

Hello, thank you for joining to hear more about my poster. Today I will be talking about the results from a 3-month randomized crossover trial done at the University of Illinois.

In this study, we were aiming to understand how the consumption of a fermented dairy beverage may impact cognition and health.

There is some evidence that implicates a healthy gut microbiome and/or fermented dairy or probiotic consumption could impact cognitive functioning. Specifically, through signaling pathways between the gut and brain, unbalanced gut microbiota can impact signaling of the HPA axis. In fact, in persons with GI disorders such as Chron's disease, we see an increased prevalence of anxiety and depression and some studies have also displayed changes in cognitive functioning. Interestingly these measures are found to be poorer during bouts of GI stress for these patients. However, the data surrounding healthy populations is lacking, leading us to employ this study, in order to better understand the population.

As I mentioned, the design of this study was a randomized crossover, where participants completed each arm of the intervention for 1 month interspaced with a 4-5 week washout period. 50% of participants completed the treatment arm first. Cognitive and Metabolic health Testing was completed prior to and after the consumption of either a commercially-available fermented dairy beverage or a dairy-based and isocalorically balanced, lactose-free control. We collected 24-hour urine samples which were pooled to assess urinary-free cortisol concentrations. Participants also completed the Depression, Anxiety and Stress subscale to assess severity of these symptoms.

Hippocampal-dependent Relational Memory was assessed using a spatial reconstruction task designed at the University of Illinois. Briefly, participants are given a 20-second study period to view an array of 6 visually ambiguous stimuli. The participant then has unlimited time to reconstruct the array to the best of their abilities. 20 arrays are completed. This task has been validated in patients with hippocampal damage, whose performance is dominated by relational

errors specifically on 2 metrics, Misplacement and Object Location Binding. Misplacement measures the distance in pixels which an object was placed from its original location. Object-location binding assess how many stimuli the participant was able to correctly bind object and location information. This is done by assessing how many objects fall within a predefined radius around the objects' original location.

Interestingly, the participants displayed significant improvement for this task following the treatment but not control period. 2x2 repeated measures ANOVA results can viewed in more detail in the following table and graphs. Misplacement showed a significant time by condition effect with a p-value of 0.003, while object-location binding was trending at 0.06. Cortisol concentrations did not show a significant condition by time effect. Due to the non-parametric nature of the data, DASS results were analyzed using the Wilcoxon-signed ranks test, where no symptoms were found to significantly change after either treatment or control, however stress did have a trending difference after the treatment arm.

While these results are interesting, we are limited by sample size. Furthermore, most of our participants were within normal range for DASS subscales, thus leading to low variability for symptoms which have the potential for change by this intervention. Finally, due to the circadian cycling of cortisol, 24-h pooled samples may not have been the best indicator for cortisol concentrations. This study does, however, display the need for future studies which will assist in our improved understanding of how the gut microbiome can impact cognition, specifically in populations with otherwise healthy GI microbiota.

I would like to thank our undergraduate, lab technician, and graduate staff for assistance in data collection as well as the University of Illinois division of nutritional sciences for funding support. If you have any questions, my contact information can be found in the top right corner of the poster. Thank you for listening!