



world diabetes day
14 November

New & Exciting Diabetes Research Sponsored by




Presented by
Noel Carlson, Ph.D. & Hayley Miller, M.D.

The Role of the American Diabetes Association in Diabetes Research in Utah

Noel Carlson, Ph.D.



Outline

- 1) Mission of the ADA
- 2) Research Objectives
- 3) ADA and its role in diabetes research
- 4) Utah and its role in ADA research



Diabetes Facts

Data from the 2011 National Diabetes Fact Sheet (released Jan. 26, 2011)

Total prevalence of diabetes
Total: 25.8 million children and adults in the United States—8.3% of the population—have diabetes.
Diagnosed: 18.8 million people
Undiagnosed: 7.0 million people
Prediabetes: 79 million people*
New Cases: 1.9 million new cases of diabetes are diagnosed in people aged 20 years and older in 2010.

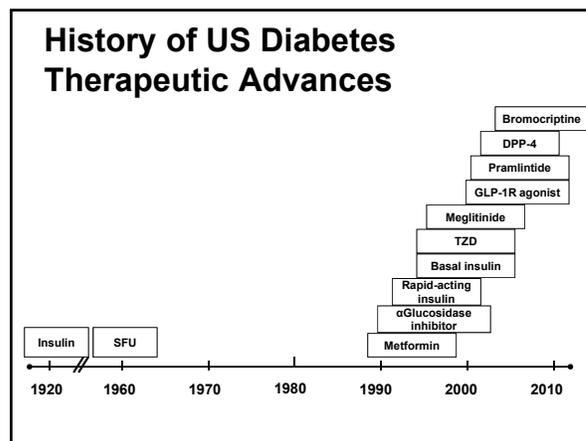
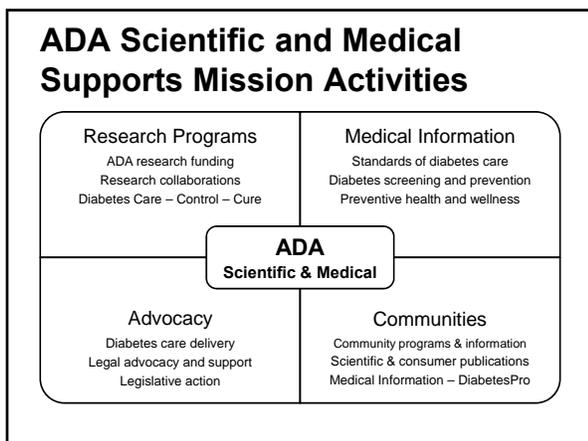


Cost of Diabetes

\$174 billion: Total costs of diagnosed diabetes in the United States in 2007
\$116 billion for direct medical costs
\$58 billion for indirect costs (disability, work loss, premature mortality)
After adjusting for population age and sex differences, average medical expenditures among people with diagnosed diabetes were 2.3 times higher than what expenditures would be in the absence of diabetes.

American Diabetes Association Mission:

TO PREVENT AND CURE DIABETES AND TO IMPROVE THE LIVES OF ALL PEOPLE AFFECTED BY DIABETES



Research Program Objectives

Support the highest quality science across the broad spectrum of diabetes research

- > Independent peer-review process ensures support of highest quality research
- > Investigator-initiated submissions in highest interest areas of clinical, basic and translational research

Encourage new investigators to dedicate their careers to diabetes research

- > 25% of annual budget dedicated to support of investigators early in their careers

Support innovative research with high potential to have a significant impact

- > Specific grant opportunities for high-risk/high-impact diabetes research
- > Targeted Research in high-needs areas
- > Encouraging translational science to move basic discoveries into the clinic

Current Research Activities and Initiatives

JDRF/ADA Genetics of Nephropathy

- > Support complimentary research to identify factors involved in susceptibility or resistance to development of kidney disease in type 1 and type 2 diabetes

Bariatric Surgery and Diabetes

- > Covidien and Ethicon Endosurgery corporate partners
- > Basic and clinic research on the effects of bariatric surgery in patients with diabetes

Diabetes Care Delivery

- > Research support provided by Sanofi-Aventis
- > Innovative studies to examine the effects of clinical care delivery programs in patients with diabetes

Technology in Diabetes

- > Research support provided by Medtronic
- > Analyze insulin pump/glucose meter data to understand the impact of these technologies on outcomes and care

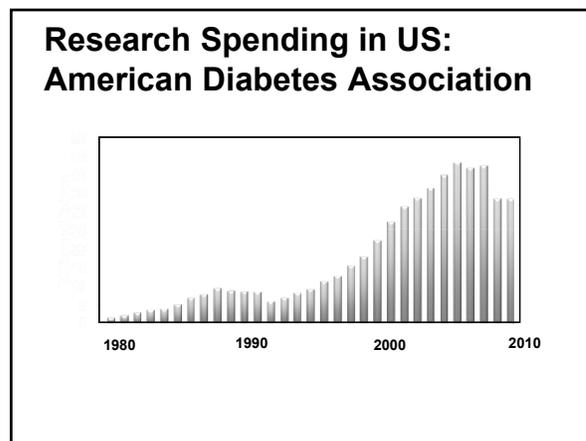
How Are We Doing? Supporting High Quality Diabetes Research

High Quality Science

- > Publication of study results in peer-reviewed journals-adding to the scientific knowledge base-average of 4 publications/award
- > Majority of ADA investigators are subsequently funded through NIH or other federal funding agencies

Dedication to Diabetes Research

- > 97% of supported investigators remain in diabetes research
- > Researchers are active ADA professional members, participate in Scientific Sessions and other ADA activities, and become an even more active member of the diabetes community



Other sources of Diabetes Research Dollars

(Diabetes health.com)

\$35M	ADA
\$100M	JDRF (2008)
\$625M	\$1.9 B from NIH-NIDDK
\$150M	Type I Diabetes Research Fund NIDDK
	Other NIH (NINDS, NIA, NEI), CDC

ADA's Continuing Commitment to Research

- > Nearly 4,000 research projects funded since program inception
- > Over the life of the program, more than \$600 million invested in diabetes research (since 1952)
- > Funding for research more than doubled between 2001 and 2007; \$34.1 million awarded in calendar year 2010
- > More than 400 active ADA sponsored research projects at 140 institutions nationwide in calendar year 2010

ADA Funded Grants in Utah

(March 2012)

University of Utah

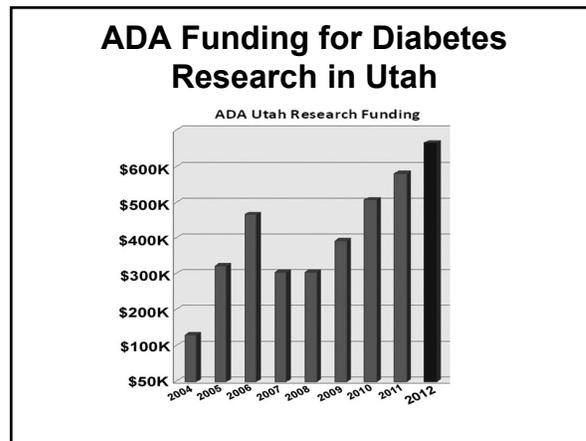
The effect of bariatric surgery on peripheral nerve and axonal regeneration
A. Gordon Smith, MD

Metabolic syndrome and peripheral neuropathy: a lifestyle intervention study.
A Smith, MD

Transcriptional control of skeletal muscle insulin resistance
Donald Ayer, PhD

Utah State University

Dietary fats regulate amygdala insulin sensitivity - American ...
Stephane Boghossian, PhD (Jr Faculty Grant)



ADA has funded \$0.67M for 2012 & \$1.8M for the last 3 years for Diabetes Research in Utah.

ADA-funded programs in UTAH are researching:

- > How skeletal muscle in diabetic people may not take up as much glucose as muscle from unaffected individuals by regulating gene expression.
- > How diet may influence neuropathy associated with diabetes.
- > How dietary fats can affect the insulin signaling in a part of the brain that contributes to learning, motivation and control of feeding behavior.
- > How a component in fat called ceramide could contribute to high blood pressure and blood vessel defects.
- > The role of glucose in diabetes-associated cardiac muscle damage and how this may relate to increased risk of developing heart failure associated with diabetes.

<http://www.diabetes.org/news-research/research/>

Thank You!

JDRF Research FY2012
Urgency – Excitement – Progress
 Top JDRF Research Advances

Hayley Miller, MD
 JDRF Utah

November 14, 2012

JDRF Research Mission



- JDRF is built around a core mission tied to research
- JDRF's research mission is to discover, develop & deliver drugs and devices that cure, better treat and prevent T1D
- Goal of transforming lives:
 - Improving outcomes
 - Reducing daily burdens
 - Accelerating progress towards curing T1D

JDRF Global Leadership in T1D Research



- Largest T1D non-profit: \$1.6B in research funded over past 40 years
- In FY11 JDRF funded:
 - \$116 million direct support
 - In 18 countries
 - Including over 50 clinical trials
- More than 80% of JDRF expenditures directly support research and research-related education
- Forbes magazine called JDRF "...a tightly run organization that puts almost every dollar spent to work curing disease...."

FY12 JDRF T1D Research Priorities

Cure	Treat	Prevent
type 1 diabetes by replacing or regenerating beta cells, and halting the autoimmune process.	type 1 diabetes with new devices and therapies that optimize blood glucose control and treat/prevent diabetic complications.	type 1 diabetes with vaccines and other therapies.
Beta Cell Regeneration, Health and Survival Encapsulation/ Immunoisolation of Alternative Beta Cell Sources Antigen-specific Immunotherapies and Vaccines Biomarkers: Staging, Prognostic, and Predictive	Artificial Pancreas Systems Glucose-modulating Agents Diabetic Eye Disease Complications Prevention	Primary and Secondary Prevention

Research Agenda of Hope for all T1D Patients



Curing T1D

- #1 priority for JDRF
- Recent explosion of new information about immune system & beta cells
- Julia's Cure Importance
- Creating exciting new paths to a cure
- Leveraging efforts to both curing & preventing T1D

CURING T1D to remove it from the lives of our loved ones

Advanced A Targeted Immune Therapy

Novel Immune Rebalancing Therapy in Clinical Study

- A JDRF-supported study at Univ. CA at San Francisco is testing a novel, targeted immune rebalancing therapy
- Importance:** This is the first human test of a more targeted cell-based immune rebalancing therapy in T1D

Source: www.diabetes.ucsf.edu/clinical-care-education/clinical-trials/type-1-diabetes

Discovered Beta Cell Regeneration Targets

An Explosion of Beta Cell Proliferation Pathways

- JDRF-supported researchers in Pittsburgh, Stanford, Zurich and Jerusalem have identified four new and different pathways that control beta cell proliferation
- Importance:** One of these new pathways may result in a future T1D drug that stimulates beta cell proliferation to restore a person's own insulin production

Source: Multiple JDRF press releases

Invented Novel Encapsulation Biomaterial

Unique Material Produces Oxygen to Sustain Beta Cells

- JDRF-supported researchers at Univ. of Miami invented a new material that produces oxygen to sustain implanted encapsulated beta cells
- Importance:** This novel biomaterial should accelerate beta cell encapsulation progress by overcoming a key technical hurdle

Source: Pedraza, et al. 2012. Proc Natl Acad Sci U S A. Mar 13;109(11):4245-50

Discovered New Test to Accelerate a Cure

Potential Blood Test to Detect Early Beta Cell Death

Group	Blood Test Index
T1D Mice	~0.05
Non-T1D Mice	~0.01

- JDRF-supported researchers at Yale Univ. discovered a blood test to measure the release of beta cell DNA after they die
- Importance:** Tests of beta cell death will allow earlier detection and treatments of T1D and speed clinical studies of beta cell therapies

Source: Akirav E M et al. PNAS 2011;108:19018-19023

Research Agenda of Hope for all T1D Patients

Treat

Better Treating T1D

Develop better ways to **TREAT** T1D allowing a better quality of life

- Until we can cure & prevent T1D we are committed to improving lives of those with T1D
- The past 40 years have seen significant improvements in care, translating into longer life expectancy
- More can be done to improve the quality of life for everyone living with T1D

Source: Aaron - Why Treat?

FDA Issued Artificial Pancreas Guidance

JDRF-Led Effort Gets Results in Washington, DC

Draft Guidance for Industry and Food and Drug Administration Staff

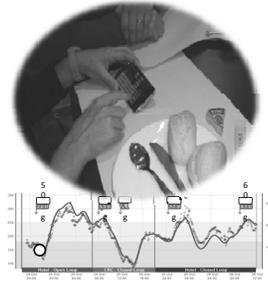
The Content of Investigational Device Exemption (IDE) and Premarket Approval (PMA) Applications for Artificial Pancreas Device Systems

- JDRF-led grassroots advocacy including professional clinical associations helped drive FDA to produce draft guidance for artificial pancreas systems
- Importance:** This guidance will speed APP clinical studies and approvals by informing researchers and companies of FDA's requirements

Source: JDRF Press Release and www.fda.gov/medicaldevices

Launched First Outpatient APP Study

Real World Testing of Control-To-Range AP System

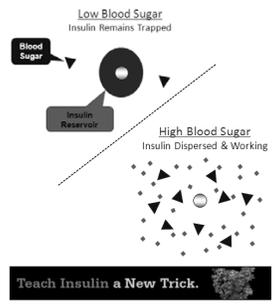


- JDRF supported the first real world studies of a handheld artificial pancreas device in France, Italy, California and Univ. VA
- Importance:** Real world testing of AP systems moves them a big step closer to delivering them to patients

Source: JDRF Press Release

Challenged the World to Invent a GRI

\$100,000 for Novel Glucose Responsive Insulin (GRI) Ideas

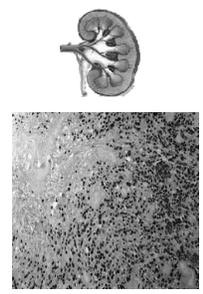


- JDRF launched a novel GRI Challenge Prize and will announce the winners in summer 2012
- Importance:** JDRF is seeking creative solutions to develop novel GRI products that could transform T1D management

Source: JDRF Press Release dated Sept 8, 2011

Discovered Marker of T1D Kidney Disease

Improves Diagnostics and Therapy Development



- JDRF-supported researchers at the Joslin Diabetes Center, Boston discovered proteins in the blood strongly associated with T1D kidney disease risk
- Importance:** Earlier identification of the risk for kidney disease will allow earlier treatment and better management of this serious T1D complication

Image of human kidney cells

Source: Gohda et al. 2012. J. Am Soc Nephrol. 23: January

Research Agenda of Hope for all T1D Patients

Prevent

Preventing T1D

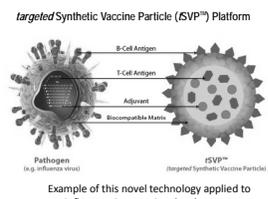


- Growth of T1D is accelerating; especially among young children
- Children born to a family with T1D have a 10 times greater risk of developing the disease
- Only prevention can alter this trend and protect future generations from T1D
- Research to prevent T1D will help accelerate finding a cure for T1D

PREVENT T1D from occurring in those most susceptible including children

Supported Novel T1D Prevention Vaccine

Focuses Novel Technology on T1D Antigen-Specific Goal



- JDRF partnered with Selecta (an MA-based company) to bring a unique nanoparticle based vaccine technology to T1D vaccine research
- Importance:** Vaccine research is one of the most promising approaches to prevent or halt the beta cell-specific autoimmunity in T1D

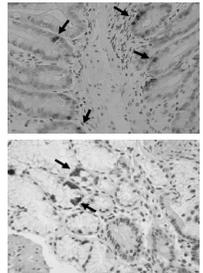
Example of this novel technology applied to influenza virus vaccine development



Source: JDRF Press Release dated June 9, 2011 and Selecta Biosciences website

Strengthened T1D Link To Enteroviruses

Providing Potential Novel Prevention Strategy



- JDRF-supported researchers in Finland showed persistent enteroviral infection and related inflammation in the gut lining of people with T1D
- Importance:** As a potential T1D causative factor, the development of a vaccine or anti-viral agents that target these enteroviruses may be a possible T1D prevention strategy

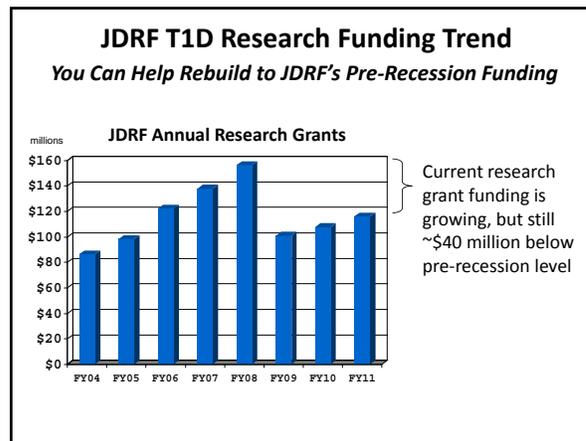
Arrows show enteroviruses in cells lining the gut of people with T1D

Source: Oikarinen et al. 2012 Diabetes. Mar;61(3):687-91

JDRF FY13 Research Priorities

Continuing Focused Momentum from FY12

Cure	Treat	Prevent
type 1 diabetes by replacing or regenerating beta cells, and halting the autoimmune process.	type 1 diabetes with new devices and therapies that optimize blood glucose control and treat/prevent diabetic complications.	type 1 diabetes with vaccines and other therapies.
Regenerating new beta cells Encapsulation of alternative beta cell sources Immune therapies Diagnostic, measurement and imaging tools	Artificial pancreas systems Novel insulins and other blood sugar control drugs Complications prevention and treatment	Preventing the autoimmune process from ever starting Stopping and reversing the autoimmune process early to maintain insulin independence



Make A Difference - Get Involved!

Thank You!

- **Give** generously to speed JDRF research to cure, better treat and prevent T1D
- **Join** a JDRF walk, ride, gala or other fund-raising event
- **Volunteer** at your local JDRF chapter
- **Participate** in clinical research

Learn more at: jdrf.org

world diabetes day
14 November

THANK YOU FOR JOINING US TODAY