

# Nutrition Trends in Type 1 Diabetes

*modern concepts to support long-term health*

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Presented by:

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# Purpose Statement

## Core Values & Ethics

**Your well-being and long-term health is paramount.**

**I respect your right to make personal decisions about your health.**

**Information in this presentation is evidence-based and thoughtfully analyzed for facts.**

**A modern approach to diabetes education challenges methods that may not be working.**

**It is an evolving, patient-centered, person-forward, holistic approach, that considers the collective community.**

**The health of a person living with diabetes extends beyond blood sugar, HbA1c, and time in range.**

**Diabetes education and instruction must also expand on clinical standards to support growth and self-sufficiency.**

**We may not share the same opinion, but we have a common goal to be healthy and happy with T1D.**

**Or to support those whose lives depend on knowledge that is in our grasp to provide.**

# Modernizing Nutrition Education

## Communication

### Nutrition Analysis

High-protein/low-carb

Plant-based/high-fiber

Free foods

Fiber & nutrient quality

Insulin Resistance

Ketogenic Diets

Fasting/time-restricted eating

## Explanation

- **History of Nutrition in T1D**
  - challenges in nutrition science
- **Trends in Diet Culture**
  - diet mentality and life with T1D
- **Consequences of Restrictive Eating**
  - Developing a healthy relationship with food
  - Healthy self-talk → Optimistic Coaching
- **A Modern Approach to Nutrition in T1D**
  - solutions-based, shared decision-making
  - holistic, long-term health

# A History of Nutrition in Diabetes

**Pre-insulin**

**“starvation diet”**

*restricting calories and carbohydrates*

**1921**

***Insulin is discovered!***

*Carbohydrate restriction continues*

**1930s**

**“the line system” evolved into the exchange system**

*Encouraged meat, cheese, and eggs, for euglycemia*

*Taglines: Sugar substitutes, “diabetic” as a label*

**1960s  
fat diet**

**concerns were raised about the risks of a low-carb, high saturated**

*studies revealed that higher carb diets in Asia and Africa decreased CV complications*

**1970s**

*strict meal plans include weighing and measuring food*

- sugar restriction & low to moderate carbohydrate **control**

**1980s-90s**  
*community*



*New guidelines published in US & UK were met with hostility by the medical*

*reduce fat intake and increase carbohydrates, mostly complex carbs*

**Recommendation:**

***a nutrition plan and insulin regimen should consider individual lifestyle***

*What was the approach  
to nutrition education*

*when the new guidelines came out?*

**standardized diet handouts,  
uniform instructions,  
lacking individualization**

**2000s**

*Guidelines stressed the need to avoid excessive protein and salt*

- sufficient in fruit and vegetables





# A Modern Approach to Nutrition in T1D

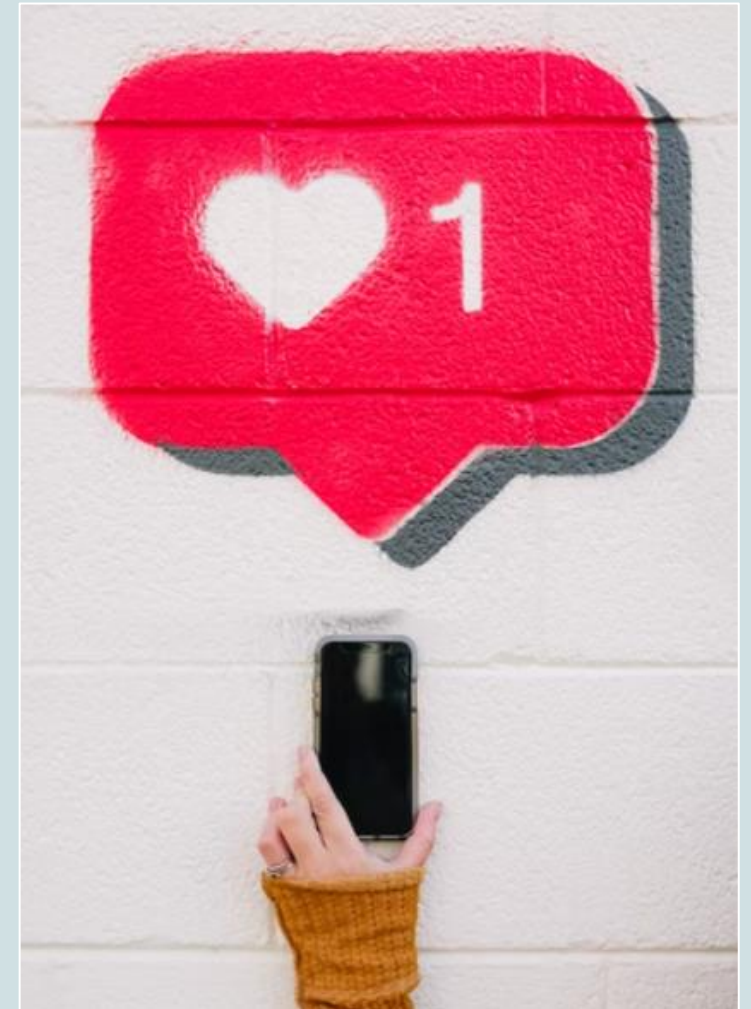
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*Each person requires  
individualized guidance  
modified to meet  
lifestyle goals & objectives*



# Challenges in www.Nutrition/Science

- ❑ Studies may only represent a small population  
*highly motivated individuals*
- ❑ Misleading opinions based on personal experience
- ❑ Mass influence: *everyone can share something*
- ❑ Science is not one size-fits-all
- ❑ The billion dollar supplement industry
- ❑ Industry funded research and bias to boost sales  
*product promotion, ag industry*



# Trends in Diet Culture

- short-term promises
- well-marketed and profitable
- thrives on insecurity
- misrepresentation of carbohydrates
- inspires body shaming/poor self-image
- truth isn't required, nor regulated
- social media promotes dieting *faster than evidence supports it*



***Well-being interventions***

*The business of nutrition  
is not always in alignment  
with the practice of nutrition*



# Diet Culture *Fuels* Carb-phobia

## *The relationship between diabetes and carbohydrates*

1. *carb counting and low-carb emphasis at diagnosis*
  2. *avoidance of carbohydrates to withhold insulin*
  3. *resentment towards foods that raise blood sugar*
- 

4. *solution seeking, disordered thinking*
5. ***diabetes takes all - mind, body, spirit***

- Misleading studies & influencers
- Food rules, titles/labels
- Carbs are NOT created equal
- fad diet marketing  
→ consumer confusion

***Are short-term results  
worth long-term risk?***

# Carb-Restriction in Kids

## Children need nutrients for growth and more calories than adults

- restriction of complex carbs is not advised
  - unintentional nutrient deficiencies can result
- 
- **VLCD are not advised for youth with T1D**
    - 20-50g/day
    - *poor quality of life*
- 
1. *Nutrient-rich nutrition supports energy & growth.*
  2. *Youth with T1D are at high risk for disordered eating, burnout, and depression.*
  3. *Encourage a healthy relationship with food for the future.*

**Restrictive dieting is not appropriate for children.**



# Impact: *Clinical & Cultural*

## *Goals*

- improve blood sugar trends & labs
- decrease body fat
- enhance athletic performance
- healthy aging & prevention
- strategically use technology
- feel happy, healthy, confident
- preventive health

## *Characteristics of People with T1D*

- goal oriented
- analytical
- stats & numbers focused
- self-aware & intuitive
- responsible
- multi-tasking
- improvement focused

*obsessive*

*Critical*

*controlling*

*denial*

*exhausted*

# Consequences of Restrictive Eating

- preoccupation with food & dieting
- nutrient deficiencies
- insulin resistance
- compromised gut integrity
- cardiovascular decline
- ↑hypoglycemia
- mental health/safety
- obsessive thoughts



*How we think and feel about food shapes our QOL*

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***Disordered Eating:***

**Eating for other reasons than hunger or nourishment**

# Mindset: *developing a healthy relationship with food*

## *Disordered Diet Mentality*

**Mon-Sun:** restrictive or compulsive eating

**Fri:** no food or 'fasting', water only

**Sat:** low-carb, high-protein

**Sun:** cheat day, anything goes

**Language:** good/bad food → insulin

**Traits:** anger, shame, poor body image

- *limited energy for exercise, brain fog*
- *obsessive, socially isolating, stressful*

## *Insightful Diet Mentality*

- ❑ 3+ meals daily
- ❑ most meals created at home
- ❑ includes complex carbohydrates
- ❑ intuitive choices; balance and acceptance
- ❑ self-regulation: emotion, mood, forgiveness
- ❑ routine exercise: moderate to intense

- *sustainable, consistent variety of foods*
- *nutrient-rich, health promoting, holistic*

# Healthy Self-Talk Optimistic Coaching

1. *"I need to stop eating carbs to get my A1c down."*
1. *"I saw someone on social media with an A1c of 5.3%. I should have that."*
1. *"I eat everything I want on cheat days and spend the whole week trying to exercise it off."*
1. *"I don't eat carbs; they're bad."*

*"I can get to a lower A1c but within a healthy range that I can maintain."*

*"I want to be healthy on my own terms and have a positive body image."*

*"I eat healthy most of the time so I can enjoy dessert a few times per week."*

*"I will learn how my blood sugar reacts to carbohydrates so I can have a plan."*

# Standard Directive



# Improved Standard

## ***Exchange diet***

- 1 exchange = 15g carbs
- measuring foods, specific diet plan

## ***'free food'***

- 5g/carbs or less per serving
- 20 calories or less per serving

## ***Set carbohydrates per meal***

- 45-60g x 3 meals + 15-20g/snack
- set dosing for meals

## ***Glycemic Index***

- based on rate of absorption

## ***Patient-Centered/Shared decision-making***

### ☐ **Holistic Nutrition: eat for a healthy body**

*self-respect, personal values, nutrient-rich*

### ☐ **Energy Balance: know how much you need**

*carbs, fat, protein, fiber, water*

### ☐ **CGM: Self-study BG patterns**

*Daily habits, typical food intake, exercise*

### ☐ **Strategic Timing: food & exercise**

*schedule and activity level*

***positive, self-sufficiency, intuition, knowledge***



# Person-Centered Nutrition *is rich in vitamins & minerals*

***Include a wide range of foods that:***

- ❑ meet daily fiber minimums
- ❑ act as anti-inflammatory agents
- ❑ provide a variety of antioxidants
- ❑ immune-boosting

## **Daily FIBER minimums**

Women	Men
25g, 21g (51+)	38g, 30g (51+)

- *Supports insulin sensitivity and glucose control*
- *increased abundance of healthy bacteria*
- *removes waste, lowers cholesterol*
- *promotes fullness & satiety*
- *supports mental & emotional health*

**high fiber ≠ high carb**

Carbohydrate Recommendations  
begin when we are 12 months old  
**RDA - 130 grams/day minimum**

# Fiber is a Guide *for choosing nutrient-rich foods*

- ★ Beans, whole grains, veggies, fruit, nuts, seeds
- ★ Carb ratio adjusts with consistent fiber intake
- ★ Carbs can be thought of positively

## *Strategy to adding more fiber:*

- ☐ increase water intake
- ☐ chew slowly
- ☐ cook thoroughly
- ☐ avoid gulping
- ☐ space fiber throughout the day

## What Causes Insulin Resistance?

### INTRAMYOCYELLULAR FAT

1. fatty acids accumulate
2. muscle cells store the excess fat
3. glucose is the main fuel source
4. insulin transports glucose into cells

If fat clogs up the muscle cell  
glucose can't get in

↑ *insulin needs rise* ↑

# Fiber & Insulin Sensitivity

**90% of adults DO NOT meet the minimum daily intake for FIBER**

*The Foundation: whole grains, beans, vegetables, fruit, nuts & seeds*

**Research is consistent on the benefits of a diet adequate in fiber**

- *Insulin resistance, cancer prevention, heart health, GI, mental function, cancer*
- consistent fiber intake supports insulin sensitivity
- Improves intestinal integrity and decreases inflammation
- healthy microbiota has a positive relationship with metabolism, mental health, & insulin sensitivity

**\*Simple vs. Complex\***

*Carbohydrates are not synonymous with junk food*

# Digestive Integrity = Insulin sensitivity

Stomach integrity improves with efficient metabolism

*The more consistent fiber intake is,  
the more insulin sensitive a person can be*

## 4 fiber-rich meals:

- ☐ high fiber toast + peanut butter + blueberries
- ☐ high fiber tortilla wrap + veggies + hummus  
3-bean salad, chili, or veg soup, apple
- ☐ whole wheat crackers, half an avocado, salsa,  
a few dark chocolate squares
- ☐ roasted stuffed sweet potato, big leafy green salad



## Subtracting fiber

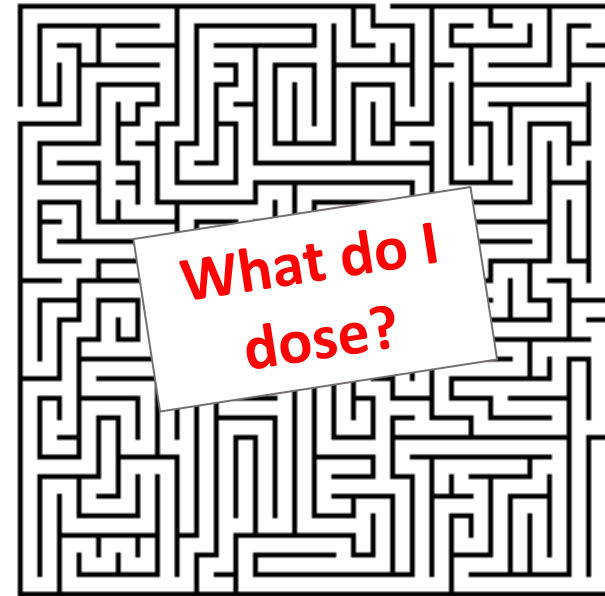
does not apply to everyone equally...

*subtract all ?*

*subtract half ?*

*subtract all if over 5g/fiber ?*

*Subtract NONE ?*



- we have individualized nutrient and insulin needs
- The integrity of the gastrointestinal tract can affect glucose absorption
- controlled release of nutrients from the stomach affects blood glucose
- ***ADA suggests a flexible approach***



# 'Net' Carbs

## *A term invented by food manufacturers*

- *processed snacks*
- *an attempt to “bio-hack” digestion*
- *not regulated, misleading info*

Complex: digests slowly

Simple: digests rapidly

Soluble: attracts water, slows digestion

Insoluble: adds bulk, eliminates waste

Sugar alcohols: undigested

- ❑ Carbohydrates are **not** stored in the body as fat
- ❑ Carbs are stored in the muscles, liver, and brain, as glycogen
- ❑ Protein is **not** stored for energy; excess calories in protein may be stored as fat

# Fiber-rich Gluten-Free choices

Aim for versatility \* always check labels

- ❑ wild rice, quinoa, couscous, rice cakes
- ❑ buckwheat: pancakes, noodles, muffins
- ❑ teff: bread, waffles, cakes, pizza crust
- ❑ tortillas: corn, (brand: Siete)
- ❑ nuts, nut butter (brand: Justin's)

\*Trader Joe's, Seeds Of Change, Lotus Foods

- oats
- lentils, garbanzo beans
- bell peppers
- Rice noodles
- peas, soy beans
- sweet potato
- squash
- pumpkin
- broccoli, cauliflower, sprouts
- avocado
- apples, pears

# Protein

## *Is there such thing as too much?*

- YES. *For everyone.*
- Amino acids cannot be used in excess
- Use it, lose it, or store the calories
- limit to 20-25g maximum at one time
- if protein ↑ , other macronutrients ↓
- Individually specific based on body weight

## *nutrient-rich, cholesterol-free*

- black beans, red lentils
- soy beans/milk, tofu, tempeh
- oats, whole grains, wild rice
- quinoa, couscous, chia
- nuts, pumpkin seeds

***Where there is fiber, there is often protein!***

“A high-protein meal requires ~50% more insulin than a low-protein meal that contains the same quantity of carbohydrates. The majority is required within the first 2 h.”

Evans, M. et al. Diabet Med. 2019.

“To achieve target glucose control following the HFHP, 65% more insulin was required in 2.4 h.”

Bell, K. et al. Diabetes Care, 2016.

# Youth Studies

## Nutrient Evaluation: *252 kids in the U.S. with T1D*

- average age of 13, pump or injections
- results: excess fat intake, insufficient fiber intake
- lower fiber intake associated with A1c > 8.5% regardless of insulin regimen
- higher fat intake, more frequent post meal hyperglycemia

***very few kids met  
nutrient guidelines  
for their age***

Katz M et al. Diabetes Techno Ther.  
2014.

## Evaluating Risk: *Very low carb diets & Kids*

- Very high fat, moderate protein, extremely low carb for the purpose of producing ketones
- Ketones are an acidic by-product of oxidation that the brain will use for fuel in the absence of glucose
- Ketogenic diets for improving seizure activity are short-term and clinically managed
- growth concerns, brain health, GI discomfort, bad breath, insomnia

***Brain health researchers are finding great success with the exact opposite method of nourishment***

Book recommendation: *The Alzheimer's Solution* - Sherzai M.D.

# THE KETOGENIC DIET

**Ketosis – *shows quick results for 3 reasons***

- nutrient & calorie restriction on 30-50g/carbs/day
- the body burns fat (ketones) for energy - ***at what cost?***
- the body takes drastic measures to maintain organ function

**May help the symptoms of diabetes but worsens the disease**

***ketogenic diets have proven to be unsustainable & extremely restrictive***

- ☐ Ketosis changes brain chemistry
- ☐ Concern for developing a disordered relationship with food
- ☐ low insulin levels; poor endurance output
- ☐ The rate of gastric emptying is slowed down by higher calorie foods (80-90% fat)



# Fasting & T1D

## *What is a nutritional fast?*

- 12, 16, 24 hours; only water
- intermittent fasting  $\neq$  time restricted eating
- eating in a specific window of time
- *sleeping!*

## **What can fasting do?**

- stimulate lipolysis
- stabilize BG after AM fasted exercise
  - most effective duration: 20 mins

## *What you should know*

### **Reducing insulin levels can increase lipid mobilization**

- $\uparrow$  physical fitness, energy utilization
- combined glucose/fat as fuel

### $\uparrow$ **risk of exercise induced hypoglycemia**

- may be difficult to maintain exercise intensity
  - low glycogen stores
- fasted training may promote a rise in glucose if vigorous
  - counterregulatory hormones at work

# Nutrition Trends in T1D Summary

Support self-sufficiency and healthy decision making.

Children & adults need nutrient-rich foods to fuel long-term health.

Diabetes is one part of a diverse system; *mind-body-spirit*.

***People with diabetes are individuals  
with specific nutrient needs intended to support the whole person***

- ✓ Dieting and restrictive practices are not necessary for healthy glucose levels
- ✓ Eating for long-term health is paramount; diabetes is a partnership
- ✓ There is much more to health and longevity than just A1c %

# Thank you

*For your attention!*

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## Nutrition Trends in Type 1 Diabetes

*modern concepts to support long-term health*

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# References

1. American Diabetes Association. *Standards of Medical Care in Diabetes—2020* Abridged for Primary Care Providers. Clinical Diabetes Jan 2020, 38 (1) 10-38; DOI: 10.2337/cd20-as01
2. Kirstine J. Bell, Elena Toschi, Garry M. Steil, Howard A. Wolpert. Mealtime Insulin Dosing for Fat and Protein in Type 1 Diabetes: Application of a Model-Based Approach to Derive Insulin Doses for Open-Loop Diabetes Management Diabetes Care 2016;39:1631-1634 DOI: 10.2337/dc15-2855
3. Buyken, A., Toeller, M., Heitkamp, G. et al. Relation of fibre intake to HbA1c and the prevalence of severe ketoacidosis and severe hypoglycaemia. Diabetologia 41, 882–890 (1998). <https://doi.org/10.1007/s001250051003>
4. Chiang JL, Maahs DM, Garvey KC, et al. Type 1 Diabetes in Children and Adolescents: A Position Statement by the American Diabetes Association. Diabetes Care. 2018;41(9):2026–2044. doi:10.2337/dci18-0023
5. Goebel-Fabbri AE, Fikkan J, Franko DL, Pearson K, Anderson BJ, Weinger K. Insulin restriction and associated morbidity and mortality in women with type 1 diabetes. Diabetes Care. 2008;31(3):415-419. doi:10.2337/dc07-2026
6. Massey CN, Feig EH, Duque-Serrano L, Wexler D, Moskowitz JT, Huffman JC. Well-being interventions for individuals with diabetes: A systematic review. *Diabetes Res Clin Pract.* 2019;147:118-133. doi:10.1016/j.diabres.2018.11.014
7. Pinhas-Hamiel, Orit et al. “Eating disorders in adolescents with type 1 diabetes: Challenges in diagnosis and treatment.” World journal of diabetes vol. 6,3 (2015): 517-26. doi:10.4239/wjd.v6.i3.517
8. Wiley J, Westbrook M, Long J, Greenfield JR, Day RO, Braithwaite J. Diabetes education: the experiences of young adults with type 1 diabetes. Diabetes Ther. 2014;5(1):299-321. doi:10.1007/s13300-014-0056-0

# Fiber & Nutrients

1. Evans M, Smart CEM, Paramalingam N, Smith GJ, Jones TW, King BR, Davis EA. Dietary protein affects both the dose and pattern of insulin delivery required to achieve postprandial euglycemia in Type 1 diabetes: a randomized trial. *Diabet Med*. 2019 Apr;36(4):499-504. doi: 10.1111/dme.13875. Epub 2019 Feb 20. PMID: 30537305.
2. Katz M, Mehta S, Nansel T, Quinn H, Lipsky L, Laffel L. Associations of Nutrient Intake with Glycemic Control in Youth with Type 1 Diabetes: Differences by Insulin Regimen. *Diabetes Technology & Therapeutics*. Aug 2014;512-518. <http://doi.org/10.1089/dia.2013.0389>
3. Muller M. Canfora E. Blaak E. Gastrointestinal Transit Time, Glucose Homeostasis and Metabolic Health: Modulation by Dietary Fibers. Department of Human Biology. Received: 16 January 2018 / Accepted: 26 February 2018 / Published: 28 February 2018.
4. Reynolds A, Mann J, Cummings J, Winter N, Mete E, Te Morenga L. Carbohydrate quality and human health: a series of systematic reviews and meta-analyses. *Lancet*. 2019 Feb 2;393(10170):434-445. doi: 10.1016/S0140-6736(18)31809-9. Epub 2019 Jan 10. Erratum in: *Lancet*. 2019 Feb 2;393(10170):406. PMID: 30638909.
5. Schoenaker DA, Toeller M, Chaturvedi N, Fuller JH, Soedamah-Muthu SS; EURODIAB Prospective Complications Study Group. Dietary saturated fat and fibre and risk of cardiovascular disease and all-cause mortality among type 1 diabetic patients: the EURODIAB Prospective Complications Study. *Diabetologia*. 2012;55(8):2132–2141. doi:10.1007/s00125-012-2550-0

# Exercise

Clark, Nancy. Nancy Clark's Sports Nutrition Guidebook. Fifth edition. Champaign, IL: Human Kinetics, October 11, 2013.

Riddell MC, Gallen IW, Smart CE, Taplin CE, Adolfsson P, Lumb AN, Kowalski A, Rabasa-Lhoret R, McCrimmon RJ, Hume C, Annan F, Fournier PA, Graham C, Bode B, Galassetti P, Jones TW, Millán IS, Heise T, Peters AL, Petz A, Laffel LM. Exercise management in type 1 diabetes: a consensus statement. *Lancet Diabetes Endocrinol*. 2017 May;5(5):377-390. doi: 10.1016/S2213-8587(17)30014-1. Epub 2017 Jan 24. Erratum in: *Lancet Diabetes Endocrinol*. 2017 May;5(5):e3. PMID: 28126459.

Scott SN, Anderson L, Morton JP, Wagenmakers AJM, Riddell MC. Carbohydrate Restriction in Type 1 Diabetes: A Realistic Therapy for Improved Glycaemic Control and Athletic Performance?. *Nutrients*. 2019;11(5):1022. Published 2019 May 7. doi:10.3390/nu11051022

# History of Nutrition

Anderson JJ, Nieman DC. Diet Quality- The Greeks Had It Right! *Nutrients*. 2016; 8(10):636. Published 2016 Oct 14. Doc 10.3390/nu810063

Laios K, Karamanou M, Saridaki Z, Androutsos G. Aretaeus of Cappadocia and the first description of diabetes. *Hormones (Athens)*. 2012 Jan-Mar;11(1):109-13. doi: 10.1007/BF03401545. PMID: 22450352.

Loriaux D, Lynn MD PhD, Diabetes and The Ebers Papyrus: 1552 B.C. *The Endocrinologist*: March/April 2006 - Volume 16 - Issue 2 - pp 55-56 doi: 10.1097/01.ten.0000202534.83446.69

Thomas B. Nutritional advice for people with diabetes: past, present, what next? 2004. *Pract Diab Int*. 21: 69-72. doi:10.1002/pdi.591