PRODUCE FOR® BETTER HEALTH FOUNDATION

USA Pears

AMERICA'S SWEET TOOTH

Using Fruits & Veggies To Create Delicious Sugar Substitutions

Moderator

Wendy Reinhardt Kapsak, MS, RDN

President & CEO

Produce for Better Health Foundation

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PRODUCE FOR® BETTER HEALTH FOUNDATION

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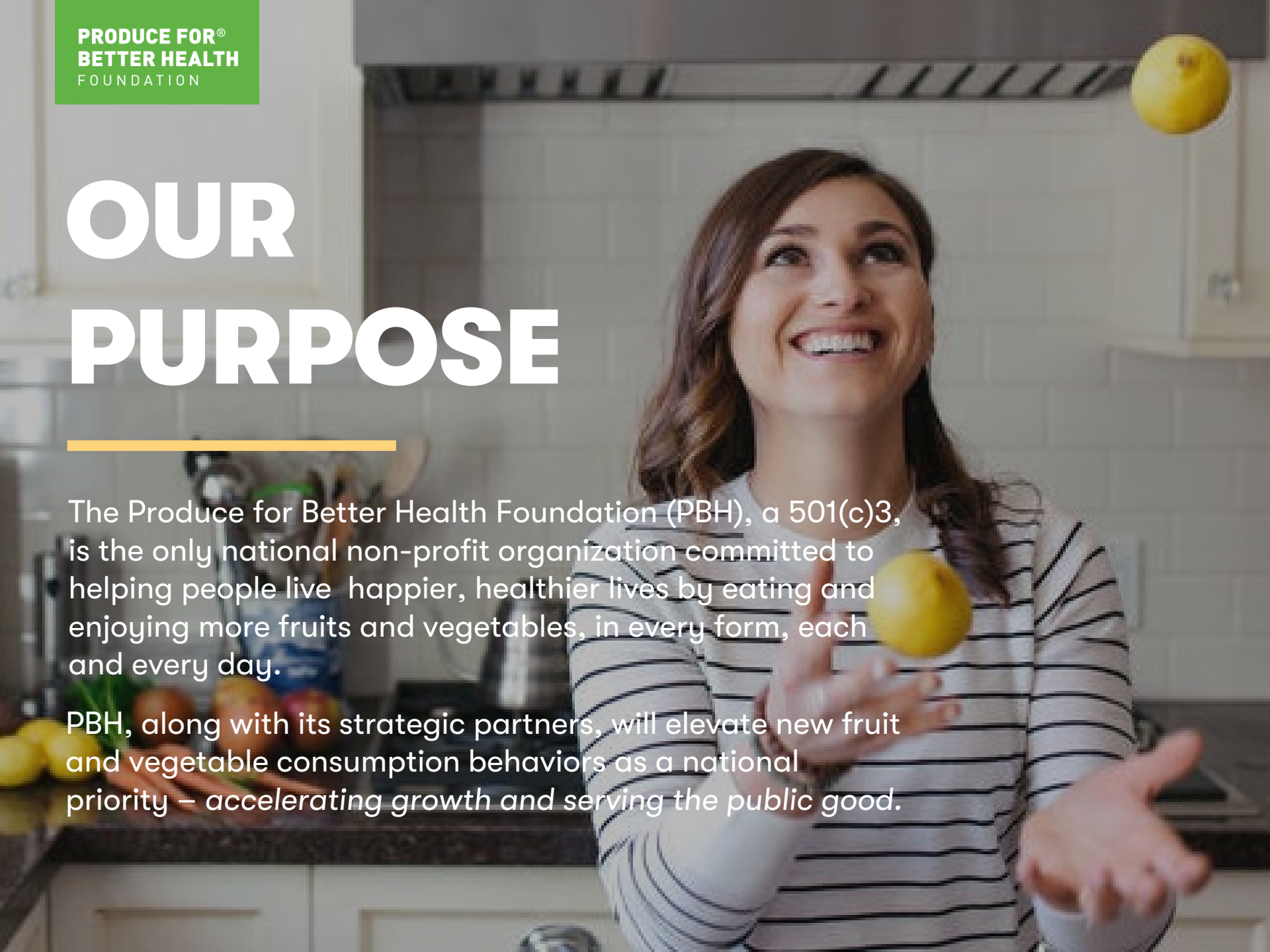
OUR PURPOSE

The Produce for Better Health Foundation (PBH), a 501(c)3, is the only national non-profit organization committed to helping people live happier, healthier lives by eating and enjoying more fruits and vegetables, in every form, each and every day.

PBH, along with its strategic partners, will elevate new fruit and vegetable consumption behaviors as a national priority – *accelerating growth and serving the public good.*



THE AWARD-WINNING HAVE A PLANT® MOVEMENT REACHES MILLIONS

The award-winning Have A Plant® Movement is a way to inspire lasting behavior change by tapping into the emotional connection consumers have to the fruit and vegetable eating experience.

PBH is an undeniable resource for health & wellness professionals, given its trusted third-party credibility, breadth of nutrition and behavioral research, and strong consumer, influencer and industry reach.

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Promoting excellence in agricultural public relations

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HOUSEKEEPING

1 CPEU available through the Commission on Dietetic Registration (CDR)

You will receive a link to the certificate of attendance, the webinar recording and PDF of the presentation!

Type your questions into the Question box at the bottom of your Control Panel at any time during the webinar.

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PRODUCE FOR® BETTER HEALTH FOUNDATION

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Author of *Half the Sugar, All the Love* and recipient of Nutrition and Healthy Living Certificate from Cornell University

Dietary sugar and cardiometabolic disease: Mechanisms, evidence & thoughts about policy

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Department of Molecular Biosciences:
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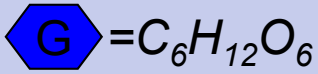
University of California, Davis

Disclosures:

Kimber Stanhope is a Principal Investigator of an NIH-funded clinical trial (R01HL137716) studying the metabolic effects of consuming naturally-sweetened orange juice or sucrose-sweetened beverage.

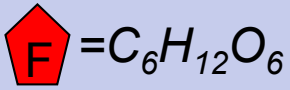
She was subcontracted to write scientific reports for Amyris, Inc. in 2020.

The major sugars as they occur in nature



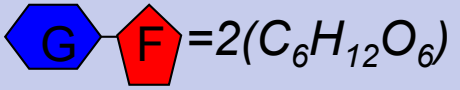
Glucose

Kcal: 4/g
Sweetness: 0.7
Sources:
Fruits 1-6%
Honey 31%



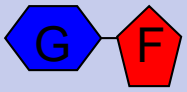
Fructose

Kcal: 4/g
Sweetness: 1.4
Sources:
Fruits 2-8%
Honey 38%



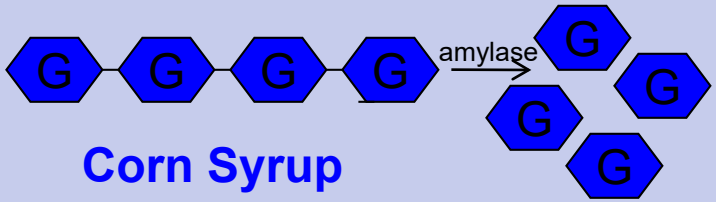
Sucrose

Kcal: 4/g
Sweetness: 1.0
Sources:
Sugar cane 10%
Sugar beet 20%
Fruits 1-4%
Maple sap 1-5%



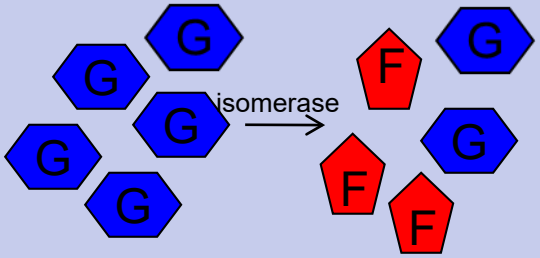
Processed sugars

Sucrose (white, brown or raw sugar)
Kcal: 4/g
Sweetness: 1.0
Sources: Sugar cane 100%
Sugar beet 100%
Maple sap 66%



Corn Syrup

Kcal: 4/g
Sweetness: 0.5-0.6
Sources: Corn starch
(Glucose syrups are also made from other grain starch i.e. rice)



High Fructose Corn Syrup

Kcal: 4/g
Sweetness: 1.0 for HFCS-55
Source: Corn syrup
Fructose composition: 42-90%

So what?

Why should we care whether our HFCS is 42% or 65% fructose?

Fructose $C_6H_{12}O_6$ = Glucose $C_6H_{12}O_6$

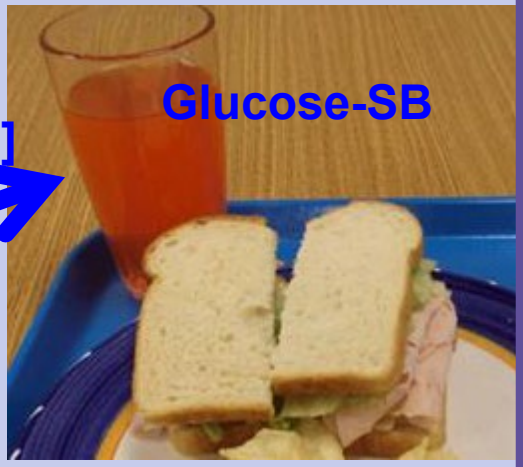
Right?

Wanting to know if this was true started our research group on an investigative journey that has lasted 24 years and is still going strong.

Our first NIH study: Older, overweight adults consumed 25% energy requirement as fructose- or glucose-SB for 10 weeks

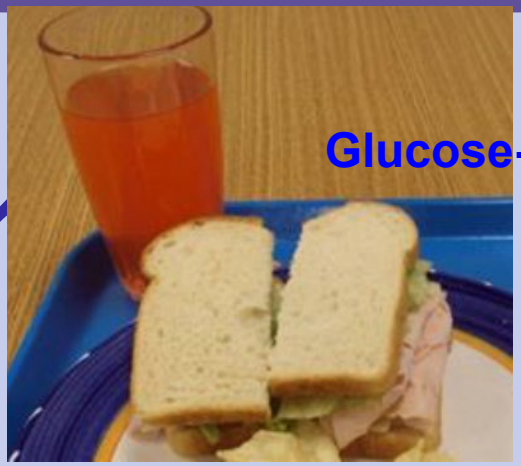
Baseline

↑BW (1.5 kg)
↑Body and subcutaneous fat
↑Post-meal [glucose & insulin]



Intervention

↑BW (1.3 kg)
↑Body fat and visceral fat
↓Post-meal [glucose & insulin]
↑de novo lipogenesis (DNL)
↓Fat oxidation
↑[TG, LDL-C….]
↓Insulin sensitivity
↑[24-h uric acid]



Glucose-SB

Understanding the mechanism:
Because glucose use is regulated, the liver only pulls in the glucose that it needs

Most of the glucose is used by brain, muscle…

Liver has first rights to refuse or use

Glucose in the intestine

Post-meal glucose, insulin spikes

Phosphofructokinase: Rate-limiting enzyme that is regulated by liver energy needs

Most of the glucose bypasses the liver and is delivered by the blood to rest of body

Glucose taken up by the liver

Used as liver energy & to replenish the glucose storage supply

Liver does need energy

Liver does not need energy

Understanding the mechanism: Because fructose uptake in not regulated, the liver pulls in 85% of the fructose consumed.

Liver has first rights to use or refuse

Fructose in the intestine

Fructokinase: Rate-limiting enzyme that is not regulated by liver energy needs

Nearly all the fructose taken up by the liver

Liver does need energy

Liver does not need energy

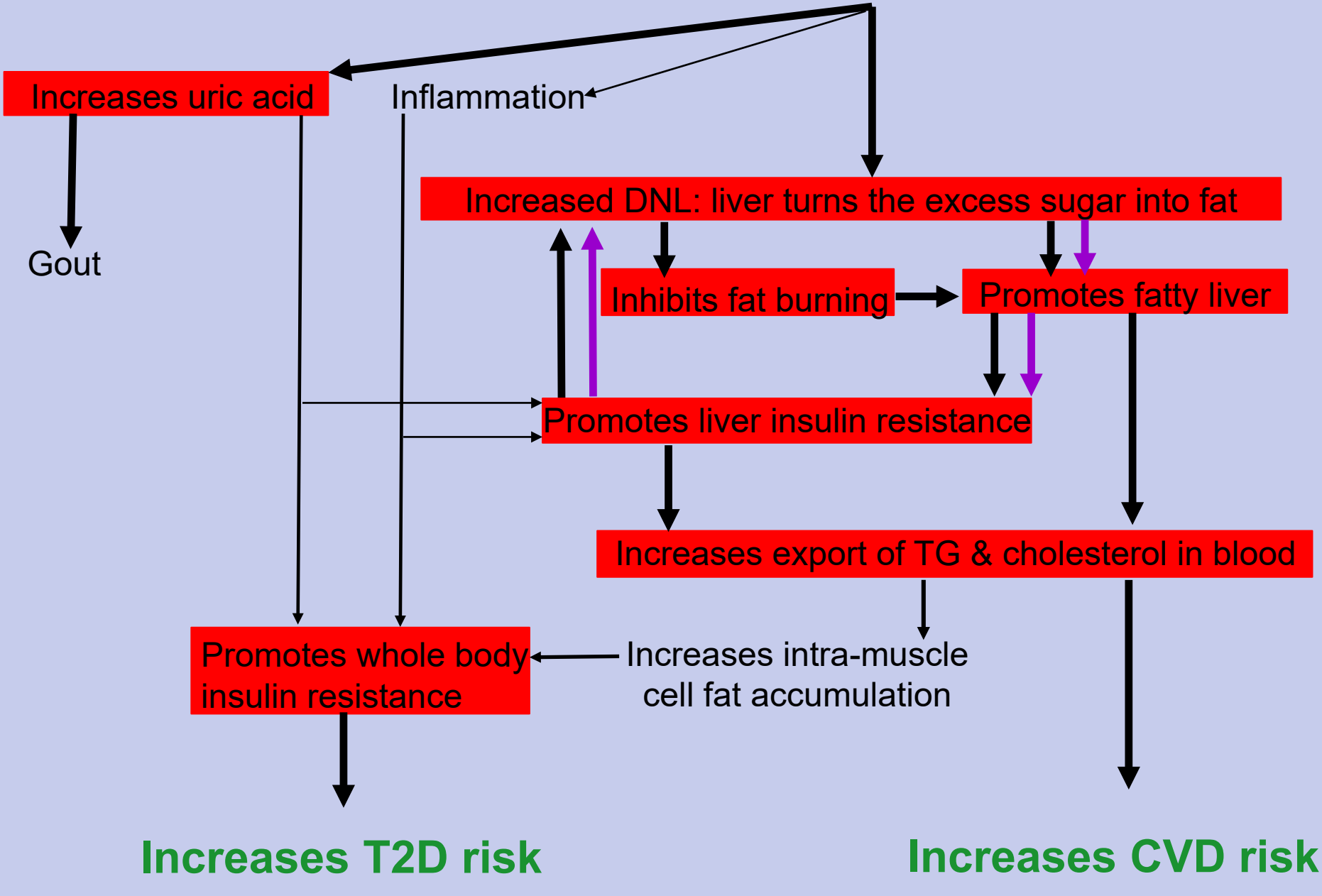
Nearly all the fructose taken up by the liver

Very little fructose is delivered to rest of body

Fructose overload in the liver

Very little fructose is used by brain, muscle…

Fructose overload in the liver causes metabolic dysregulation



Evolution did not provide us with protection against fructose overload because our ancestors did not need it.

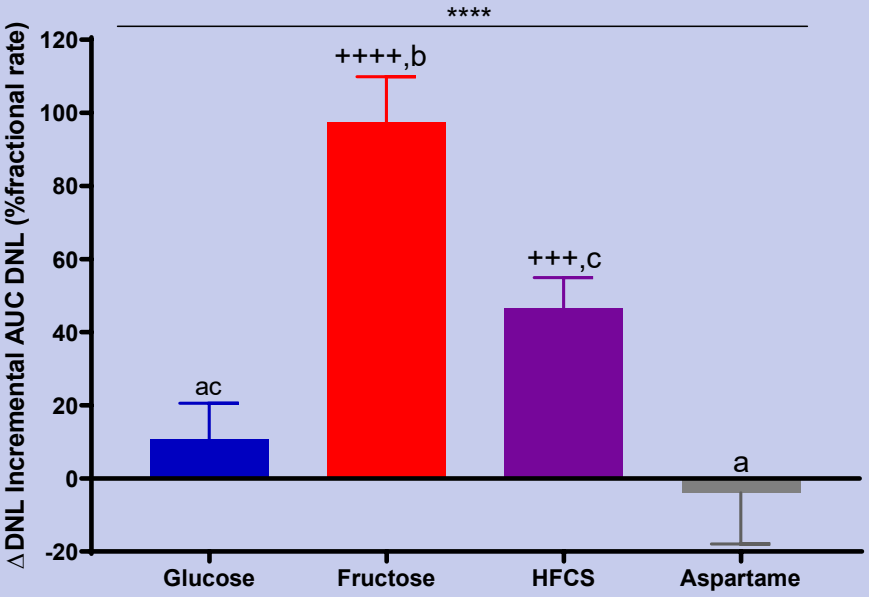
The only source of excess fructose was in a beehive.

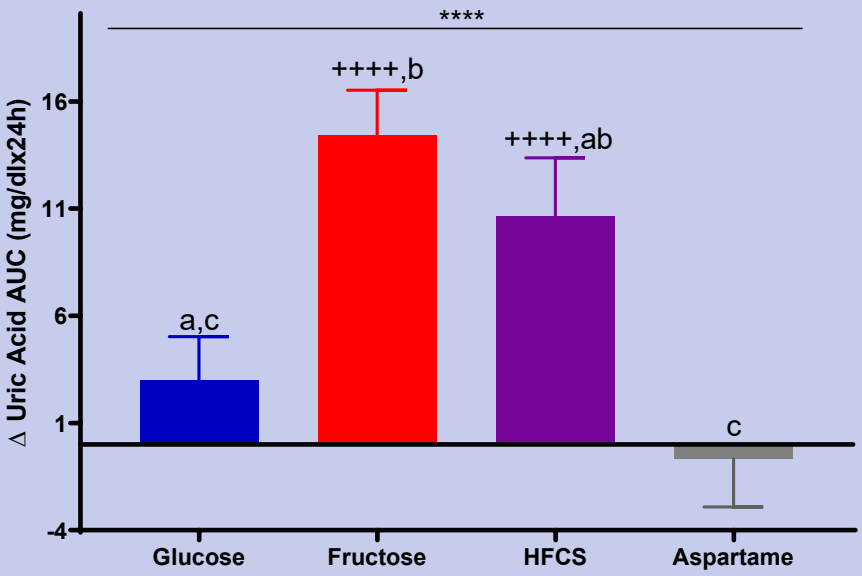
But we don't drink beverages sweetened with pure fructose—we drink HFCS-SB and sucrose-SB.

Next NIH study: For 2 weeks, young men and women (average age = 25 years; average BMI = 25 kg/m^2) consumed the beverages (SB) sweetened with:

- **25% Ereq fructose**
- **25% Ereq glucose**
- **25% Ereq HFCS-55**
- **17.5% Ereq HFCS-55**
- **10% Ereq HFCS-55**
- **0% Ereq as aspartame**
- **25% Ereq sucrose**

Question 1: How do the effects of pure fructose-SB and pure glucose-SB compare to HFCS-SB (HFCS-55 = 55% fructose, 45% glucose)?

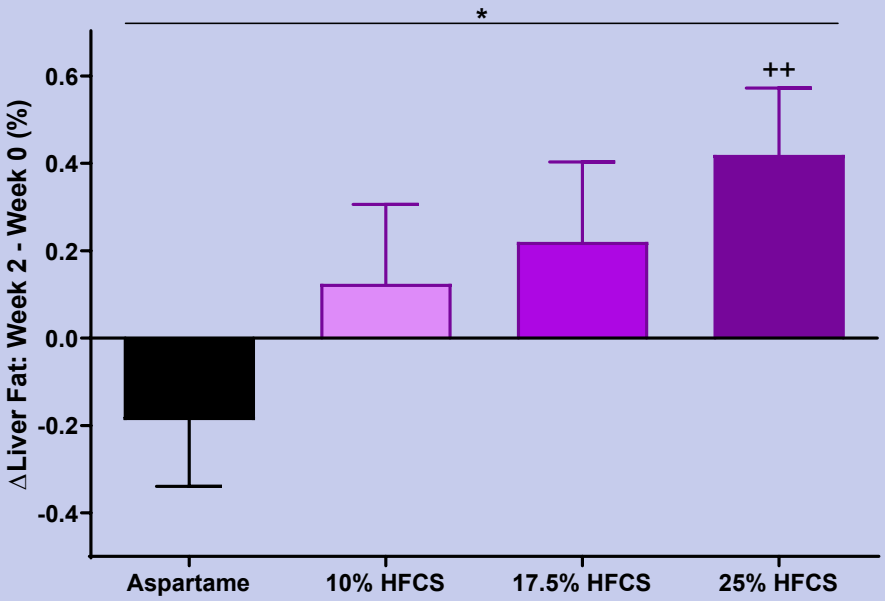


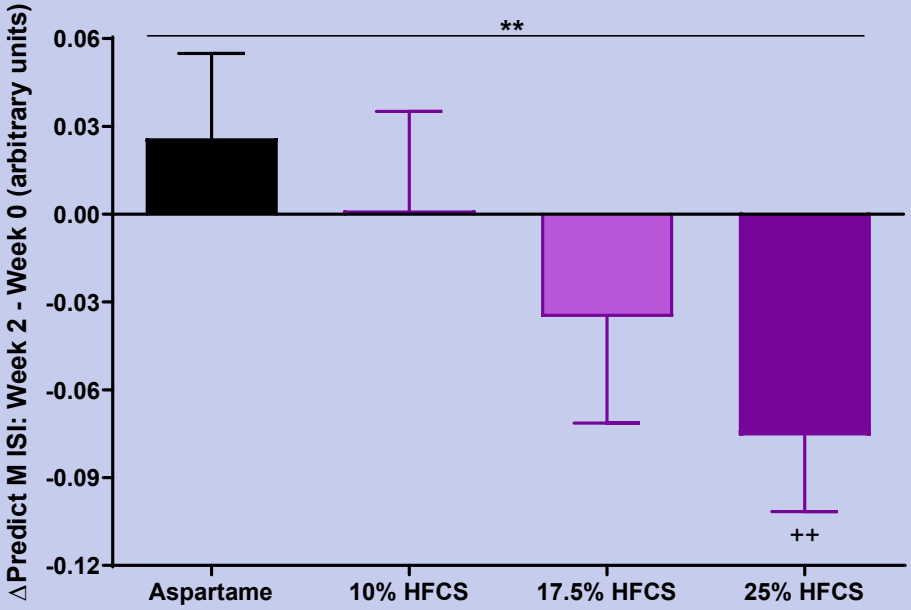


****P<0.0001 effect of sugar-sweetened beverage. $^{+++}$P<0.001,$^{++++}$P<0.0001, 2-week intervention compared with baseline. Change in outcome is significantly different between groups without shared letters.

For more and unexpected Question 1 results: Hieronimus, 2020, Metabolism

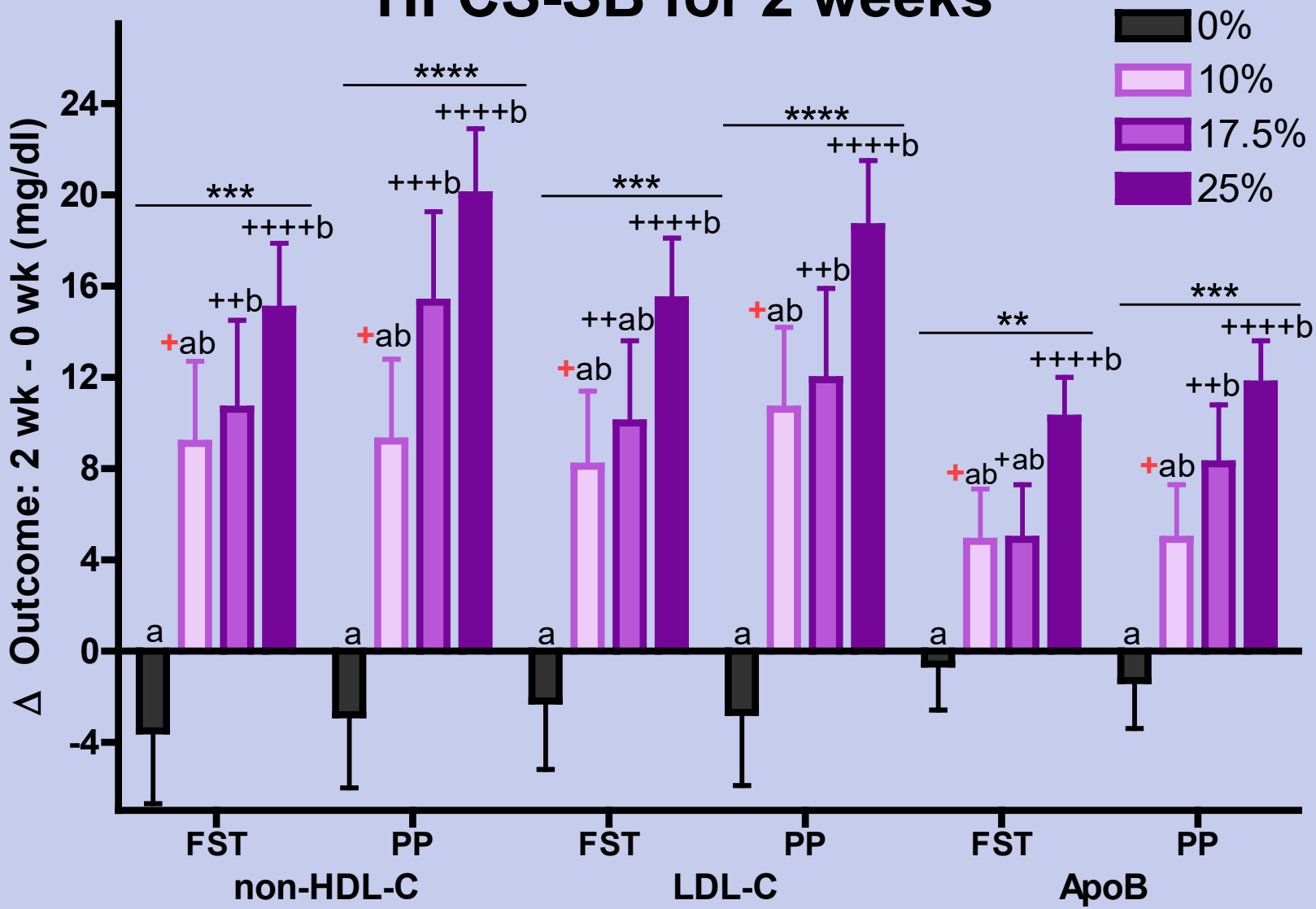
Question 2: Does HFCS-SB induce dose response effects on risk factors for metabolic disease?





*P<0.01, **P<0.01, effect of HFCS dose. ++P<0.01 2-week intervention compared with baseline (Week 0)

Question 2: Changes in lipoprotein risk factors in young adults consuming 0, 10, 17.5 or 25%Ereq as HFCS-SB for 2 weeks



Consuming beverages containing 10%Ereq HFCS

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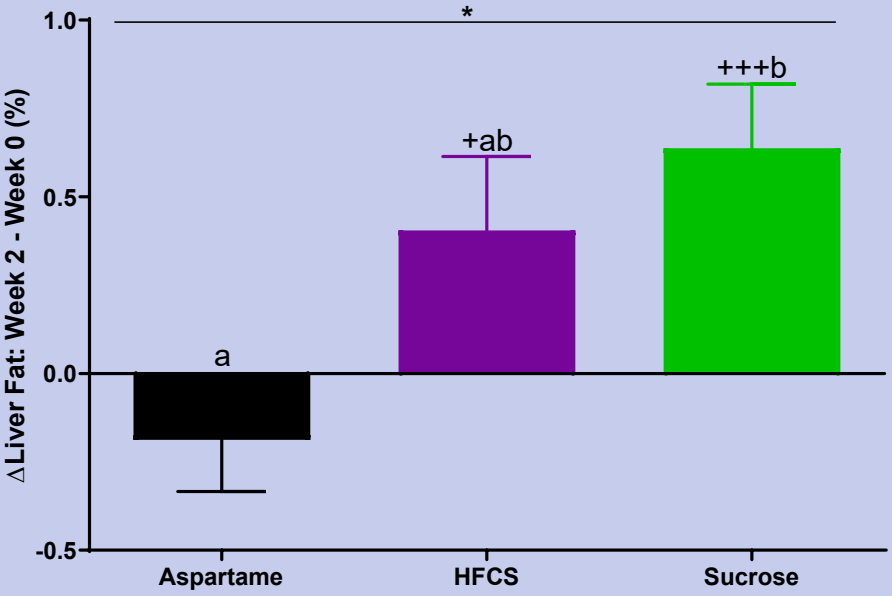
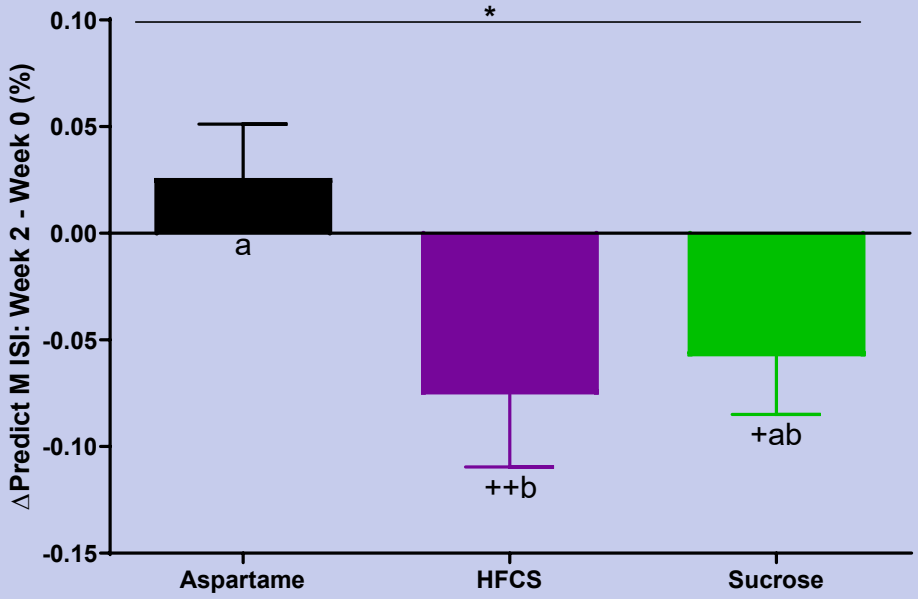
Breakfast

Lunch

Dinner

Question 3: Is sucrose-SB a healthier choice than HFCS-SB?





ANCOVA with adjustment for BMI; *P < 0.05, effect of group;
+P < 0.05, ++P < 0.01, 2-week intervention compared with baseline (Week 0)
; a different from b, Tukey's. Change in outcome is significantly different between groups without shared letters.

Four recent sugar-reductions dietary intervention studies show decreases in risk factors:

Population	Methods	Outcomes
Adolescents with metabolic syndrome	Consumed standardized meals with 10% added sugar for 10 days	Decreased body weight, DNL, liver fat, lipids, glucose intolerance, blood pressure
Children with obesity	Consumed prescribed diet low fructose diets (<20 g/day) for 6 weeks	Decreased liver fat and plasma TG
Overweight adults	Replacement of >two 12-oz SSB/day with diet sodas	Decrease in liver fat (74%)
Adolescents with NAFLD	Randomized to low sugar or usual diet prescriptions for the household for 8 weeks	Liver fat in low sugar group decreased from 25% to 17%, P <0.001 vs control group

Conclusion: Public health policies that promote reductions in added sugar consumption could improve public health.

Problem: Instituting these policies is easier said than done!

Hurdles to establishing public health policies to reduce added sugar consumption

- **Nutrition is not a priority for policy makers.**
- **Sometimes a conflict of interest exists between industry, governments and the health of the population.**
- Consequences of poor nutrition are often not immediately obvious and may manifest years later.
- Many people with malnutrition belong to poor and financially weak levels of society.
- Most policy makers have a clinical view of nutrition and less attention is paid to prevention and the social aspects of nutrition.
- The indirect costs of poor nutrition are not always apparent.
- Nutrition research is often biased and contradictory.
- Solutions are not easy to identify and are multifactorial.
- Prioritizing individual rights over public health outcomes.

Important example of the conflict of interest between public health and industry financial interest and power:

- **2014:** Berkeley, CA passed a SSB which decreased SSB purchases, generated >$5 million of tax revenue for public health programs, and provided a SSB tax template for other communities.

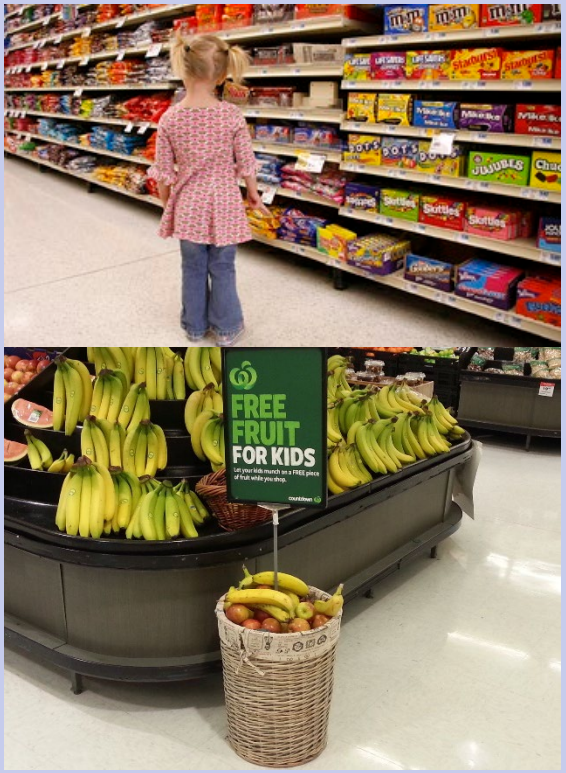
- **2018:** Suddenly CA passed a law banning cities and counties from implementing SSB tax through the year 2030.
  - This ban was achieved by what lawmakers characterized as the beverage industry “blackmailing” Californians.

Another area where public health policy could impact health: Targeted marketing of unhealthy food to children

Obesity rates in children are positively associated with their exposure to advertising of unhealthy foods.

Functional magnetic resonance imaging (fMRI) studies that measure reward activation in the brain provide a biological mechanism:

- The higher the brain's reward responses to the sight of palatable foods cues (actual or images), the higher the risk of weight gain.
- Reward responses in the brain to palatable food cues are amplified with repetitive exposure.
- Children have higher brain reward responses when viewing unhealthy foods than adults.
- Children are surrounded with real life palatable food cues.



Public health policies to restrict targeted marketing of unhealthy food to children

2017 International Food and Beverage Alliance Global Commitment for Responsible Marketing to Children

- Prohibits the advertising of unhealthy food to children.
- Industry adherence is voluntary and virtually non-existent.

6 countries have enacted statutory regulation but only 2 have regulations that include both broadcast and non-broadcast media

	Chile (2019)	United Kingdom (2017)
What it is	Extensive laws (no Tony the Tiger, no toys, no product placement)	Less extensive laws (yes Tony the Tiger, no toys, yes product placement)
Enforcement	Ministry of Health	Subcontracted by the government to a committee in the UK advertising industry
Outcomes	Evidence for fewer unhealthy food ads and less child exposure to unhealthy food ads	No change in exposure to food ads

Given that regulations to restrict marketing of unhealthy food to children in the US are not likely forthcoming, what other proactive measures can we take?

Just some thoughts:

Is a sugar-sweetened soda really more delicious to a child than a fresh pear, or is it the targeted marketing that eventually makes it more delicious?

Can we apply the same targeted marketing strategies used by the industry to promote fruit?

- Fill the environment with palatable fruit cues?
- Associate those cues with positive and truthful health messaging that can resonate with children?
- Can we target even the 2-year olds? (I recommend studying “Peppa Pig”)
- It may be too late for teenagers.

Acknowledgments:

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Also thanks to the 100+ UCD undergraduate students who have prepared 100s of meal and processed 1000s of blood samples while assisting with this research!

About Me

"A compelling argument for why we eat too many added sugars and that there are ways to reduce them without sacrificing flavor."
- The Washington Post

Best-selling author of
Half the Sugar, All the Love

Nutrition and Healthy Living
Certificate from Cornell University

Disclosures

Guest lecturer at Stanford University

Past collaborations:

Farmers' Market Foods
Rancho Meladuco Dates
California Walnuts
Williams-Sonoma
Good Eggs

Agenda

Sugar 101

Addressing sugar myths with clients

Culinary techniques

Practical strategies & recipes

Sugar 101: Definition

Added sugar is:

Sugar used in processing and preparing foods and drinks

Sugars eaten separately

Sugars added to foods at the table

Excerpted from *Half the Sugar, All the Love*
by Jennifer Tyler Lee and Anisha Patel, MD, MSPH.
Photographs by Erin Scott. Workman Publishing ©2019

Sugar 101: Added Sugar Intake Recommendations

	American Heart Association (AHA)	World Health Organization (WHO)**	Dietary Guidelines for Americans (DGA)
Date published	2009	2015	2020
Grams/day	24-36	25-50	50
Tsp/day	6-9	6.25-12.5	12.5
Calories/day	96-144	100-200	200
% Calories*	4.8-7.2	5-10	10
Recommendations for Children	No added sugars <2yr; >2yrs = 3 to 6 tsp (12-24g)	N/A; same as above	No added sugars <2yr

*Figures are based on a 2,000-calorie diet.

**WHO recommends to reduce sugar intake to 10% or less of total calories but states that there may be further health effects if sugar intake is reduced to 5% of total calories which would be 6 tsp/day. Juice is classified added sugar by WHO but not by other groups.

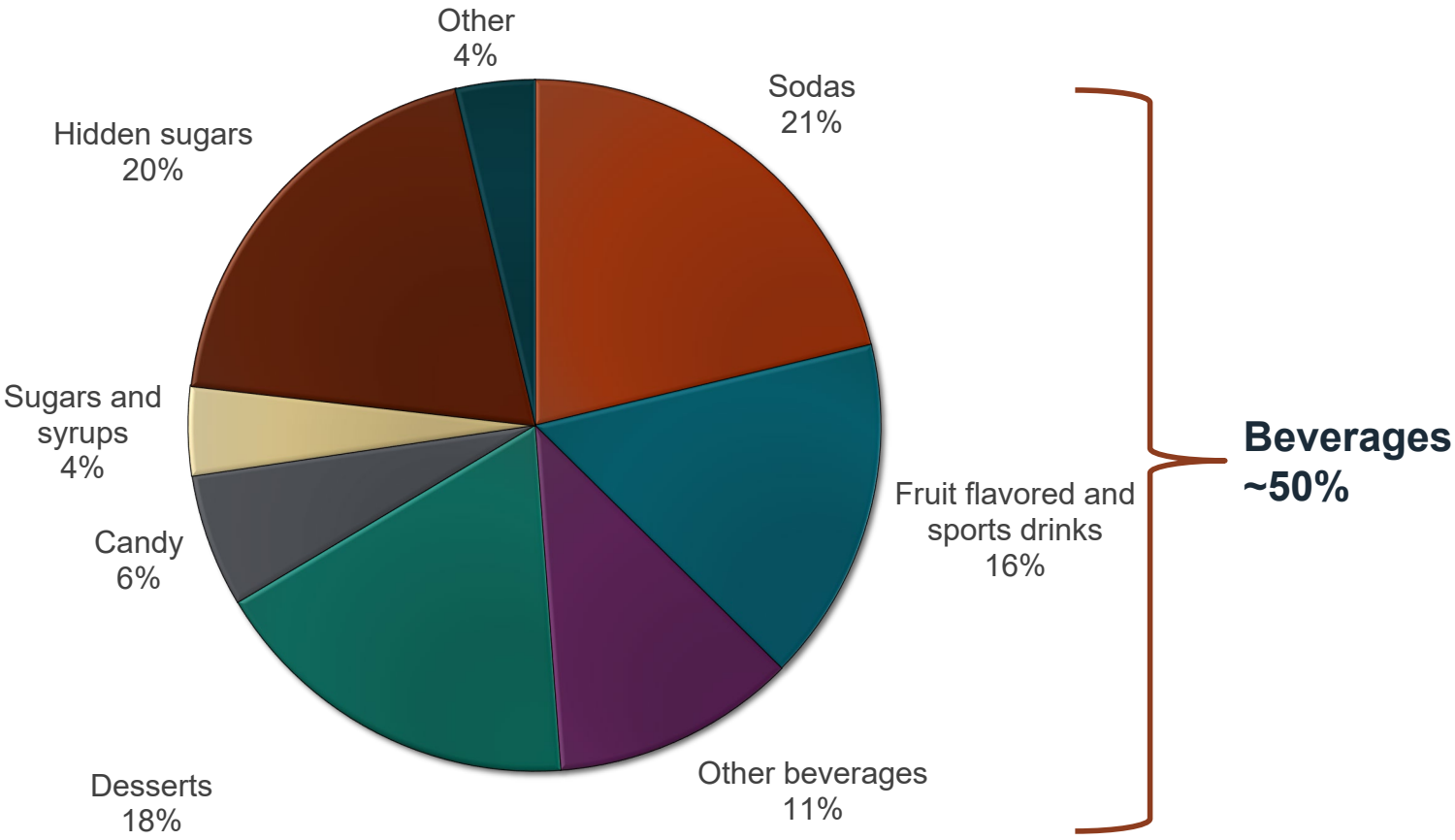
Sugar 101: Limits

We are consuming 3X the daily recommended limit of added sugar

…while also not meeting recommendations for important nutrients like fiber

More than 90% of women and 97% of men do not get enough fiber

Sugar 101: Sources



Source: Added Sugars and Cardiovascular Disease Risk in Children: A Scientific Statement From the American Heart Association

Poll

What is the most common question you receive from clients regarding added sugar?

Debunk Myths

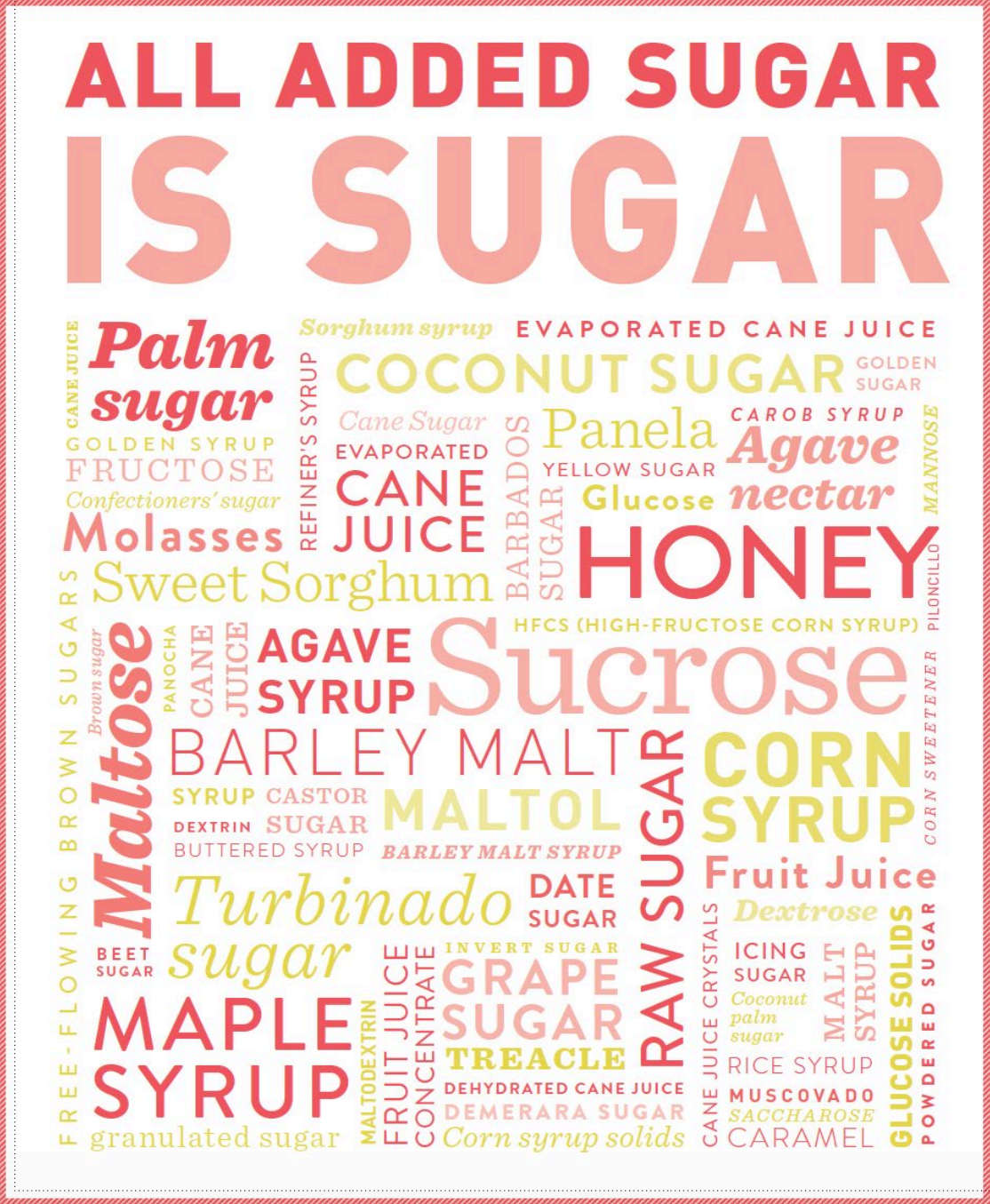
Client asks: Less refined sugars are healthier than more refined sugars, right?

All added sugar is sugar

Less refined sweeteners are not better for you than table sugar

Honey has some beneficial properties but still counts towards daily limit

TAKEAWAY: Reduce all types of sugar—refined and unrefined



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Debunk Myths

Client asks: Fruit has sugar, should I avoid it?

Naturally-occurring sugars are different than added sugars

Fiber is the difference

Fiber slows absorption of sugars to prevent health conditions

TAKEAWAY: Eat more fruits and vegetables

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Debunk Myths

Client asks: Are sugar substitutes a smarter choice?

Sugar substitutes taste many times sweeter than sugar, fueling cravings.

Artificial sweeteners may upset healthy balance of gut bacteria.

Lack of data on the long-term health effects.

TAKEAWAY: Focus on natural sources of sweet

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Debunk Myths

Client asks: I don't eat sweets. Do I need to be concerned about my added sugar consumption?

Added sugar shows up in unexpected places

"Health halo" foods

Savory foods

20% of consumption from sneaky suga

TAKEAWAY: Make simple swaps

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by Jennifer Tyler Lee and Anisha Patel, MD, MSPH.
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Sneaky Sugars: Guess the Food

Nutrition Facts:

		% DV
Servings Per Container	12	
Serving Size	2 Tbsp (29 g)	
Calories per Serving	100	
Total Fat	7g	9%
Saturated Fat	0g	0%
Trans Fat	0g	
Cholesterol	0mg	0%
Sodium	310mg	13%
Total Carbohydrate	11g	4%
Dietary Fiber	0g	0%
Total Sugars	9g	
Includes 9g Added Sugars		18%
Protein	0g	
Vitamin D	0mcg	0%
Calcium	1mg	0%
Iron	0mg	0%
Potassium	3mg	0%

9g or 2 ¼ tsp added sugar = 1 donut

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Sneaky Sugars: Dressings

Salad dressings can contain more than 3 teaspoons of added sugar per serving

Healthy Swap: Pear

Serving size = 2 Tbsp

Theirs: 1 3/4 teaspoons

Ours: 1/4 teaspoon

Why I love it:

3 minutes in blender

Versatile

Sneaky Sugars: Guess the Food

Nutrition Facts

1 Servings Per Container

Serving size	**1 Container**
Amount per serving	
Calories	**300**
	% Daily Value*
Total Fat 9g	12%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 10mg	3%
Sodium 850mg	37%
Total Carbohydrate 44g	16%
Dietary Fiber 4g	14%
Total Sugars 27g	
Includes 17g Added Sugars	34%
Protein 5g	
Vitamin D 0mcg	0%
Calcium 50mg	4%
Iron 1.3mg	8%
Potassium 1350mg	30%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

17g or 4 ¼ tsp added sugar

=

1 packaged snack cake

Excerpted from *Half the Sugar, All the Love*
by Jennifer Tyler Lee and Anisha Patel, MD, MSPH.
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Sneaky Sugars: Soup

Packaged soup can contain more than 4 teaspoons of added sugar per serving

Healthy Swap: Carrots

Serving size = 1 cup
Theirs: 1 3/4 teaspoons
Ours: 0 teaspoons

Why I love it:
20 minutes
Multiple meals all week

Excerpted from *Half the Sugar, All the Love*
by Jennifer Tyler Lee and Anisha Patel, MD, MSPH.
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Culinary Techniques

Three keys to reducing added sugar:

1) Fiber-rich fruits and vegetables
2) Spices
3) Nuts and seeds

Culinary Techniques

Dessert isn't the only culprit

Dishes we think are savory can contain high amounts of added sugar

20% of added sugar consumption comes from sneaky sugars

TAKEAWAY: **Fruits and vegetables can build flavor in both sweet and savory dishes**

Excerpted from *Half the Sugar, All the Love*
by Jennifer Tyler Lee and Anisha Patel, MD, MSPH.
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Culinary Techniques

Three main methods:

1) Puree

2) Pulverize

3) Mix-In

Excerpted from *Half the Sugar, All the Love*
by Jennifer Tyler Lee and Anisha Patel, MD, MSPH.
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Let's Cook:
Mason Jar Salads with Cream Poppy Seed Dressing

85% less added sugar than packaged equivalent

¼ tsp vs 1 ¾ tsp

Secret ingredient: pear

15g fiber; plant-based

Can be made ahead

Use jarred pears if can't find fresh

Get the recipe: https://www.52newfoods.com/mason-jar-salad/

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Let's Cook:
Coffee-Shop Style Blueberry Scones

2/3 less added sugar than packaged equivalent

¾ tsp vs 2 ¼ tsp

Secret ingredient: pear

Can be made ahead

Use jarred pears if can't find fresh

PRODUCE FOR® BETTER HEALTH FOUNDATION

Let's Cook:
Chicken Lettuce Cups

80% less added sugar than restaurant equivalent

¼ tsp vs 1 ¼ tsp

Secret ingredient: miso paste or peanut butter

Flexible / customizable

Can be made low carb

Get the recipe: https://www.52newfoods.com/chicken-lettuce-wraps/

Let's Cook:
Double Chocolate Brownies

2/3 less added sugar than boxed brownie mix

1 ½ tsp vs 4 ½ tsp

Secret ingredients: sweet potato and almond butter

Can use sunflower butter

Gluten free

Made in food processor

Get the recipe: https://www.52newfoods.com/double-chocolate-brownies-low-sugar/

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Let's Cook:
Honey Peach Breakfast Pops

75% less added sugar than packaged froyo pop

1 ¼ tsp vs 5 tsp

Sweetened with: peaches

Can be breakfast, snack, or dessert

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Cook More

Cook when you can

Regain control

Reduce processed foods (they contain sugar—often when you don't expect it)

TAKEAWAY: Cooking is the antidote to added sugar.

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Sweeten Naturally

Use fruits and vegetables to sweeten instead of added sugar

Boost flavor with spices

Add texture with toasted nuts and seeds

TAKEAWAY: Fiber-rich fruits and vegetables are the keys to sweetening with less added sugar

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Start Small

Do one simple thing this week to reduce added sugar:

A low sugar breakfast

Make a dressing / sauce / condiment

Drink fruit-infused water

TAKEAWAY: Small steps lead to big changes

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Thank you!
Questions?

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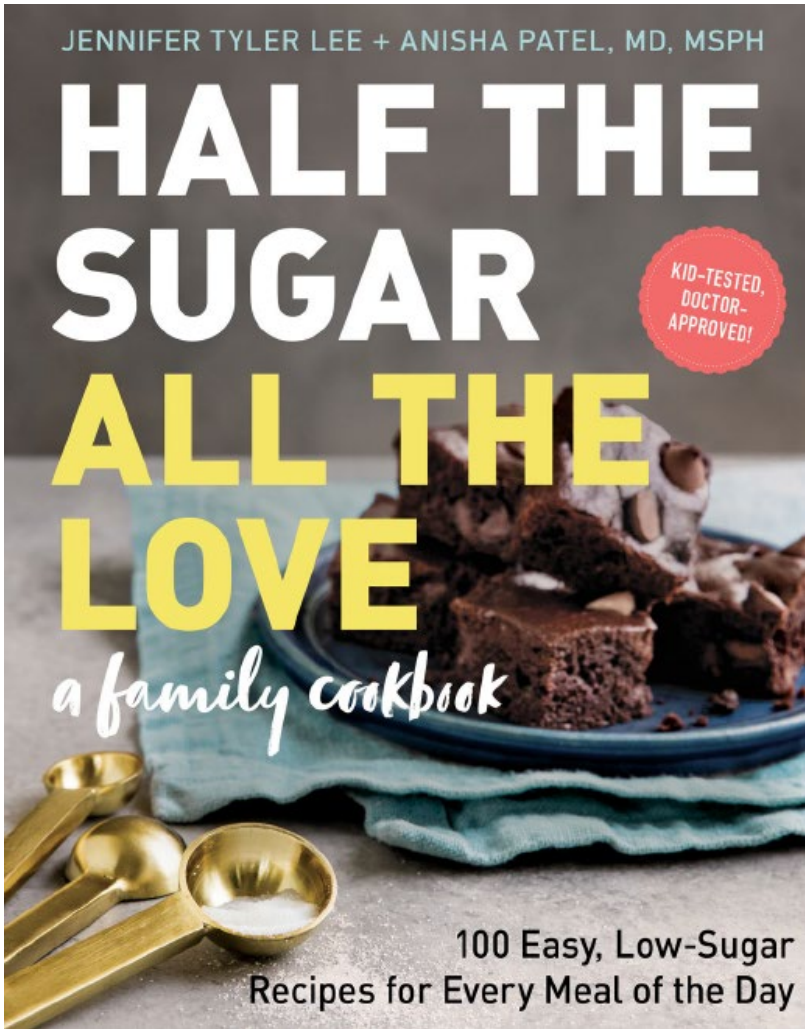
BONUS PACK!

Download the *Half The Sugar, All The Love Bonus Pack* created exclusively for this PBH Health & Wellness Webinar.



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JOIN THE MOVEMENT

Show your support by taking and sharing the Have A Plant® pledge at fruitsandveggies.org. While you're there, check out the useful resources to equip you with the tools you need to enhance your nutrition knowledge and empower consumers to enjoy more fruits and vegetables every day.

Follow PBH's social channels to keep up to date on all the insights and inspiration. #haveaplant

@fruitsandveggies

@fruitsandveggies

@fruits_veggies

Produce for Better Health Foundation

September is National Fruits & Veggies Month and each year we celebrate Have A Plant® during this monumental moment.

How can you help consumers enjoy more fruits and vegetables during the month of September and beyond to support greater health and happiness?

Start planning today for next year's celebration with our National Fruits & Veggies Month Toolkit!

https://fruitsandveggies.org/nfvm-toolkit/

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PBH WEBINAR ARCHIVE

A catalog of PBH's past webinars is available at fruitsandveggies.org/expert-professionals/webinars

Continuing professional education units (CPEU) are available for live and pre-recorded webinars.

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