QUESTIONS ABOUT LOW CALORIE SWEETENERS: HOW DID WE GET HERE AND WHAT TO DO NOW?

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LOWER ADDED SUGAR INTAKE

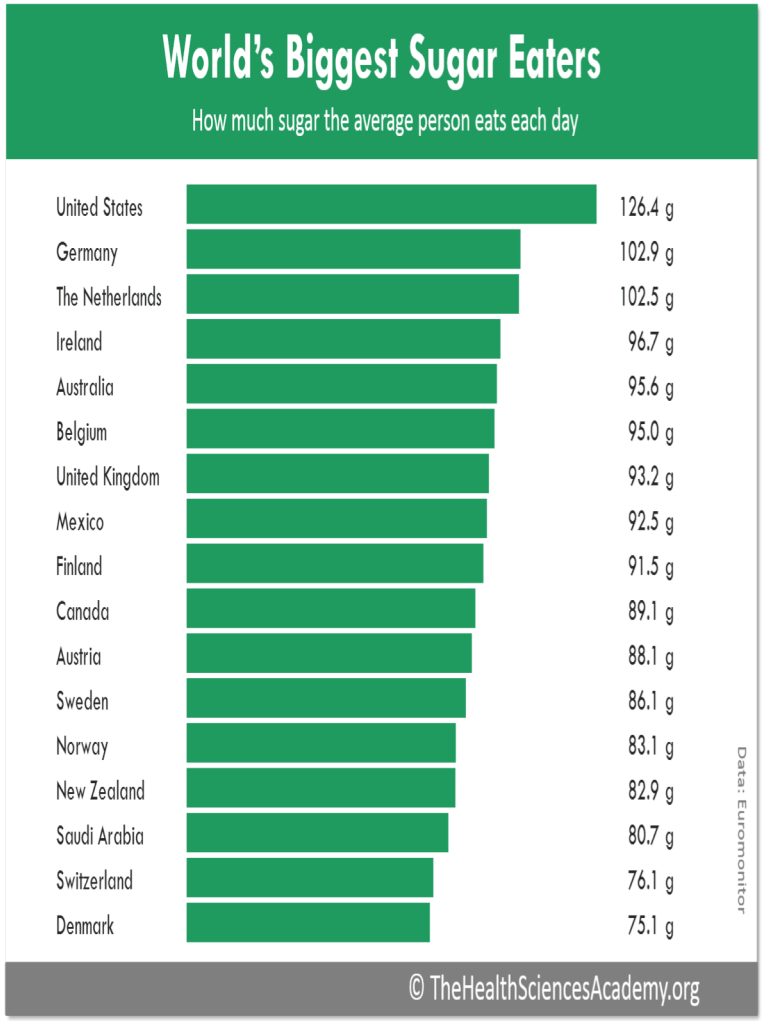
- Currently recommended by notable health authorities[1 2]

World Health Organization

American Heart Association®

  - Increased risk of overweight with increased sugar intake[2]
    - Particularly full calorie beverages[3]
  - Many health complications associated with excess weight[1]

- Sugar, per se, is not the issue, it is how much we consume



CAN WE RECOMMEND LOW CALORIE SWEETENERS (LCSs)?

- Yes!
  - SAFE
    - Confirmed by food safety and regulatory experts around the world
      - Intensive, thorough and robust process[4]
      - Entirety of data reviewed by independent experts
  - Exceedingly low intakes

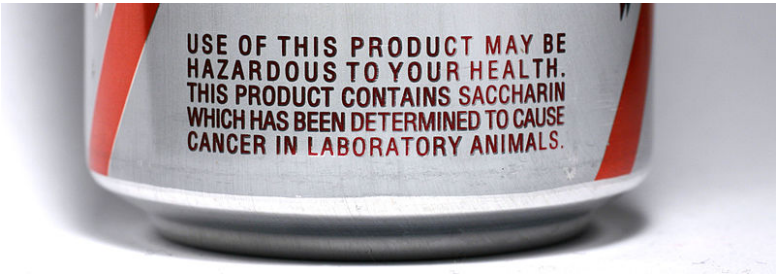
AND

- We need to address consumer questions!

WHAT ARE THE MOST PREVALENT QUESTIONS?

- Blood glucose/microbiota
- Cancer
- Weight gain
- Natural vs. Artificial

HOW CAN THERE STILL BE QUESTIONS?



- Myths may linger based on old research
- Sensational headlines get attention
  - Academic research
  - Scientific journals
  - Lay press
  - Social Media
- Some new studies are touting sensationalist headlines

BUT – are they justified?

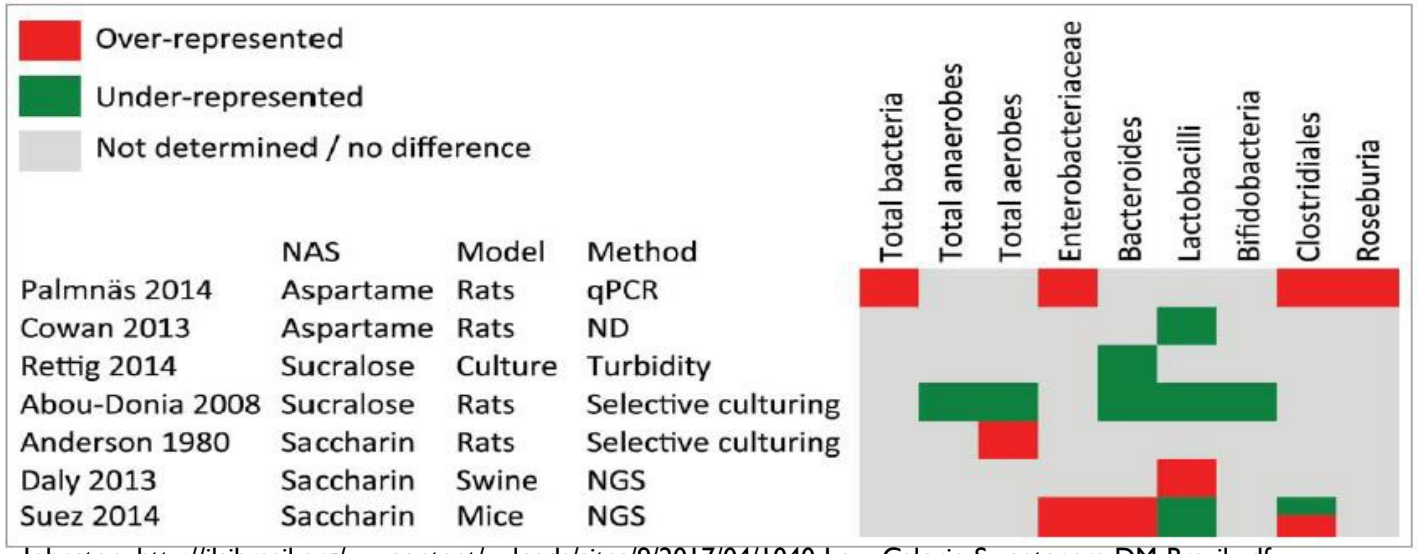
Let's take a look at the drivers behind the most prevalent questions

BLOOD GLUCOSE/GUT MICROBIOME

Suez et al. 2014, *"Artificial sweeteners induce glucose intolerance by altering the gut microbiota"*[5]

- No microbiome changes are currently known as reliable biomarkers for an adverse impact on glycemic control[6]
- Major problems in study design and analysis,[7] e.g.:
  - Test material, doses, statistical analyses; normal variability; size; duration, etc.
- Data are inconsistent across LCSs

In contrast, MANY well-designed RCTs, and also systematic reviews and meta-analyses, show no effect of LCSs on blood glucose control[8-10]



Johnston, http://ilsibrasil.org/wp-content/uploads/sites/9/2017/04/1040-Low-Calorie-Sweeteners-DM-Brazil.pdf

WEIGHT GAIN

Hypothesis-generating *in vitro* studies

- Early gut sweet taste receptor studies drove new hypotheses of how an LCS could cause weight gain
  - Changes in incretin secretion and glucose absorption

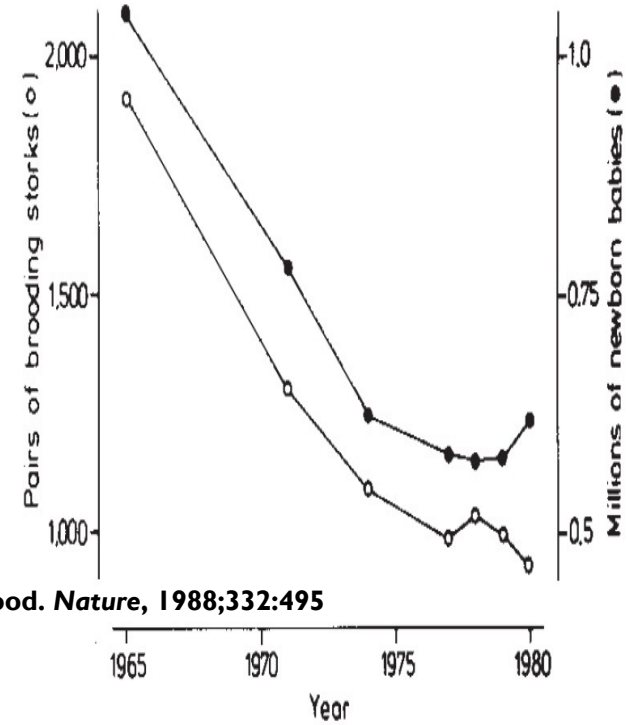
Results of *in vivo* studies discredit the hypotheses

- LCSs do not cause clinically meaningful changes in either incretins or blood glucose levels[8-11]

Observational (association) studies

- By their nature, cannot prove cause and effect[12]
- Reverse causality is likely
- Reliability even more suspect when there is no known reliable MOA

In contrast, systematic reviews and meta-analyses of RCTs show that LCSs can help in nutritional strategies for weight loss/maintenance[13 14]



Good. *Nature*, 1988;332:495

CANCER

Research studies by Soffritti et al., of the Ramazzini Institute, Italy.[15-17]

- Regulatory agencies have not accepted any sweetener study by this laboratory as evidence of adverse effects[18-20]

Early saccharin study in rats showing urinary bladder tumors

- In 2000, results officially declared not relevant to humans[21]
  - Mechanism of action not possible in humans – unique to rats
  - Finding only observed when the rat feed contained ≥ 5% sodium saccharin
    - equivalent in sweetness for us humans to ≥ **8 pounds of sugar/day**

Collectively, both epidemiologic and direct research refutes that any approved LCS causes cancer[4, 18-23]

NATURAL VS. ARTIFICIAL

- Natural does not = safe
- Man-made does not = unsafe
- Safety is only known from testing
- Consumption of any food ingredient, natural or not, has a risk – it all depends on the dose!

TAKE-AWAYS

- Sensationalist headlines may not hold up to scrutiny
- Safety assessment requires consideration of all the available evidence
- The collective research supports that LCSs are safe AND they can have tangible benefits:
  - Weight management
  - Diabetes meal planning
  - Dental health

HOW CAN WE HELP WITH CONSUMER QUESTIONS?

- Expert voices are needed
  - *How to counter the circus of pseudoscience*, NYT, Jan 5, 2018[24]
- Some helpful recent resources:
  - Medscape (Oncology): Mythbusters series[25]
  - FDA: Additional information about high intensity sweeteners[20]
  - ADA Medical Standards of Care[26] and UK Diabetes Nutrition Guidelines[27]
  - *The role of low-calorie sweeteners in the prevention and management of overweight and obesity: evidence v. conjecture.* Rogers, 2018 [28]
  - *Natural vs. Synthetic.* In: Fitness Reloaded, Oct 2016[29]
  - Other Web resources: e.g., FoodInsight.org; Calorie Control Council; International Sweetener Association; Splendaprofessional.com[30]

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