Final AND Project

"Does sucralose consumption alter glucose tolerance?"

Evidence Summary:

The evidence analysis consisted of one randomized crossover trial and 3 randomized controlled trials. The baseline characteristics for the studies included healthy men and women ages 18-55.

Article #1

A randomized crossover trial performed by Amornpan Lertrit et al in 2018 aimed to study the impacts of chronic exposure to sucralose on glycemic response, insulin secretion, and sensitivity, and glucagon-like peptide-1 (GLP-1) release in healthy participants. The participants were fifteen healthy adult volunteers (11 females, 4 males, average age = 31.9 years) who do not regularly consume nonnutritive sweeteners, do not smoke, are not breastfeeding, are not night shift workers, do not have any health conditions such as renal failure, liver disease, diabetes, etc., and are not taking any glucose altering medications. In this study, participants were given either an empty capsule placebo or 200 mg sucralose capsules and were asked to take one pill each morning for 4 weeks. After the 4 weeks, an OGTT and IVGTT were performed. A one-week washout period of no treatment was performed before the crossover treatment and the OGTT and IVGTT were replicated. The sucralose group had a significantly lower Matsuda index (P<0.005), significantly lower HOMA-%S (P<0.001), a significantly higher HOMA-IR (P<0.001), a significantly higher HOMA-%B (P<0.001), significantly higher insulinogenic index (P<0.001), a significantly lower area under the curve (AUC) of insulin (P=0.001), and a significantly higher active GLP-1 AUC(P<0.001). Regular use of NNS may cause decreased acute insulin response, decreased insulin sensitivity, and increased GLP-1 release and should not be promoted as part of a healthy diet. This study was limited by a small sample size, including mostly women, and by consuming capsules and mitigating the cephalic sweet taste response to sucralose.

 Article #2

A randomized control trial performed by Pamella Thomson et al (2019) aimed to study the effect of short-term consumption of sucralose on glucose control and gut microbiome composition. Participants included thirty-four healthy men ages 18 -30 (average age = 23 years old) with BMIs between 20 and 30 kg/m2. Anyone who performed intense physical activity within the past 3 months or had any drug treatments in the last 3 months were excluded. In this study, participants were randomly assigned either a capsule containing 260 mg of sucralose (780 mg/day) and 70 mg of calcium carbonate (n=16) or a placebo containing 250 mg of calcium carbonate (n=14). Participants were instructed to take 3 capsules a day for 7 days. Participants

collected fecal samples and an OGTT was performed before the trial and after the 7 days. No significant differences were seen in microbiota compositions, blood glucose levels, blood insulin levels, insulin sensitivity, and insulin resistance between the two groups. This study was limited by a low sample size and only males participated in the study.

Article #3

Conclusion Summary:

Sucralose consumption appears to impact glucose tolerance in a time sensitive manner, inconsistent with a dose response. Sucralose consumed over 7 days showed no impact on glucose tolerance, but when consumed in a 2 - 10 week timeframe, sucralose decreased glucose tolerance. Further research on sucralose dosage is still needed to understand how sucralose impacts glucose tolerance.

Grade: II