Since last year’s walk, the money that YOUR teams raised made real things happen to improve the lives of those with T1D:

**Top 10 Advances of FY2013**

JDRF is the only global organization with a strategic plan to produce a continuous flow of life-changing therapies and, ultimately, a cure for T1D. Our plan is aggressive, forward-looking, and realistic. Our past investments have yielded significant progress and taught us that there will be no single “eureka” moment that will cause T1D to vanish all at once. Instead, our progress will be a series of research and development advances across multiple therapeutic programs. JDRF will drive these advances from the lab to clinical trials and into the hands of patients. Here’s a summary of ten exciting R&D advances JDRF made possible over the past year.

**Ranibizumab (Lucentis) Approved by FDA for Diabetic Macular Edema – Complications Research**
Diabetic macular edema (DME) is a complication of T1D and the leading cause of blindness in people ages 20 to 74 in the US. Until now, the standard treatment available was laser therapy. Such therapy, though it stalls the progression of the disease, does not reverse visual loss. For many people, Lucentis goes a significant step further by improving vision in some individuals. It works by inhibiting the VEGF pathway of blood vessels in the eye. JDRF supported pioneering research in this area beginning in the mid-1990s that helped create the foundation for this new therapy to treat DME. Now, the investment in that basic research has been translated into a product and delivered to individuals with T1D and DME to improve their lives.

**Advanced Sensor Development Accelerated – Artificial Pancreas Research**
JDRF in collaboration with the Helmsley Charitable Trust (HCT) formed partnerships with Medtronic and BD to advance continuous glucose monitoring (CGM) accuracy and reliability towards the next generation artificial pancreas systems. The goal of the partnerships is to accelerate the development and delivery of next generation sensor systems that are more accurate and reliable and easier to use. Improved CGMs will also be a key aspect of developing advanced generation artificial pancreas systems. Today’s CGM devices have significantly helped improve glucose control in people with T1D; next generation sensors will allow for more optimized insulin management with automated artificial pancreas systems. Both Medtronic and BD have reported successful animal study results with their new devices and are rapidly moving these into the clinical testing phase.

**Successful Artificial Pancreas System Clinical Testing – Artificial Pancreas Research**
The pace of JDRF-supported artificial pancreas (AP) clinical testing is clearly accelerating. Building on the first successful real-world clinical study last year of a treat-to-range AP system in Europe, similar studies have been conducted in multiple locations in the US. These systems use existing CGMs and pumps linked with special software in a hand-held mobile phone-like device to automatically maintain a person’s basal glucose level within an acceptable range. The next step is a larger real-world test of the system. In addition, Animas recently reported positive results from their second clinical study with a treat-to-target artificial pancreas system, also supported by JDRF. This system is designed to automatically control an individual’s basal glucose level to a specified target level. In a 20-person study, the system was tested to achieve the target level using more or less aggressive control approaches. Such information helps design a more optimal control process for broader clinical testing.

**JDRF Encapsulation Consortium Launched – Encapsulation Research**
JDRF beta cell encapsulation research to restore insulin independence in individuals with T1D is being translated by two JDRF-supported companies. Living Cell Technologies (LCT) reported results from their Phase 1/2 clinical studies and ViaCyte continues to make steady progress towards launching the first clinical study of their encapsulation product. These products will be breakthroughs when they reach the market, but may not meet the needs of every person with T1D. More advanced product concepts using improved encapsulation technologies and cell sources will be needed to produce more durable and effective encapsulation products. To speed work on next generation encapsulation products, JDRF has brought together scientists and researchers from more than 25 premier institutions through a newly formed JDRF Encapsulation Consortium. Under JDRF’s leadership, these collaborative teams of key players in science, engineering, and medicine will share their research and ideas to accelerate next generation encapsulation product research and development.
Beta Cell Health Improved With Drug Therapy – Regeneration Research
A pilot JDRF-supported clinical study showed that a combination therapy of the drugs sitagliptin (approved for T2D) and pantoprazole (approved for acid reflux) successfully boosted transplanted islet cell function in patients with T1D. After six months of treatment, five of the eight study participants regained insulin independence. While the exact mechanism by which these drugs affect beta cell health is unknown, this clinical study is a translation of findings from lab and animal studies. In another study of a similar drug combination supported by JDRF and Sanford Health, the benefit of this therapy is being studied over two years in individuals recently diagnosed with T1D. The study recently completed the enrollment phase.

CGM Use in T1D Pregnancy Study Launched – Complications Research
Poorly controlled T1D during pregnancy carries extra risks that can affect both mother and baby. JDRF launched a clinical study called CONCEPTT to address these risks. CONCEPTT aims to determine whether the use of continuous glucose monitoring will facilitate improved glucose control in women with T1D who are pregnant or planning to become pregnant—a finding that could have wide-ranging benefits for mothers with T1D and their babies and potentially establish a new standard of care.

Improving The Standard Management of T1D – Glucose Control Drug Research
The treatment of T1D has been based on insulin since its discovery in 1921. Since then, the evolution of therapy has focused on new insulin preparations, different ways of delivering it and testing with continuous glucose monitoring systems. Despite these advances, the control in individuals with T1D continues to be challenging since insulin alone is still not a complete substitute for natural glucose control. Based on prior observations, JDRF has launched a clinical study to investigate the value of treating T1D with a drug called liraglutide (Victoza, approved for T2D) in addition to insulin. Such a combination could improve glucose control in T1D by decreasing variability in blood sugars and reducing episodes of severe hyperglycemia.

New Support Discovered for Potential Prevention Strategy – Prevention Research
There is a growing body of evidence connecting gut microbes to autoimmunity, the so-called “hygiene hypothesis”. Previous studies have shown that early life exposure to gut microbes can modify autoimmunity in mice. Now, a JDRF-supported researcher has shown that gut microbial exposures and sex hormones exert potent effects on autoimmunity. They demonstrated that early-life microbial exposures determine sex hormone levels and modify progression to autoimmunity in a mouse model of T1D. JDRF is accelerating work in this area to confirm these and other findings to determine if and how to conduct clinical studies of this theory as a potential strategy to prevent T1D in those at risk.

Role of Beta Cell Stress in T1D Confirmed – Regeneration Research
Beta cell stress has emerged from JDRF-supported research as an important component of T1D. It ultimately provides a new potential path for curing the disease. JDRF-funded research teams from two universities discovered a link connecting beta cell stress and beta cell death in T1D. Both teams independently discovered how a certain beta cell protein links cell stress with inflammation and cell death. Another JDRF-supported researcher conducted a study in mice with an experimental drug, called TUDCA that is known to reduce beta cell stress. They found that this treatment could dramatically reduce the occurrence of T1D in mice specially bred to develop the disease. Translating these findings to people is a clear focus now for JDRF.

Immune Tolerance Therapy Advancing – Immune Therapy Research
JDRF-supported scientists are testing a vaccine to slow down the progression of T1D in hopes that such a breakthrough will help millions. The vaccine trial at Cardiff University, in the UK, hopes to stop or slow down the immune system attack on the pancreas, the cause of T1D. This vaccine is a targeted immune therapy designed to reset a person’s immune system and slow or stop the body from damaging its own insulin-making cells in the pancreas. Preliminary research has shown that the vaccine is safe; this next step is meant to determine if the treatment is effective in people. The scientists are recruiting adult patients who have recently been diagnosed with T1D and have just started taking insulin to take part in the trial.