolism"
Session: The Future Is Here – New Technologies in Islet Biology
Friday, June 7th, 2:00-4:00 PM; Location: W-2002



Michael L. Stitzel, PhD; 2018 Pathway Accelerator awardee
"Genomic Signatures in Human Beta Cells"
Session: From Genome-Wide Association Studies to Functional Impact in the Beta Cell
Saturday June 8th, 4:00-6:00 PM; Location: W-2002