



Diabetes Education
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15 years

Advancing Your Career in Diabetes Education

New Horizons in the Prevention of Type 1 and Type 2

DiabetesEd.net
DiabetesEducationUniversity.com

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New Horizons Topics



- ▶ New findings in diabetes prevention and treatment
- ▶ Focus on Type 2
- ▶ Focus on Type 1
- ▶ Double Diabetes

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Taking this CDE Exam in Future?



FALL 2014 CDE BOOT CAMP

Taking the CDE Exam this Fall?
Feeling overwhelmed with what to study?
Need help focusing in on key points?
Get started now! Immediate access to all six sessions is just a click away!

Level 2 - Diabetes Educator Course
Carmel, CA

Carmel Mission Inn
Carmel, CA
Date: April 8 – 10, 2015

Earn 27 CEs

Diabetes Educator Course Fee: \$499



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CDC Announces



35% of
Americans will
have Diabetes
by 2050

Boyle, Thompson, Barker, Williamson
2010, Oct 22:8(1)29
www.pophealthmetrics.com



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Diabetes in America 2014

- ▶ 29 million or > 9.3%
- ▶ 27% don't know they have it
- ▶ 1 in 3 of US adults have pre diabetes (79 mil)

Diabetes



Legend: No Data, <4.5%, 4.5-5.9%, 6.0-7.4%, 7.5-8.9%, ≥9.0%



CDC's Division of Diabetes, Translation National Diabetes Surveillance System available at <http://www.cdc.gov/diabetes/statistics>



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Celebrating Dr. Banting's Birthday Nobel Prize in Medicine 1923



Frederick G. Banting

Born: 14 November 1891, Canada

Died: 21 February 1941,
Newfoundland, Canada

**Affiliation at the time of the
award:** University of Toronto,
Toronto, Canada

Prize motivation: "for the discovery
of insulin"

Field: endocrinology, metabolism



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World diabetes day-



Idf.org - Off to the Right Start



Type 2 in Kids



- ▶ 7 fold increase 1990
- ▶ 1 in 6 overweight kids (age 12- 19) have prediabetes.
- ▶ ~2,500 to 3,700 new cases in U.S. annually.
- ▶ Highest risk: very obese, minority, female, low socioeconomic status, limited education
- ▶ In age range 12-19, less than 1% have Type 2 – NHANES
- ▶ Environmental changes to urgently needed



Why Should Zip Code Determine Life Expectancy?



California Endowment – look up your zip code at www.measureofamerica.org



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Thoughts on Diabetes, Weight, Social Change

- ▶ “The only way on a societal basis to reduce the prevalence of obesity is through community action” –

Dr. Frieden, CDC

- ▶ We live in an “Obesogenic” environment



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Public Health Issue?

- ▶ 66% of our people are obese/overweight
- ▶ Rates of gestational diabetes on rise
- ▶ 30% of kids are obese/overweight



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Average American Consumes 22 teaspoons of sugar a day

- ▶ Warning label on sodas proposed
- ▶ One soda has 12 teaspoons of sugar
- ▶ On avg, 1 person consumes 40 gallons of soda each year
- ▶ ADA guidelines "limit sodas and beverages with sugar, High Fructose Corn Syrup, (HFCS)



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Berkeley Passes Sugar Tax



GIVING THE BOOT TO SUGARY DRINKS



THE DATE | UPCOMING TOOLS | CAMPAIGN | MODEL POLICIES | MEASUREMENT | BUDGETING | BEST PRACTICES

THIS ELECTION, THE TIDE TURNED ON SODA TAXES

By Heidi Sabatini, Special to the Sacramento Bee newspaper

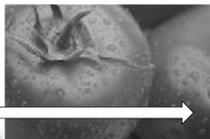


Diabetes Education Services, Berkeley, Health, 2013 Coalition, Berkeley, with fellow supporters after the passing of Measure G, imposing a sales tax on soda drinks in Berkeley, 98000 800 544 8320 415 432 0759 9910



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Move toward the Tomato



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10 SuperFoods to Enjoy

- ▶ Beans
- ▶ Dark Green Leafy Veggies
- ▶ Citrus Fruit
- ▶ Sweet Potatoes
- ▶ Berries
- ▶ Tomatoes
- ▶ Fish High in Omega-3 Fatty Acids
- ▶ Whole Grains
- ▶ Nuts
- ▶ Fat-Free Milk and Yogurt



Weight loss and Prevention

- ▶ For every 2.2 pounds of weight loss, risk of type 2 diabetes was reduced by 13%.



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Type 2

look BEYOND the obvious



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Obesity - other factors?

- ▶ Not only humans are gaining weight globally
- ▶ Animals are getting heavier too (and not just the domestic kind).
- ▶ Factors – sleep deprivation, AC, other?
 - ▶ Marmosets to macaques



Newsweek, Fat Canaries in a Coal Mine, Dec 10, 2010.. Begley



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Double Diabetes – An Increasing Problem

- ▶ Defined as a person who presents w/ features of both type 1 and type 2 diabetes.
- ▶ Someone with type 1 diabetes gains significant weight and manifests the clinical features of insulin resistance and type 2
- ▶ or in those with type 2 who develop autoantibodies to beta cells and manifest type 1 (esp in kids)



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Double Diabetes in Adults – Type 1 then add on Type 2

- ▶ Seem to be especially susceptible if both parents had type 2 diabetes
- ▶ Treatment?
 - ▶ **REMOVAL** study (Reducing with Metformin Vascular Adverse Lesions) - adding metformin to insulin
 - ▶ GLP-1 Agonists – Victoza use early in type 1 may help preserve beta cells. Also helps with wt loss, lower insulin dose and improved A1c
 - ▶ SGLT-2 Inhibitors – add on to insulin in Type 1 also improve A1c and leads to wt loss



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Bacterial Cells Outnumber Human Cells 10 to 1

- 30 trillion human cells
- Host 100 trillion bacterial and fungal cells



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Getting to the Gut

- ▶ Gut bacteria and body weight
- ▶ Gut bacteria health influence on expression of type 1 and type 2
- ▶ Gut hormones



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Gut Microbiome

- ▶ Part of endocrine axis
- ▶ Stabilized by 3 years of age
- ▶ Influenced by:
 - ▶ Birth method
 - ▶ Antibiotics
 - ▶ Environment
 - ▶ Immune function
 - ▶ Travel



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Gut Bacteria – 10,000 species, 4 lbs



Electron micrograph of small intestine and bacterial inhabitants in green. Obesity and Gut Flora, Nature 2006



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Normal Gut Bacteria

- ▶ Diverse
- ▶ Collected over a life time through
 - ▶ Environmental exposure
 - ▶ Types of foods consumed
 - ▶ Breast or bottle fed?
 - ▶ Parents
 - ▶ Vaginal delivery or C-Section
- ▶ Help us
 - ▶ utilize energy
 - ▶ fight off invaders

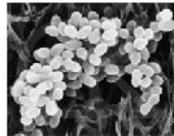


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Intestinal Health – A Balancing Act

▶ Major Groups

- ▶ Firmicutes
 - ▶ Bacteroidetes
- Plus thousands of others



Bacteroides



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Weight and Gut Bacteria New and Early Research

▶ Fecal samples in humans have distinct microbial signatures:

- ▶ Obese
- ▶ Type 1
- ▶ Type 2



Pathobionts – at low levels in healthy people but can bloom under certain dietary conditions

Lipopolysaccharide Endotoxins – stimulated with high fat diets

Endocrine Today 10/2014



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Fatty Foods Trigger Leaky Gut?



With diabetes, a high fat meal appears to trigger:

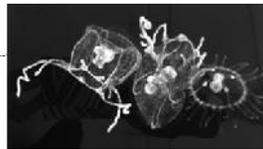
- Passage of bacterial endotoxins through intestinal wall
- Increase levels of inflammatory cytokines and triglycerides
- Contributing to insulin resistance
- Seems to be worse if eat frequent fatty meals throughout the day – increases presence of lipopolysaccharide endotoxins

Research by Alison Harte, PhD - Clinical Endocrinology News- Nov 11, 2011



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Healthier Guts



- ▶ Leaner people
 - ▶ more bacterial diversity
- ▶ High proportion of:
 - ▶ *Bacteroides* – synthesize biotins and riboflavins
 - ▶ *Prevotella* – synthesize thiamin and folate
 - ▶ *Ruminoccus* – digest cellulose plant walls
- ▶ Flourish in people with plant based diets
- ▶ Improved gut microbiota within 24 hours to one week
- ▶ Can alter and improve metabolic activity



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Obesity associated with

- ▶ Higher levels of:
 - ▶ Firmicutes
 - ▶ *Staphylococcus aureus*
- Depletion of:
 - ▶ *Bifidobacterium*
 - ▶ *Lactobacillus*
- Microbes might strategically generate cravings for food
- High fat diet, lower fiber diet decreases microbial diversity

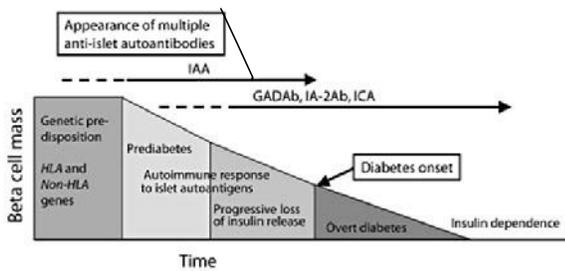


▶ *Endocrine Today*, Oct 2014
Meghan Jardine



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Natural History of Type 1



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Autoantibodies Assoc w/ Type 1

Panel of autoantibodies –

- ▶ GAD65 - Glutamic acid decarboxylase –
- ▶ ZnT8 - Zinc Co-Transporter 8
- ▶ ICA - Islet Cell Cytoplasmic Autoantibodies
- ▶ IA-2A - Insulinoma-Associated-2 Autoantibodies
- ▶ IAA - Insulin Autoantibodies



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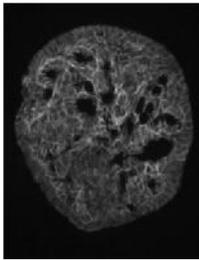
The Honeymoon

- By diagnosis, 15-40% of beta cell function remains
- ▶ Length of honeymoon varies
 - ▶ 10-15% of teens and adults still have clinically significant insulin production > 5 yrs after DM onset (DCCT, NEJM 1993)
- ▶ Rate of beta cell loss is correlated with age
- ▶ Younger pts tend to have shorter honeymoons



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Remaining Beta Cells



- ▶ Can serve one well while it lasts...even if on supplemental insulin.
- ▶ Better overall glucose control lower A1C, less glycemic excursion, lower risk for severe hypoglycemia

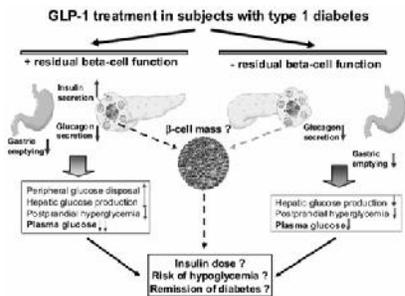


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Treatment of Type 1 with GLP-1 Agonists

272 Current Diabetes Reviews, 2009, Vol. 5, No. 4

Kilgus et al.



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Medalist Study – Harvard Joslin Diabetes Center

- ▶ After 50 years with diabetes
 - ▶ Many still produced some insulin
 - ▶ Many had no eye disease



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Research on Type 1

- ▶ Pathophysiology
- ▶ Primary Prevention – what triggers type 1?
 - ▶ Viruses
 - ▶ Lack of breastfeeding
 - ▶ Early exposure to foods?
 - ▶ Hygiene (too much?)
- ▶ Intervention – Secondary and Tertiary
- ▶ Cure



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Primary Prevention of Type 1

- ▶ Strategy – Find those at highest risk of Type 1 diabetes and see if early intervention to protect beta cells prevents or delays onset.
- ▶ Identify through genetic testing
- ▶ 1 million currently at risk



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TEDDY
The Environmental Determinants of Diabetes in the Young

Funded by NIDDK, the National Institute of Allergy and Infectious Diseases (NIAID), the National Institute of Child Health and Human Development (NICHD), the National Institute of Environmental Health Sciences, the CDC, the JDRF, and the ADA.



TEDDY – to determine if...

- ▶ Can reduce the risk of type 1 diabetes w/
 - ▶ Avoid early cows milk exposure
 - ▶ Avoid introduction of gluten grains < 6mo
 - ▶ Adequate vitamin D
 - ▶ Reduce nitrate exposure
 - ▶ Others




TEDDY Update

- ▶ No news yet on causes yet, but researchers have developed a reliable system of identifying who is at risk for type 1 diabetes based on autoimmune markers.
- ▶ TEDDY approach offers “appropriate and effective public health model for screening for type 1 diabetes in the general population”,
William Haggopian, MD, PhD,




The Hygiene Hypothesis

- In studies, mouse raised in clean environment is higher risk for DM than one raised in dirty one
- ▶ “Clean living” may increase risk for autoimmune diseases
- ▶ Risk is higher in urban than rural settings
- ▶ •Daycare, other early exposures, lower risk for DM



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Take Home Message

- ▶ Get Dirty
- ▶ Breastfeed if possible.
- ▶ Avoid early exposure to cows milk and cows milk based formula and gluten?
– year of life for those at high risk
- ▶ Keep an eye on new research results



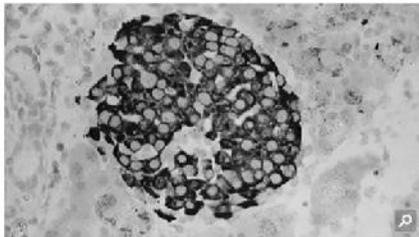
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News 21 10 2013 10:56 | updated 23 10 2013 11:43

Finnish team makes diabetes vaccine breakthrough

Researchers in Finland could be close to a breakthrough in the search for a vaccine against Type 1 diabetes. Clinical trials could start soon.

Recommend 18,390 people recommend this



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Coxsackie Virus Vaccine?

- ▶ Opens up novel possibilities for future research aimed at developing vaccines against these viruses to prevent type 1 diabetes.
- ▶ Since the group B coxsackieviruses includes only six enterovirus types it may be possible to include all of them in the same vaccine.



sciencemagazine.com



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Type 1 – Intervention Studies

- ▶ Trial Net – Oral insulin, delay onset 4 yrs
- ▶ Vaccine (glutamic acid decarboxylase)- Start earlier
- ▶ START Trial – Thymoglobulin – still enrolling
- ▶ CD3 Monoclonal Antibodies
- ▶ Stem Cell



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Get Involved – Get Screened
DiabetesTrialNet.org

www.DiabetesTrialNet.org

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+44-117-999 8327

Australia and New Zealand

+61-3-93452555

Italy

39-02-2668 2818

Finland

358-2-913 0000

(Dial 911 for emergencies)



If Someone in Your Family Has

Type 1 Diabetes

You May Be At Risk



You Can Help Answer This Question

Type 1 Diabetes TrialNet



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Date: April 8 – 10, 2015

Earn 27 CEs

Diabetes Educator Course Fee: \$499



We would love an Invitation to Present in Your Town – DiabetesEd.net



Thank You



- ▶ Questions?
- ▶ Email bev@diabetesed.net
- ▶ Web www.diabetesed.net