Be Unstoppable: An Update on Research Progress

November 20, 2019
Presenters

Andy Rakeman  Curing T1D
Daniel Finan  Improving Lives
Campbell Hutton  Advocacy’s Role
Sanjoy Dutta  Looking to the Future
JDRF’s Purpose

Our Vision:
A world without T1D

Our Mission:
Improving lives today and tomorrow by accelerating life-changing breakthroughs to cure, prevent and treat type 1 diabetes and its complications
I. OUR APPROACH

JDRF RESEARCH

Curing T1D

Beta Cell Therapies
Immunotherapies

Improving Lives

Glucose Control Therapies
Complication Treatments

Community Outreach

JDRF ADVOCACY
JDRF Accelerates Progress Across the Pipeline
II. CURING T1D

JDRF RESEARCH

Curing T1D

Beta Cell Therapies

Immunotherapies

Glucose Control Therapies

Complication Treatments

Community Outreach

JDRF ADVOCACY
Curing T1D

Immune Therapies
- Stopping the attack on beta cells

Beta Cell Therapies
- Creating insulin-producing beta cells
Disable the “bad” overactive immune cells that attack and destroy the beta cells

Boost the “good” regulatory cells that can control and inhibit the destructive cells

Identify at-risk individuals earlier to slow down and halt the progression of T1D
Teplizumab has delayed the onset of T1D in at-risk adults and children for an average of 2 years and is in Phase III clinical trials.

JDRF is working with the Helmsley Charitable Trust and Parker Institute for Cancer Immunotherapy to learn more about the autoimmune attack.

ATG, an FDA-approved drug, preserves beta cell function and improves insulin production.
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AnToIRx

• JDRF partnered with Orion Healthcare and Equity Partners in 2016 to create AnToIrx, a new company to develop an immunotherapy with microscopic particles developed by JDRF-funded research.

• Pfizer has licensed AnToIrx’s immune tolerance therapy for further development.

• This work addresses the urgent need for disease-modifying T1D immunotherapies to slow down the autoimmune process and delay or block progression to symptomatic insulin-dependent diabetes.
Teplizumab

• Provention Bio is developing an enterovirus vaccine for T1D

• Clinical trials of a Provention Bio’s drug showing it may be able to significantly delay – up to 50% – the onset of T1D
Teplizumab

• Teplizumab delayed T1D onset in at-risk individuals by average of 2 years in a recent clinical trial

• It is currently being tested in a phase 3 clinical trial in new onset T1D
Universal Screening

- DKA is preventable through screening
- DKA at diagnosis predicts poor long-term outcomes

![Graph showing HbA1c (%) over time since diagnosis with and without DKA](chart.png)
Develop a reliable beta cell source or enable beta cell growth so that every person with T1D can get this treatment.

Find ways to support the beta cells so they stay healthy, functional and grow inside the body.

Shield the beta cells from immune attack to prevent the need for additional immunosuppressant drugs.

Beta Cell Therapies
Strategy
T1D Fund backed-Semma Therapeutics acquired for $950 Million

Verapamil, a widely used blood pressure medication, was found to show preserved beta cell function in recent-onset adults with T1D

ViaCyte presented preliminary clinical trial data showing that implanted cells are capable of producing insulin in people with T1D
Semma Therapeutics, a JDRF T1D Fund-backed company, agreed to be acquired by Vertex for $950 million

JDRF played an integral role, from funding Dr. Melton for years to the T1D fund providing a catalytic investment in Semma
Verapamil

- Verapamil, a widely used blood pressure medication, was shown to preserve beta cell function in recent-onset adults with T1D in a JDRF-funded clinical trial.
III. IMPROVING LIVES

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JDRF ADVOCACY
Improving Lives

Glucose Control Therapies

Maintaining glucose balance for healthy living

Complications Therapies

Improving the lives of those living with T1D in kidney and eye disease, and psychological and behavior health
Create next-generation insulins that will automatically respond to blood-sugar levels, turning on and off as needed.

Discover combination therapies using insulin and other drugs to dramatically improve daily blood-sugar management.

Develop better, smaller, less intrusive devices that keep blood sugar levels in range more of the time—and make sure people with T1D have access to them.
JDRF is funding several new approaches to better insulins, including ultra-rapid insulins and glucose-responsive insulins.

Two drugs have been approved in Europe for use in conjunction with insulin.

Several new artificial pancreas systems, including those with interoperable components, are anticipated to become commercially available in the near future.
SGLT Inhibitors: Zynquista and Forxiga

• Zynquista and Forxiga were approved for T1D use by the European Commission

• These are the first oral medications approved for use in T1D in Europe

• JDRF continues to advocate for better T1D management tools, technologies, and drugs
Glucagon: Baqsimi

- Baqsimi was approved by the FDA as the first low glucose treatment without an injection
Next AP System to Market: Tandem’s Control-IQ

- Pivotal study completed in Q2 2019; results reported at ADA 2019 and in NEJM
- Launch expected in late 2019 as a free software upgrade for most users

Pivotal study results
- 2.6 hours/day more in 70-180 mg/dL glucose range (vs. control)
- All participants completed the study (zero dropouts)
- 92% of time spent in closed-loop mode
Open-Protocol AP Systems

• Helmsley and JDRF are currently supporting creation of a hybrid closed-loop automated insulin delivery algorithm/app

• Tidepool Loop is intended to work with multiple insulin pumps and continuous glucose monitoring devices, so PWD can choose the system that works best for them!

• People with T1D would be able to manage their blood sugar levels from their smartphones

• Many other open-protocol efforts are underway
Support research related to psychosocial factors in T1D that promote optimal health outcomes

Discover biomarkers that indicate the early stages of complications

Reduce the barriers to clinical trials and accelerate new therapies for the T1D population
JDRF is funding research to discover the best ways to address the emotional burden and behavioral health issues that come with type 1 diabetes.

17 biomarkers associated with the progression for end-stage kidney disease were identified.

Two drugs were approved as therapies for T1D-related eye diseases.
Expansion of JDRF’s Psychology Fellowships Program

2020 Diabetes Psychology Fellowships

- Einstein College of Medicine
- MGH
- Children’s National
- Ann & Robert H. Lurie Children’s Hospital of Chicago
- University of Alabama
- Ohio State University
- OHSU
- Baylor College of Medicine
- Joslin Diabetes Center
- Vanderbilt University Medical Center
Novel Interventions in Children’s Healthcare (NICH)

- The NICH project provides proactive 24/7 skills training and coaching to patients and caregivers through weekly interactions in the home, community, school, and medical setting.

- NICH capitalizes on technology to aid in daily touch points to prompt and reinforce behaviors.

- NICH provides intensive care management and care coordination to address barriers to health management and stability.
NICH Results – Pilot

Days Hospitalized per Year

Prior to NICH | During NICH | After NICH

Reduction in Annual Direct Medical Costs

Before NICH | After NICH

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Kidney and Eye Protective Factors Found in T1D Medalists

- May mitigate toxic effects of high glucose on cells
- May help cells use glucose more efficiently in managing T1D
- People are living healthy, complications-free lives with long-standing diabetes
IV. ADVOCACY’S ROLE

JDRF RESEARCH

Curing T1D

- Beta Cell Therapies
- Immunotherapies

Improving Lives

- Glucose Control Therapies
- Complication Treatments

Community Outreach

JDRF ADVOCACY
JDRF Accelerates Progress Across the Pipeline

- Discovery Research
- Translational Research
- Regulatory Approval
- Healthcare Coverage
- Clinical Adoption
- Better Outcomes
Raising Money from Congress for T1D Research

SDP - $2.8 billion!
Bringing the Latest Science and Voice of Community to FDA

One Example

Symposium – Immunotherapy Approaches in T1D
November 20, 2018

• People with T1D
• FDA Staff
• JDRF Staff
• Researchers

• Unmet needs in T1D
• Immune approaches
• When to intervene
Paving the Way for New Therapies

• Educating FDA about research on beta cell replacement therapies

• Educating beta cell replacement researchers on reimbursement considerations

• Collaborating with researchers and companies on path to regulatory approval and reimbursement by payers of beta cell replacement products
Creating New Pathways for Patient Choice

- iCGM
- iController
- Algo/app
- ACE Pump
Demanding #Coverage2Control

**Affordability**
Make out-of-pocket insulin and other costs predictable and reasonable

**Choice**
Give people the freedom to choose the insulin pump that’s right for them

**Coverage**
Cover all life-saving technology, including the artificial pancreas
Insulin Affordability is a Top Priority for JDRF

- No one should go without insulin because of cost
- Reports that insulin prices tripled over a 10 year period
- JDRF focus:
  - End the drug rebate system that drives up list prices
  - Improve plan benefit design to provide insulin at a low, fixed out-of-pocket cost
  - Share resources to help with costs through www.jdrf.org/insurance
- We are actively advocating to insulin manufacturers, government, health plans and employers
V. LOOKING TO THE FUTURE

Curing T1D

- Beta Cell Therapies
- Immunotherapies

Improving Lives
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- Complication Treatments

Community Outreach

JDRF RESEARCH

JDRF ADVOCACY
Looking to the Future

Accelerating Translation

Enabling efficient translational research through innovative clinical trial design

Driving Innovation Through Collaboration

Harnessing the power of collaboration through Centers of Excellence
Innovative Clinical Trial Design Initiative

Goals

• Understand emerging innovative clinical trial design paradigms

• Identify implementation enablers and/or barriers to enrich our approach to making therapy development “smart” (shorter, better, quicker, cheaper = efficient)

• Increase the amount of information gained about a new therapy’s safety and benefits
Key objectives:

1. Good glucose control + reduced burden
2. Reduced beta cell stress
3. Combination additive/synergistic?

Key strategy:

1. Use of innovative trial design
2. Combination of device and drug
3. Building evidence for improved outcomes
Get Involved: JDRF’s Clinical Trials Connection

Clinical Trials Connection

A clinical trial matching tool for the T1D community
Participating in a clinical trial is a great way to contribute to curing, preventing and treating T1D and its complications. Start your search below to find clinical trials that need people like you.

Match to clinical trials in 60 seconds

- Know your options
- Access the latest treatments
- Receive world class care

START
Centers of Excellence
What is a Center of Excellence?

Collaborative research partnerships with leading global research institutions and universities with a track record of excellence in T1D research and clinical translation, and a shared commitment to deliver therapies to cure T1D with accelerated timelines.

Opportunity to drive incremental resources to T1D in accelerated timeframe.
Northern California COE
Potential for Bigger Impact

Mission Alignment

Deep T1D expertise
Top-quality clinical research and care
Training program with successful track record

Core Infrastructure Established

Strong NIDDK-supported scientific cores
Islet Production
Immune-Monitoring
Mouse Genetics
Clinical and Translational

Access to Innovation

Hot-bed for technical innovation
Additional expertise in organ transplant, novel technologies
Proven ability to spin out and commercialize tech
Immune – Beta Cell Interactions

Premise

• Understanding and targeting the interactions between the immune system and the beta cell is critical to curing T1D

Plan

• Develop and employ state-of-the-art approaches to dissect the immune-beta cell interactions in T1D and to use this knowledge to develop novel clinical approaches to control the immune system and allow replacement of beta cells without immune suppression toward cures for T1D
University of Michigan COE
What is the Optimal Metabolic Environment?

The central tenet of this proposal is that T1D is a complex metabolic condition that includes alterations in lipid and amino acid metabolism, as well as glucose (carbohydrate) metabolism, and that these complex alterations influence multiple tissues, including pancreatic islets, retinas, kidneys, hearts and peripheral nerves, and determine the risk of hypoglycemia and low quality of life.
Potential for Bigger Impact

Mission Alignment

- Deep T1D expertise
- Training program with successful track record
- Psychosocial research and care

Core Infrastructure Established

- T1D cohorts, biosamples, assays
- Systems biology core
- Preclinical core
- Clinical trial framework
- Diabetes = Priority area

Product Focused

- Six ongoing pharmaceutical relationships
- Systems biology core = fodder for translation
Centers of Excellence: Looking Forward

• Increase our push for cures and improving lives via *additional* global expertise and resources

• COEs can be created in locations where there is *excellence* and a *shared commitment*

• COEs are another tool, *complementing* regular grants, partnerships and investments
JDRF Accelerates Progress Across the Pipeline
Thank You