Juvenile Diabetes Cure Alliance
The Voice of the Donor For a Cure

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FLASH REPORT: 2014 ADA Conference

The American Diabetes Association held its 2014 annual conference in San Francisco from June 13-17. In this report, JDCA Fellow Joshua Levy, who attended the conference, provides an overview of events and type 1 diabetes highlights.

General Information Regarding the Conference:

The annual ADA conference is huge in scope and scale. It includes papers, posters, and symposia on everything you could imagine related to type 1 and type 2 diabetes. My overall feeling is that this conference was about 10% type 1 research, 20% research that applies to both type 1 and type 2, and 70% type 2 research. Here are a few numbers to get a sense of the conference's size. There were:

- 1,000+ posters on research projects and initiatives. A "poster" is a literally a poster in the conference where attendees can read about a project. Abstracts for the posters cover 400 pages in a book published by conference organizers.
- 80 research symposia (2 hours: usually about 4 presentations per session)
- 50 sessions of oral presentations (2 hours: about 7 presentations per session)
- 15 or so corporate symposia (2 hours: presentations and discussion)

The conference is structured in two main parts: Exhibitions and Scientific Sessions. The Exhibition is primarily a trade show with booths that attendees can walk around and visit. The Scientific Sessions present research findings. In general, the Exhibitions focus on the "now" while the Scientific Sessions focus on the future. Although both occur side by side, it is surprising how different they are.

- The Exhibition section was about 50% selling drugs; 20% selling pumps; 20% selling services to doctors, researchers, or labs; and 10% everything else. The biggest single goal was to get type 2 diabetics to take more drugs. There was a particular emphasis on moving type 2 diabetics to take insulin (mainly because people with type 2 diabetes represent a very large existing and potential market).
- No one at the exhibition talked directly about products expected in the future. If representative could sell the product now, they could talk about it, but there was complete silence on futures. The exception was "medical information." All the big booths had a little corner marked "medical information" staffed by a special crew. If you asked a question about anything in the future, or anything not specifically approved by the FDA, you were moved to the medical information crew, who would ask you two questions: "Are you a medical professional?" and "Will you sign this non-disclosure agreement?" If the answer to either question was "no" they couldn't talk to you, so you couldn't learn anything. This was frustrating for the layman.
- In contrast, the scientific meeting was all about the future, nothing available now. They could discuss new combinations of technology and speculate about the future, but they had no idea when anything would be offered to patients. Most of the academic presenters had no view of the path from research to product at all.

T1D Research Highlights

Very few projects addressed a cure for T1D, and not a single presentation featured a project that could directly yield a Practical Cure. Still, several projects are worth mentioning. When it came to type 1 diabetes, the Bionic Pancreas got the most convention buzz and press coverage. Of additional interest to the type 1 community were announcements of research progress in glucagon, islet transplantation, and SGLT2:

The Bionic Pancreas

Dr. Ed Damiano's group at Boston University is developing a closed-loop artificial pancreas that provides both insulin and glucagon. "Bionic" is a marketing name for the device. This group presented at least one paper and two posters at the conference, which coincided with their publication of a major paper in *The Journal of Clinical Endocrinology and Metabolism*.

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In human trials conducted in adults and adolescents, the Bionic Pancreas spent one day learning the person's reactions to insulin and glucagon, then data was collected for two days. In my view, the results are tremendous. For adults, the average blood glucose was 146. If they signaled they were going to have a meal (not counting carbs, just signaling the meal is about to start), the average dropped to 132. For adolescents the numbers were 175 and 162. System improvements are ongoing, which is likely to lead to better results in the future.

Long-lasting glucagon
There was a lot of interest and work in alternate forms of glucagon and glucagon-like hormones, which raise blood sugar in response to hypoglycemia. The Bionic Pancreas requires long-lasting glucagon, and there was at least one poster on that.

Transplantation
A compelling paper tracked people with type 1 who recently underwent islet transplantation with a modern protocol of anti-rejection drugs. These people will be on anti-rejection medicine for the rest of their lives, so this is not a Practical Cure by JDCA standards. However, results were impressive:

- 50% of transplant recipients injected no insulin after one year, and the rest used such low amounts that average insulin usage at one year amounted to 0 units/kg.
- There were 19 instances of "major side effects." 13 of them related to immunosuppression, which supports what we already knew: immunosuppression has real risk.

SGLT2
SGLT2 is a signaling pathway that causes the kidneys to void more sugar through urine, which could lower blood glucose levels, especially after a meal. This therapy could potentially benefit both type 1's and type 2's. Basic research papers and posters explained how and why it works, and presentations featured applied research about various drugs that effect SLGT2. One paper suggested that SGLT2 may have an effect on glucagon generation that would help avoid low blood sugars as well.

Honeymoon interventions
Two projects presented promising results for those newly diagnosed with type 1:

- **Expanded Polyclonal Tregs**. In this treatment, a specific immune cell is removed from the blood, grown 500x, and put back in the patient. A phase I trial on 14 people preserved beta cell function for two years, as evidenced by steady C-peptide numbers.
- **Thymoglobulin (ATG) and Neulasta (GCSF)**. 17 patients who were given a drug combination of ATG and GCSF generated as much C-peptide after 12 months as at the start of the trial, while 8 patients who were untreated had their C-peptide numbers drop significantly. Both groups were limited to people diagnosed 4-24 months ago, though the treatment may have future application for people with long-standing type 1 diabetes.

Additional Topics of Interest
Big Data. There was some discussion on how "big data" might improve treatment, enhance medical record availability, identify drug interactions, and accelerate recruitment for research studies.

T1D Depression. In one study, type 1 diabetics have a depression rate of about 12%, as compared to 3% in the overall population. This study is notable because it found depression evenly in men and women with type 1, while a previous study found higher rates of depression only in women with type 1.

Hypoglycemic Awareness. The conference featured discussion of restoring hypoglycemic awareness after it has been "lost." Researchers stated, as though it were common knowledge, that avoiding low blood sugars for three weeks would re-establish hypoglycemic awareness. Their paper discussed using brain scans to view the process. I know that acquired hypoglycemic unawareness makes people very nervous. Well, these researchers think there is an easy-to-follow cure: just avoid hypos for three weeks. The paper, recently published in *Diabetic Cure*, raises many questions and merits a more thorough review.