Overview

Scientific Sessions brought together over 14,000 attendees, featuring nearly 900 speakers and more than 2,100 poster presentations, including 47 moderated poster discussions. Social media was buzzing, and there were nearly 300 news reports of breakthroughs presented at Scientific Sessions, with press releases, original news articles and preview coverage of the 78th Scientific Sessions reaching a total potential audience of more than 700 million, putting diabetes front and center in conversations around the globe. The reach of the meeting is impressive, but the real power of Scientific Sessions goes beyond the numbers. The meeting provides unique opportunities for diabetes professionals to make important connections that advance science. The program ranges from large sessions with 6,000 attendees to intimate one-on-one conversations at a poster board. Former colleagues reconnect and new personal and professional connections are made at every corner of the convention center. These are the relationships and exchanges critical to moving progress forward.

American Diabetes Association Presidents Seek to Change the Future of Diabetes

Felicia Hill-Briggs, PhD, President, Health Care & Education, examined the era of health care transformation and the role of the American Diabetes Association in her presidential address.

For Dr. Hill-Briggs, diabetes is personal. She was diagnosed with type 1 diabetes at the age of nine and turned to the ADA as a lifeline. In her role as ADA’s President, Health Care & Education, Dr. Hill-Briggs is dedicated to keeping the ADA current and relevant in today’s era of health care transformation. She noted the critical nature of convening stakeholders to work at the population level, develop new health and therapeutic modalities, and ensure that people with diabetes get the right care at the right time and place. Dr. Hill-Briggs highlighted the ADA’s population health initiatives that are serving the mission, including the Diabetes Prevention Program, the Risk Test, a quality improvement program called Diabetes Inside, and a new mental health provider education program.

Jane E.B. Reusch, MD, President, Medicine & Science, called upon the diabetes community to tell the story of diabetes to change diabetes outcomes in her presidential address.

Dr. Reusch focused on the staggering facts and statistics defining the burden of diabetes today. She noted that there are 30.3 million diabetes stories in the U.S.—and we need to tell those stories to change the trajectory of the disease. The cost alone—a staggering $377 billion in the U.S. in 2017—is enough to elevate diabetes to a nonpartisan, nonpolitical, nonnegotiable issue. She relayed the story of Shane Patrick Boyle, who died in 2017 because he couldn’t afford insulin. And she noted that public awareness is key to reducing the toll of diabetes. Early intervention can change the mortality curve of diabetes, but you can’t intervene without awareness. Reiterating her call to action, she directed the audience to “know the story of diabetes and tell the story to anyone who will listen.”
Type 1 Diabetes (T1D)

Current Management of T1D in Youth
In a joint American Diabetes Association/JDRF Symposium, expert presenters focused on available therapies and technologies for management of all parameters of T1D in youth. Dr. Hood Thabit addressed insulin therapy by multiple daily injections or pump. Dr. Gregory Forlenza discussed monitoring blood glucose with meters, continuous glucose monitors, or both. Dr. Maureen Monaghan, who is among the newest ADA Pathway to Stop Diabetes Award recipients, addressed psycho-social support in youth with T1D, which is sometimes neglected in management. Dr. Petter Bjornstad examined managing the comorbidities of T1D. The goal of the session was to equip health care providers with the best current evidence for making management decisions for their young patients with T1D.

Automating Diabetes Management: Glucose Sensing and Drug Delivery
Several exciting studies presented during the ADA’s 78th Scientific Sessions focused on technology advances that are making diabetes management safer and easier. For example, the Diabeloop DBLG1 is a closed-loop insulin delivery system. Dr. Sylvia Franc presented data from a 12-week, 68-person study that showed that patients with T1D could achieve better glucose control with fewer hypoglycemic events with this system compared to their usual pump and sensor. Dr. Ronnie Aronson presented data from a 36-patient study that investigated the safety and efficacy of the Eversense XL implantable continuous glucose monitor primarily in adolescents with T1D over a six-month period. The system provided accurate glucose measurements with no major side effects. In a five-day study of the Omnipod hybrid closed-loop system in “free-living” adults with T1D, Dr. Bruce Buckingham reported that time spent in the target glucose range was higher and time spent in hypoglycemia was lower for patients on the Omnipod. Dr. Ahmad Haidar presented a study examining a dual-hormone artificial pancreas, which combines the delivery of insulin with the only other FDA-approved drug for lowering glucose in people with T1D, pramlintide. The dual-hormone system improved blood glucose levels more than the insulin-only system. Together, these studies demonstrate promising advances to safe and effective treatment of T1D on the horizon soon.

Repurposing Type 2 Diabetes Medications for Type 1 Diabetes
As the challenges of managing T1D continue to prevent many patients from reaching their treatment goals, more emphasis has been placed on determining whether medications approved for the treatment of T2D might also help people with T1D improve their health outcomes. Dr. John Buse reported a 52-week study of sotagliflozin, an SGLT-1/2 inhibitor, in people with T1D. The patients taking sotagliflozin had sustained reduction in A1C levels and body weight, and a lower total daily insulin dose compared to patients on insulin only. However, there was an increased risk of diabetic ketoacidosis (DKA) in patients on sotagliflozin. In a 24-week study of dapagliflozin, another SGLT-2 inhibitor, Dr. Chantal Mathieu reported improvements in A1C, weight loss, and insulin doses. Similarly, there was an increased risk of DKA in patients on dapagliflozin. With proper DKA patient education, this class of drugs that includes both sotagliflozin and dapagliflozin may offer an important adjunct therapy for people with T1D who are not consistently reaching their target blood glucose range. These types of studies show the value of research relevant to all types of diabetes, because it is difficult to predict which study will lead to important knowledge that will ultimately help which patients. Here, we are seeing improved options for people with T1D that would not have been possible without the studies that led to the development of these drugs, currently approved for T2D.
Type 2 Diabetes (T2D)

Veterans Administration Diabetes Trial (VADT) 15-Year Follow-Up Outcomes
This trial, which compared intensive glucose control (getting patients to <6.0% A1C) to standard glucose control (maintaining A1C between 8.0-9.0%) previously showed a long-term “legacy effect” of intensive glucose control on reducing the 10-year risk of cardiovascular events. This year at the ADA’s Scientific Sessions, the study investigators reported the results from 15 years of follow up and showed that the improvement in cardiovascular outcomes was lost at that point. The investigators concluded that there are benefits of glucose lowering, but they do not last forever. The intensive glucose-lowering regimen would need to be continued to continue to see the positive outcomes. Some limitations to interpreting these outcomes include that almost all (97%) of the study participants were men and that they had advanced T2D at the start of the trial. Therefore, health care providers continue to be advised to make diabetes therapy decisions individually for specific patients. There is no one-size-fits-all treatment or treatment goal for diabetes.

Restoring Insulin Secretion (RISE) Program’s Pediatric Medication Study
Prediabetes and T2D are characterized by insulin resistance and beta cell dysfunction—and these conditions are affecting an increasing number of youth in the U.S. Research has suggested that youth with T2D might have a more severe and more rapidly progressive condition than those who develop T2D as adults. The RISE program studied different interventions to determine whether they could halt or reverse beta cell dysfunction in youth. At baseline, youth were found to have lower insulin sensitivity than adults; and they have to release larger amounts of insulin with each meal to regulate metabolism. The diabetes drugs metformin and insulin have previously been shown to improve beta cell function in adults with prediabetes or recent-onset T2D; therefore, this study examined these drugs to determine whether they could do the same in youth. Both drugs were ineffective, which further suggests that youth who develop diabetes have a more severe form of the disease. More research is needed to understand the differences in how T2D progresses in youth, and to identify the best treatments for these patients, who may be at a higher risk of future diabetes complications.

Real-World Analysis of Amputation Risk with Diabetes Drug
In 2017, findings were published from two trials on a diabetes drug called canagliflozin, which indicated that risk for cardiovascular events was lower with this drug, but that risk for amputation was higher. At this year’s Scientific Sessions, Dr. John Buse described a large comprehensive analysis of data on more than 700,000 patients to examine canagliflozin-associated effects compared to other drugs of the same class and to different classes of diabetes drugs. This analysis confirmed a reduced risk of heart failure for the drug class known as SGLT2 inhibitors, including canagliflozin. However, there was no increased risk of amputation for users of canagliflozin or other SGLT2 inhibitor drugs. Additional research will be needed to examine longer-term use of these drugs, but this promising analysis suggests that this type of medication has a favorable benefit to people with diabetes and should be considered as a therapeutic option for appropriate patients.
2018 Pathway to Stop Diabetes Awardees Describe Projects; Meet Mentors, Association Leadership and Program Sponsors and Donors

To drive transformational diabetes research, the American Diabetes Association’s Research Foundation launched Pathway to Stop Diabetes in 2013. This unique program is made possible with the support of corporate sponsors, individual philanthropists and family foundations. Pathway to Stop Diabetes offers substantial funding, freedom, autonomy, mentorship and collaboration to early-career investigators and to those established in other fields, but who have never studied diabetes before. Since the first grants were awarded in 2014, an elite group of 29 brilliant investigators has been selected to become Pathway Scientists.

In Orlando, for the second year in a row, we brought together the Pathway awardees, program sponsors and donors, Mentor Advisory Group members, and ADA leadership at an intimate reception hosted by Dr. Karen Talmadge, Chair of the ADA Board of Directors and one of the founders of the Pathway to Stop Diabetes program. The reception offered a relaxed atmosphere for networking in advance of official scientific programming and was well received.

Six stellar scientists were newly awarded Pathway grants in January 2018. This year, they presented their Pathway project plans and early results at an invitation-only symposium of Pathway stakeholders. Collectively, the new class of awardees impressed the audience with their innovative approaches to understand, treat, and prevent diabetes. Among the new projects added to the portfolio are how specific subtypes of cells in the brain control digestion and glucose metabolism; new insights into whether inhibitory neurons in the brainstem can control metabolism; understanding how different types of cells in the pancreas are disrupted in T2D; leveraging a new class of molecules as a gene therapy for T2D; a chemist's approach to characterizing—and treating—beta cell destruction in T1D and insulin resistance in T2D; and a behavioral scientist's approach to improving health communication during the transition from pediatric to adult diabetes care. The projects were presented to much acclaim at the private symposium. The innovative proposals have high potential for improving the lives of people with diabetes. And the scientists supported through the Pathway program are joining an exceptional network of rising stars in diabetes research committed to changing the trajectory of diabetes and diabetes complications.

The 78th Scientific Sessions brought these individuals together for several days of unparalleled scientific exchange that will help them improve and refine their studies, build and leverage collaborations, and succeed in their ultimate goals to provide solutions that will make a difference for people with diabetes.

Pathway to Stop Diabetes Posters Featured at Networking Reception

For the first time this year, select Pathway to Stop Diabetes awardees were invited to present posters during the Scientific Sessions Networking Reception. Posters featured presentations by a representative sample of scientists awarded between 2014—2017 and featured topics such as insights into T1D risk factors, how diabetes leads to blindness, connections between the sense of smell and obesity, gut bacteria and T1D, and the engineering of a continuous glucose monitoring patch. The relaxed atmosphere provided an intimate setting for all attendees of the Scientific Sessions to engage with Pathway scientists and learn more about what makes the program unique.
Pathway to Stop Diabetes® Awardees Report Recent Results

In addition to the dedicated Pathway symposium for new awardees, Pathway scientists who were awarded in prior years delivered exciting and thought-provoking presentations throughout the official conference program.

Type 1 Diabetes (T1D)
Thomas Delong, PhD

Dr. Delong received a Pathway Accelerator Award in 2015. He is an assistant professor in the department of pharmaceutical sciences at the University of Colorado, Denver. Dr. Delong’s motivation for diabetes research largely stems from his own diagnosis of T1D at the age of 12. His research program is focused on identifying the triggers for the autoimmune attack that causes T1D. With that information, his hope is that T1D could be prevented or reversed. He has identified a novel protein modification in the pancreatic beta cells of mice that may trigger the autoimmune attack. His presentation in Orlando showed that immune cells from humans with T1D react to this protein modification, suggesting that it could trigger the beta cells for destruction by the immune system. This exciting discovery sets the stage for examining whether the protein modification that generates so-called hybrid insulin peptides, occurs in humans.

Type 2 Diabetes (T2D)
Stephen C.J. Parker, PhD

Dr. Parker received a Pathway Initiator Award in 2014 when he was a postdoctoral fellow at the National Institutes of Health. Since receiving his grant, he started his own research laboratory at the University of Michigan, where he is assistant professor of computational medicine and bioinformatics and assistant professor of human genetics. Dr. Parker is focused on better understanding the interplay of genetic and environmental factors in the development of T2D. His research is highly innovative because it uses a combination of novel approaches to yield the most comprehensive ‘omics’ profile of T2D to date. Based on this multi-tissue and multi-omics profiling, Dr. Parker anticipates being able to personalize tissue-specific signatures of diabetes development, which is critical to achieving precision medicine in diabetes. In Orlando, Dr. Parker presented data from human islet samples that contribute to a genetic map of tissue-specific gene regulatory activity. These data are expected to inform the interpretation of how known genetic mutations contribute to T2D risk and progression, and what treatment is most effective for what patient.

Gestational Diabetes
Marie-France Hivert, MD

Dr. Hivert received a Pathway Accelerator Award in 2015. She is currently an associate professor in the department of population medicine at Harvard Pilgrim Health Care Institute/Harvard Medical School. Her research is focused on how exposure to gestational diabetes influences gene regulation in the fetus, particularly with regard to genes associated with T2D risk. By better understanding the mechanisms of metabolic disorders during pregnancy and in early life, she hopes to identify ways to prevent T2D. In Orlando, Dr. Hivert presented data on the role of gene regulation in the placenta on insulin sensitivity during pregnancy. These data suggest that the placenta has a major role in decreasing insulin sensitivity and may be a target for treating gestational diabetes. Due to the transgenerational effects of diabetes exposure in the womb, prevention or better management of gestational diabetes may help prevent the future development of T2D in the offspring.
New Diabetes Therapies
Praveen Sethupathy, PhD

Dr. Sethupathy received a Pathway Accelerator Award in 2016. He is now an associate professor at Cornell University College of Veterinary Medicine. His research is focused on the intestine, an understudied tissue in diabetes, with a goal of understanding the effects of high-fat diet and of bariatric surgery on diabetes risk. In Orlando, Dr. Sethupathy presented data that showed that a high-fat diet increases the proliferation of intestinal stem cells and promotes the differentiation of these cells into different cell types. Furthermore, he identified gene expression changes that are associated with these changes. He is now investigating whether bariatric surgery effectively treats diabetes by reversing these gene expression changes. With such an enhanced understanding, Dr. Sethupathy hopes that we will be able to identify newer, safer therapies that work at the level of the intestines to treat or prevent diabetes.

Complications
David A. Spiegel, MD, PhD

Dr. Spiegel received a Pathway Visionary Award in 2017. Currently a professor of chemistry at Yale University, Dr. Spiegel had never studied diabetes before receiving his Pathway grant. He is investigating a molecule called glucosepane, which is derived from glucose and may contribute to the development of diabetes and complications of diabetes. In Orlando, Dr. Spiegel presented a study that identified enzymes capable of breaking down glucosepane. Presently, he is investigating the mechanism of action for one of these enzymes, with a goal of using this insight to better understand the role of glucosepane in diabetes and to target its action to develop new therapies that may prevent diabetes complications.

Major Award Lectures Feature Cutting-Edge Science and Predict Future Treatments

Understanding Insulin Resistance to Treat the Root Cause of T2D

The Banting Medal for Scientific Achievement is the Association’s highest honor. This year’s recipient, Gerald I. Shulman, MD, PhD, of Yale University, is renowned for transformative studies examining the molecular mechanisms of insulin resistance in humans that have been paradigm shifting in our understanding of how T2D develops. A clinical investigator with acute focus, he developed and implemented novel tools to directly examine glucose and lipid metabolism in humans. His award lecture summarized decades of work that showed that when fat storage builds up in muscle and liver, instead of in fat tissue, insulin resistance in these tissues results and leads to hyperglycemia and eventual T2D. Furthermore, Dr. Shulman discussed new studies from his laboratory that are focused on targeting the liver to improve insulin sensitivity and decrease glucose production by the liver. He is currently working to advance this line of work to clinical trials with the hope of developing a new class of medications for T2D.
**Treating Diabetes in the Brain**

The Outstanding Scientific Achievement Award is a prestigious award recognizing the contributions of an investigator under the age of 50 years. Lora K. Heisler, PhD, of Aberdeen University (Scotland), was this year’s recipient. In her award lecture, Dr. Heisler discussed her research efforts over the course of her career that contributed to the notion that drugs that act in the brain could improve metabolism. She first noticed more than 20 years ago that Prozac reduces food intake and body weight. And drugs that act like Prozac, called serotonin reuptake inhibitors were approved for obesity. However, they were quickly removed from the market due to cardiovascular side effects. Dr. Heisler thought that a better understanding of how the brain controls metabolism would open the possibility of new, more specific drugs that could have the positive effect on reducing obesity, but without dangerous side effects. In her award lecture, she presented a series of studies that identified a specific receptor in the brain that could be targeted to both reduce body weight and improve glucose metabolism. There is already an obesity drug on the market, called lorcaserin, that works through this receptor and, based on Dr. Heisler’s research, is likely to be an effective medication for T2D. Notably, Dr. Heisler took special care to credit the progress of her research program to her first large research grant, a junior faculty development grant from the American Diabetes Association. As she puts it, none of this work would have been possible without that funding.

**Summary**

The American Diabetes Association’s Scientific Sessions bring together the world’s experts and thought leaders in diabetes research and care each year to share data and ideas and discuss the best ways to fight diabetes. Researchers, clinicians, and educators integrate into this extraordinary community of experts. The power of information exchange and personal connection excites and energizes diabetes professionals to explore more and better ways to do their work when they return home. All the while, planning for our next opportunity to bring these incredible people and new ideas together has already begun! We invite you to join us June 7-11, 2019 in San Francisco.