

AT A GLANCE

# LEAKY GUT STUDY

ORAL SPORE-BASED PROBIOTIC SUPPLEMENTATION WAS ASSOCIATED WITH REDUCED INCIDENCE OF POST-PRANDIAL DIETARY ENDOTOXIN, TRIGLYCERIDES, AND DISEASE RISK BIOMARKERS.

PUBLISHED AUGUST 15, 2017



## RESEARCH SUMMARY

Dietary endotoxemia is a condition that affects approximately 1/3 of individuals. It is characterized by increased serum endotoxin following a high-fat, high-calorie meal. Due to the inflammatory nature of endotoxin, long-term repeated exposure may increase the risk for developing chronic diseases. In the current study, 28 college students consumed a high-fat meal of thin crust cheese pizza. Serum endotoxin was subsequently measured following the meal. We saw the biggest spike in endotoxin 5 hours after consuming pizza. The study participants were then split into 2 groups. The first group was instructed to take MegaSporebiotic for 30 days and to make no other dietary or lifestyle changes. The second group was instructed to take a placebo for 30 days and to make no other dietary or lifestyle changes. Upon re-running the experiment, the group taking MegaSporebiotic demonstrated a 42% reduction in serum endotoxin and a 24% reduction in triglycerides; while the placebo group demonstrated a 36% increase in serum endotoxin and no meaningful changes in triglycerides. The significant reductions in serum endotoxin and triglycerides following supplementation with a spore-based probiotic helps highlight the link between GI health and the inflammatory response. Strengthening the gut barrier and healing intestinal permeability is one way to help lower inflammation and protect the host.

## GOALS

- To determine if 30-day supplementation with a spore-based probiotic could modify metabolic biomarkers and inflammatory cytokines.
- To determine if 30-day supplementation with a spore-based probiotic could reduce dietary endotoxemia.

## KEY TERMINOLOGY

- Dietary or metabolic endotoxemia is the rise in serum endotoxin concentrations during the first five hours after eating a meal.
- The endotoxin measured in the blood comes from bacteria that populate the GI tract. The most common example of this is Lipopolysaccharide (LPS).

## SUBJECTS

A total of twenty-eight subjects were selected after blood analysis revealed a dietary endotoxemia response following a high-fat meal.



Fifteen subjects were placed into the experimental group taking MegaSporeBiotic.



Thirteen subjects were placed into the placebo group taking a rice flour capsule.

# MATERIALS AND METHODS

## PRE-EXPERIMENT

- Study participants (n=28) came to the research facility after a night of fasting (>8hrs).
- Subjects were given a high-fat meal of thin crust cheese pizza.
  - A high-fat meal was defined as 85% of the fat RDA and 65% of daily calorie needs based on RMR.
- Blood was drawn three times to measure serum endotoxin: before eating the pizza, 3 hours post-meal, and 5 hours post-meal.
  - Researchers found the largest spike in endotoxin 5 hours after eating.
- Serum endotoxin, triglycerides, and inflammatory biomarkers were measured.
  - Inflammatory biomarkers: Ghrelin, insulin, leptin, MCP-1, GM-CSF, interleukin (IL)-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12(p70), IL-13.

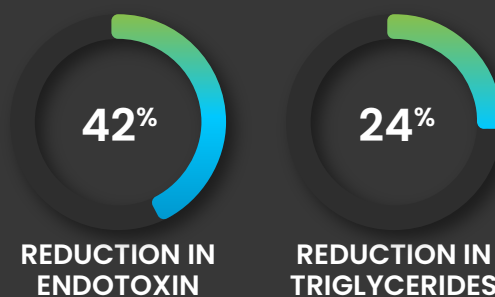
## EXPERIMENT

- The experimental (n=15) and placebo (n=13) groups were sent home and instructed to take 2 capsules per day for 30 days. No other dietary or lifestyle instructions were given.
- After 30 days, subjects came back to the research center after a night of fasting (>8hrs) for the same experimental test.
- Subjects were given a high-fat meal of thin crust cheese pizza.
- Blood was drawn three times to measure serum endotoxin: before eating the pizza, 3 hours post-meal, and 5 hours post-meal.
- Serum endotoxin, triglycerides, and inflammatory biomarkers were measured.

# RESULTS

After 30 days of supplementation with a spore-based probiotic, subjects (n=15) saw a significant reduction in serum endotoxin and triglycerides. There was a significant reduction in IL-1B, IL-12p70, and ghrelin.

In the placebo group (n=13) a significant 36% increase in endotoxin, as well as a 5% reduction in triglycerides was observed.



# CONCLUSIONS

- Thirty-day supplementation with a MegaSpore resulted in blunting of dietary endotoxin, triglycerides, and systemic inflammation.
- A non-protective microbiome is associated with a greater influx of dietary endotoxin that can lead to inflammation.
- There is a link between microbiome composition, intestinal permeability, and inflammation.