

This years scope

- ▶ Instead of focusing on building out an entire Cargo Transfer Bag (CTB) that is edible, we want to focus on the inner foam part of the CTB bag as the edible portion.
- ▶ The focus of this supplement is to help the gut-biome axis that affects the health of the astronaut.
- ▶ Many studies showing that mental health, and the immune function of the body, is connected to the gut-biome.

Information from the HRP Gap assessment.

- Diet and nutrition offer key modifiable targets for the prevention of psychiatric disorders associated with BioMed risk. For example, multiple lines of research indicate that diets rich in phytochemicals (e.g., polyphenols), known for their antioxidant and anti-inflammatory properties can mitigate increases in vascular inflammation due to aging, stress, GCR exposure, etc. Growing evidence indicates a relationship between nutrition deficiencies, diet quality and mental health, and for the efficacy and use of nutritional supplements to address deficiencies, or as augmentation to other therapies. Research results from CBS Nutritional Datamining and CBS biomarker identification tasks have helped identify the biological pathways that mediate the observed relationships between diet, nutrition and behavioral health, to determine how the immune system, oxidative biology, brain plasticity, and the microbiome-gut-brain axis may serve as key targets for nutritional interventions.

Process for Project

- ▶ Students will research the gut-biome axis, and how it relates to other functions for the body (mental health, immunity, disease states).
- ▶ Students will create a table that includes all potential aspects that their supplement would have on the gut-biome
- ▶ Students will design several supplement ideas (using the foam insert measurements of the CTB in the documents on web page)

Constraints of the Supplement

- ▶ Supplement should not contain artificial flavors or ingredients (stevia is ok)
- ▶ Supplement should taste well to the crewmember
- ▶ Supplement should have longer shelf life.
- ▶ Supplement should not contain more than 250 mg sodium per serving.
- ▶ Supplement should not have added sugars, but you can use natural sugars instead.
- ▶ Supplement should be able to be packed into a side wall of the CTB to represent the “foam” part of the bag.
- ▶ Supplement should not crumble but maintain its shape during launch loads.

Supplement final product

- ▶ Your supplement should represent the “foam” inner layer replacement. Your sizing of the foam can be between 3-5 inches in Width and Length and $\frac{1}{4}$ - $\frac{1}{2}$ inch for the depth.
- ▶ You should be able to calculate the dimensions of one serving size of your supplement. (ie. If I have a 5X5 inch with $\frac{1}{2}$ inch depth this would probably be way too much to eat as one supplement. I would probably want to calculate what a 1X1 inch supplement has nutritionally.)
- ▶ Your single serving of the supplement should have the following specifications
 - ▶ 25-100 calories
 - ▶ 250 mg of sodium or less
 - ▶ 4 grams of sugar or less
 - ▶ 3 grams or more of fiber