

# Sweeteners

# Timely Topic

Diet Soda and Dementia (April 2017)

- <http://www.foodinsight.org/diet-soda-dementia-alzheimers-stroke>

Low Calorie Sweetener Intakes In Adults and Children (March 2017)

- [http://www.andjrnl.org/article/S2212-2672\(16\)31395-8/fulltext](http://www.andjrnl.org/article/S2212-2672(16)31395-8/fulltext)

# Outline

- Types
- Safety/Adverse Effects
- Effect on:
  - Weight
  - Appetite/Hunger
  - Energy Intake
  - Metabolic Responses

# Terminology

- Artificial Sweeteners = Food additives
- Generally Recognized as Safe (GRAS) vs food additive
- Acceptable Daily Intake (ADI)
- Sugar Alcohols

# Types

Artificial	Sugar Alcohol	Novel	Natural/Nutritive
Acesulfame-K (sunett, sweet one)	Erythritol	Stevia extracts (Pure Via, Truvia)	Agave Nectar
Aspartame (Equal, NutraSweet)	Hydrogenated starch hydrolysate	Tagatose (Naturlose)	Date Sugar
Neotame	Isomalt	Trehalose	Fruit Juice Concentrate
Saccharin (SugarTwin, Sweet "n Low)	Lactitol		High Fructose Corn Syrup
Sucralose (Splenda)	Maltitol		Honey
	Mannitol		Maple Syrup
	Sorbitol		Molasses
	Xylitol		Sugar

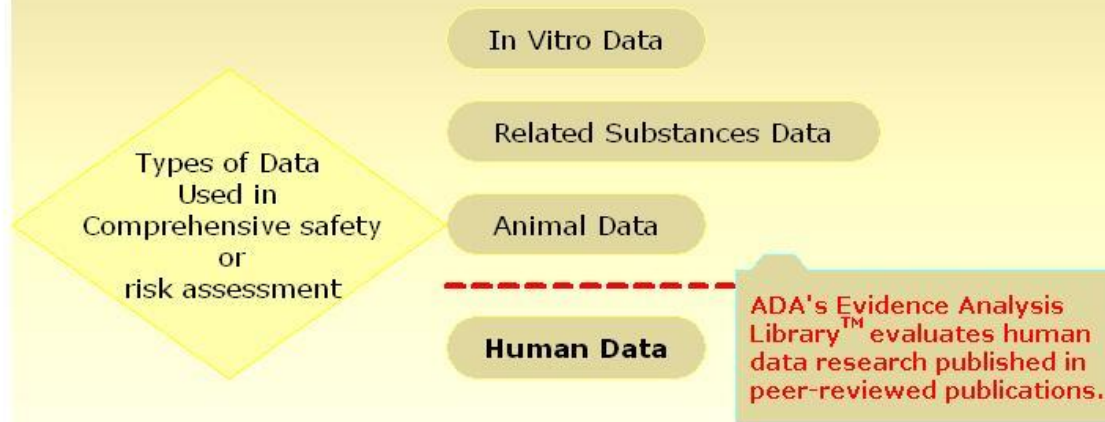
# High Fructose Corn Syrup

- **Bottom Line** - Little evidence that it's different than sucrose (Grade 1):
  - Blood sugar
  - After meal triglycerides / fat
  - Leptin
  - Ghrelin
  - Hunger
  - Energy intake subsequent meals
  - Weight gain

# Safety / Adverse Effects

- Acceptable Daily Intake (ADI) Table from FDA [here](#)

## Evaluating Safety: Data to Determine Risk



**Source of information for developing diagram:** Committee on the Framework for Evaluating the Safety of Dietary Supplements Food and Nutrition Board on Life Sciences, Institute of Medicine and National Research Council of the National Academies, *Dietary Supplements: A Framework for Evaluating Safety*; 2005.

# Safety / Adverse Effects (cont)

- 1970s:
  - studies in rats, saccharin and link to bladder cancer
- 1996:
  - Suggestion that increase of brain tumors 1975-1992 associated w/ introduction of aspartame; analysis showed that the tumors arose 8years BEFORE aspartame approved
- 2000:
  - saccharine delisted from US National Toxicology Program's *Report on Carcinogens*
- 2005:
  - Lab study w/ rats and increased lymphomas and leukemias by high dose aspartame (8-2083 cans diet soda/d); inconsistencies
- 2006
  - NCI examined human data from the NIH-AARP Diet and Health Study of over half a million retirees. Increasing consumption of aspartame-containing beverages was not associated with the development of lymphoma, leukemia, or brain cancer



# Safety / Adverse Effects (cont)

- **Bottom Line / Current** - NOT associated w/ adverse effects in general population
  - Effects studied include brain cancer, neurological changes
  - EXCEPTION: aspartame in folks w/ rare hereditary disease PKU
  - Aspartame (grade I)
    - Refer to Explanation
  - Neotame, (grade V - to date, no studies from human subject research in peer-reviewed literature were identified to evaluate adverse effects of neotame consumption in the general population)
  - Saccharine (grade III)

# Effect on Weight

- **Bottom Line – Likely associated w/ greater wt loss**
  - Aspartame (grade I)
  - Neotame, no studies (grade V)
  - Saccharin (grade III)
  - Sucralose (grade III)

# Effect on Weight (cont)

- Studies challenging the evidence
  - Fowler, S.P., Williams, K., Resendez, R.G., Hunt, K.J., Hazuda, H.P., Stern, M.P. **Fueling the obesity epidemic? Artificially sweetened beverage use and long-term weight gain.** *Obesity (Silver Spring)*. 2008;16:1894–1900.
  - Fowler, S.P., Williams, K., Hazuda, H.P. **Diet soda intake is associated with long-term increases in waist circumference in a biethnic cohort of older adults: The San Antonio Longitudinal Study of Aging.** *J Am Geriatr Soc*. 2015;63:708–715.
- the concern: we may “unknowingly” or “subconsciously” replace the missed Calories from the artificially sweetened food with real Calories (e.g. from cake or cookies)

# Effect on Appetite

- **Bottom Line** - No affect on appetite
  - Aspartame, grade I
  - Neotame, grade V (no studies)
  - Saccharine & Sucrulose, grade III

# Effect on Energy Intake

- Nonnutritive Sweeteners: Current Use and Health Perspectives A Scientific Statement From the American Heart Association and the American Diabetes Association
  - See table 2 “potential mechanisms of effects on compensatory appetite and food intake”
  - Conclusion of the research for these mechanisms
  - Mattes RD, Popkin BM. Nonnutritive sweetener consumption in humans: effects on appetite and food intake and their putative mechanisms. Am J Clin Nutr. 2009;89:1–14.

# Effect on Metabolic Response

- **Bottom Line** – no significant difference
  - Specifically to stevia (grade II):
    - Blood glucose
    - Blood insulin
    - Blood Pressure

# Additional References/Resources

- Mayo Clinic
- Academy of Nutrition and Dietetics; Evidence Analysis Library (EAL)
- Cancer.gov
- International Food and Information Council (IFIC)
  - <http://www.foodinsight.org/Content/6/gestationaldiabetes.pdf>
  - <http://www.foodinsight.org/sites/default/files/Facts%20about%20Low%20Calorie%20Sweeteners.pdf>
- 2015 Dietary Guidelines
  - <https://health.gov/dietaryguidelines/2015-scientific-report/PDFs/Scientific-Report-of-the-2015-Dietary-Guidelines-Advisory-Committee.pdf#page=464>
- For more information about artificial sweeteners, contact the FDA at:  
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Silver Spring, MD 20993  
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<http://www.fda.gov/>