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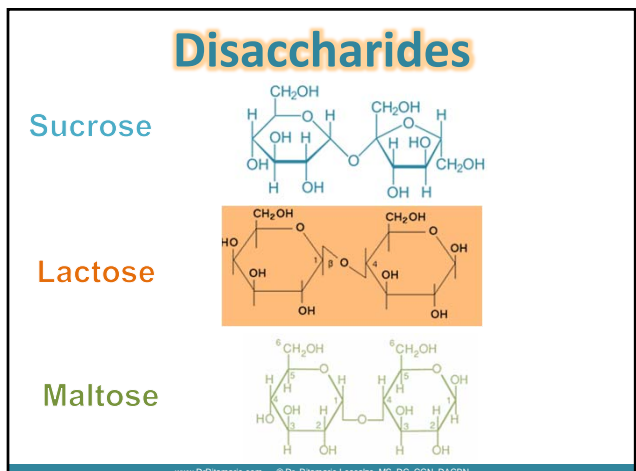
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### Review: Sugar on a Molecular Level

- ★ Review: Sugar on a Molecular Level
  - ✓ Monosaccharides
  - ✓ Disaccharides
  - ✓ Oligosaccharides
- ★ Why you need sugar
- ★ Where sugar comes from in diet
- ★ What affects rate of absorption and uptake into cells
- ★ How sugar is converted to energy
- ★ What's needed for sugar to be efficiently utilized
- ★ The negative effects of simple sugars
- ★ Alternatives to sugar for satisfying your sweet tooth

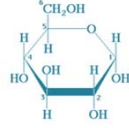
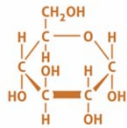


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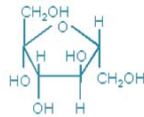
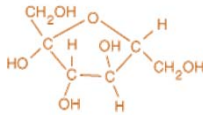


## Monosaccharides

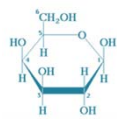
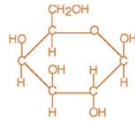
### Glucose



### Fructose



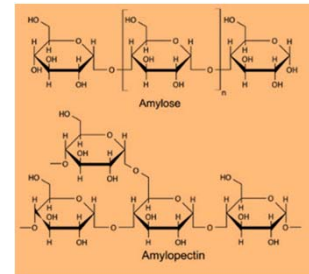
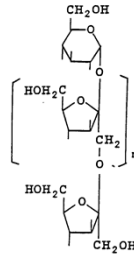
### Galactose



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## Oligosaccharides

### Fructooligosaccharides

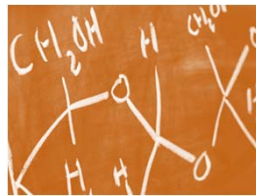


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## Why You Need Sugar

### ★Energy

- ✓ For optimal cellular growth and repair
- ✓ For gland and organ function
- ✓ For mental clarity, attention, and focus
- ✓ For steady moods
- ✓ For having fun
- ✓ For meaningful relationships
- ✓ For achieving success in your chosen career



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## Where Sugar Comes From In Foods

### Best Sources (Complex)

- ★ Green leafy vegetables
- ★ Rainbow colored vegetables
- ★ Root vegetables and tubers
- ★ Fruit
- ★ Whole, non-gluten grains
- ★ Legumes
- ★ Nuts and seeds

### Less Desirable Sources (Simple)

- ★ Table sugar (sucrose)
- ★ Fructose
- ★ Glucose syrup
- ★ High-fructose corn syrup
- ★ Maple syrup
- ★ Agave nectar
- ★ Coconut nectar
- ★ Palm sugar
- ★ Honey
- ★ Refined grains



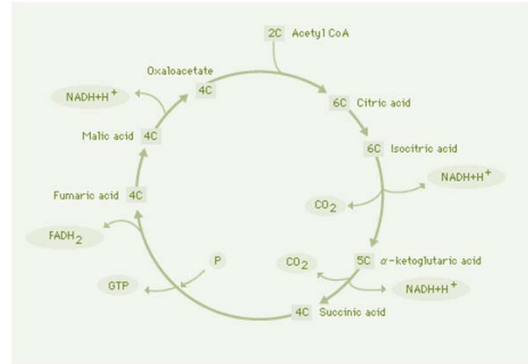
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## Getting Sugar Into Cells

- ✓ Insulin
- ✓ Healthy Insulin Receptors
- ✓ Nutrients



## Converting Sugar into Energy



## Negative Effects of Simple Sugars

- \* Blood sugar imbalances leading to insulin resistance, diabetes
- \* Dental cavities
- \* Decreased immunity
- \* Accelerated cancer cell growth
- \* Premature aging
- \* Mental decline – Alzheimer's
- \* Depletion of B vitamins and other nutrients required for energy production
- \* Intestinal distress
- \* Candida and other organism overgrowth
- \* Mood swings
- \* Addiction
- \* ...many, many more



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## Assessing Your Tolerance To Various Sugars

### \* Home Testing

Check your blood sugar for several hours after eating a variety of foods

### \* Lab Testing

- ✓ Fasting blood glucose
- ✓ Hemoglobin A1C
- ✓ Fructosamine
- ✓ Insulin



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Nutrition Facts		
Serving Size: About (20g)		
Servings Per Container: 16		
	Amount Per Serving	% Daily Value*
<b>Total Calories</b>	60	
Calories From Fat	15	
<b>Total Fat</b>	2 g	3%
Saturated Fat	1 g	4%
Trans Fat	0 g	
<b>Cholesterol</b>	0 mg	0%
<b>Sodium</b>	45 mg	2%
<b>Total carbohydrates</b>	15 g	5%
Dietary Fiber	4 g	17%
Sugars	4 g	
Sugar Alcohols (Polyols)	3 g	
<b>Protein</b>	2 g	
Vitamin A		0%
Vitamin C		0%
Calcium		2%
Iron		2%

\*Percent Daily Values are based on a 2,000 calorie diet.

**Ingredients:** Wheat flour, unsweetened chocolate, erythritol, inulin, oat flour, cocoa powder, evaporated cane juice, whey protein concentrate, corn starch (low glycemic), natural flavors, salt, baking soda, wheat gluten, guar gum

## Best Alternatives To Sugar For Satisfying Your Sweet Tooth

- ★ **Stevia:** Green plant
  - ✓ fresh is best,
  - ✓ then green powder,
  - ✓ then sweet leaf concentrate
- ★ **Lohan:** Chinese herb
- ★ **Erythritol:** Sugar alcohol
- ★ **Chicory root inulin:** Maybe – test
- ★ **Yacon:** Maybe – test



## Alternatives To Sugar: Products

- ★ **Zero:**  
Organic erythritol
- ★ **Lakanto:**  
Lohan and erythritol
- ★ **Just Like Sugar:**  
Chicory root



## Sugar Alcohols

- ★ Also known as polyols
- ★ Do not contain ethanol
- ★ Sweetness similar to sucrose
- ★ Fewer calories than sugar
- ★ Naturally occurring and chemically derived
- ★ Do not raise blood sugar

**Glucose**

$$\begin{array}{c} \text{CHO} \\ | \\ \text{HC}-\text{OH} \\ | \\ \text{HO}-\text{CH} \\ | \\ \text{HC}-\text{OH} \\ | \\ \text{HC}-\text{OH} \\ | \\ \text{CH}_2\text{OH} \end{array}$$

→

**Erythritol**

$$\begin{array}{c} \text{CH}_2\text{OH} \\ | \\ \text{HC}-\text{OH} \\ | \\ \text{HC}-\text{OH} \\ | \\ \text{CH}_2\text{OH} \end{array}$$

1  $\text{H}-\text{C}-\text{OH}$

2  $\text{H}-\text{C}-\text{OH}$

3  $\text{HO}-\text{C}-\text{H}$

4  $\text{H}-\text{C}-\text{OH}$

5  $\text{H}-\text{C}-\text{OH}$

6  $\text{H}-\text{C}-\text{OH}$

D-Glucitol (sorbitol)

$\text{OH}$

$\text{H}-\text{C}-\text{H}$

$\text{H}-\text{C}-\text{OH}$

$\text{OH}-\text{C}-\text{H}$

$\text{H}-\text{C}-\text{OH}$

$\text{H}-\text{C}-\text{H}$

$\text{OH}$

D-xylitol

## Sugar Alcohols Compared

Name	Sweetness relative to sucrose	Energy (kcal/g)	Sweetness per food energy, relative to sucrose
<b>Erythritol*</b> (4 carbon)	0.812	0.213	15
<b>Mannitol</b> (6 carbon)	0.5	1.6	1.2
<b>Sorbitol</b> (6 carbon)	0.6	2.6	0.92
<b>Xylitol</b> (5 carbon)	1.0	2.4	1.6
Compare with: <b>Sucrose</b>	1.0	4.0	1.0

\* Erythritol is by far the best choice, sorbitol the worst

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## Erythritol

- Most absorbed in the small intestine and excreted unchanged in the urine and feces
- About 10% enters the colon - does not normally cause laxative effects
- Free of side effects in regular use
- Doses over 50 grams (1.8 oz) can cause nausea and stomach rumbling
- More difficult for intestinal bacteria to digest than other sugar alcohols, so it's less likely to cause gas or bloating
- Naturally occurring in pears, melons, grapes, mushrooms, wine, soy sauce, and cheese



**Smart Sweet Erythritol 4.5lbs**  
By Smart Sweet  
4.5 lb (2.0 kg) 1 customer review  
Price: \$36.50 + \$4.97 shipping  
View the details for Amazon Prime  
In Stock  
Ships from and sold by Global Sweet Polymers, LLC  
• All Natural, Free of GMO, Gluten, Wheat, Soy & Corn  
• Zero Calories, Zero Glycemic Index  
• Safe for Diabetics, High Digestive Tolerance  
• 50% as Sweet as Sugar

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