Topic: Microbiome

Relevance to GFF

Everywhere you turn these days, people are using the terms “gut health,” “good bacteria,” “probiotics” and “microbiome.” From Activia commercials to news stories to social media chatter, good gut health is at the forefront of the conversation on health and wellness. While historically associated with helping maintain proper gastrointestinal (GI) function, the bacteria found in the GI tract (and throughout your body, including on your skin) is now being linked to many measures of health, such as immune-system health, brain health and even weight maintenance.

The term microbiome refers to the collective genes of a person’s microbiota (the ecosystem of organisms that live in and on your body, including bacteria, fungi and viruses), and no two people have the same composition of these resident species. Due to mounting evidence demonstrating the (potentially huge) effect of the microbiome on a person’s health, scientists are working to uncover the lifestyle factors (including diet) that impact it. In other words, researchers are interested in what foods can help “feed” the good bacteria in our bodies as well as the combination of these bacteria, fungi, etc., most associated with positive health outcomes.

Issue at hand: Western diet’s effect on gut health

Current and emerging research around the microbiome’s role in health could cast enriched grains in a negative light. For example a clinical trial in progress at Tufts University is comparing the effects of a whole-grain, high-fiber diet with a typical Western diet rich in refined grains on participants’ immune-system health.

Issue at hand: Celiac disease/gluten intolerance

While there are many explanations for the rise in celiac disease and other gluten intolerances (and no one has truly identified a single cause), the microbiome is a factor frequently named as driving this increase. This is a chicken-and-egg situation because other factors tied to an increase in celiac disease, including increase in Cesarean births, a decrease in breastfeeding and a lifestyle that’s “too clean” (i.e., rife with antibiotic and hand sanitizer use) can also negatively impact the microbiome.

Why GFF Should Be Concerned

The microbiome represents a complex opportunity — and threat — for GFF. Recognizing that research around the microbiome is still in its early stages, there is published evidence linking fiber and whole grain intake with better measures of gut health, which is positive for the industry. Additionally, the literature review on the gluten-free diet authored by GFF advisory board chairman, Glenn Gaesser, PhD, published in the *Journal of the Academy of Nutrition and Dietetics* indicated that the gluten-free diet may lead to reductions in good gut bacteria. Beyond this, there are formulation opportunities on two fronts: the addition of probiotics to grain products to increase their health value and the opportunity for potential sourdough bread formulations that can be tolerated by people with gluten intolerance disorders.

However, with the Tufts University clinical trial in process potentially implicating enriched grain intake in poorer GI health, the industry must be prepared for these negative findings. Likewise, acknowledging

the suggested link between a compromised microbiome and gluten intolerance, there may be a cascade of issues for GFF if the scientific community's work indicates a domino effect: the Western diet (rich in refined grains) leads to compromised healthy gut bacteria/proliferation of harmful gut microbes, which leads to gluten intolerance and/or poorer overall health.

Recognizing this tension, it is imperative that the grains industry be prepared with messaging for multiple scenarios but also to demonstrate a willingness to formulate its products accordingly to support overall population health.

Articles of interest

Your Gut Bacteria Want You to Eat a Cupcake
The Atlantic, 8/19/14
A review paper published in the journal *BioEssays* suggests that the many different species of bacteria present in the human gut compete for space and nutrients, and the more dominant ones may have more influence on their humans. These bacteria may be responsible for inducing certain food cravings and may impact mood.

Gut Bacteria Play Significant Role in Gluten Metabolism
Celiac, 8/6/14
Although the role of human digestive proteases in gluten proteins is quite well known, researchers don't know much about the role of gut bacteria in the metabolism of these proteins. A research team recently set out to explore the diversity of the cultivable human gut microbiome involved in gluten metabolism. Their findings show that the human intestine hosts numerous bacteria that can use gluten proteins and peptides for food. These bacteria could have an important role in gluten metabolism and could give rise to new treatments for celiac disease.

Human Microbiome Varies by Sex and Diet, Findings That Could Improve Health
Medical Daily, 7/29/14
Researchers have known diet affects the balance of the hundreds of bacteria living inside people's stomachs and intestines. But a recent paper shows that men's and women's microbiomes respond differently to the same diet.

Monitoring the Rise and Fall of the Microbiome
MIT News, 7/24/14
Close analysis of bacteria in the human digestive tract reveals links to diet and other lifestyle factors.

Using the Gut Microbiome to Improve Health
LA Times, 7/9/14
Scientists analyzing the gut microbiome have found groups of bacteria that are either abundant or nearly absent, a finding that could aid in coming up with interventions for improving a person's health.

Four Habits for a Healthy Gut
CNN, 6/18/14
This article describes the benefits of healthy gut bacteria and provides four examples of habits that promote these: choose food-based probiotics, eat plenty of probiotics, avoid fatty foods and control your stress.

White Bread Helps Boost Some of the Gut's 'Good' Microbes
American Chemical Society, 6/11/14
Scientists are now reporting that white bread seems to encourage the growth of some of our most helpful inhabitants — beneficial gut bacteria. In addition to this surprising find, their study in ACS's *Journal of Agricultural and Food Chemistry* also revealed that when looking at the effects of food on our microbiomes, it is critical to consider the whole diet, not just individual ingredients.

How Your Microbiome Controls Your Health
Mercola, 5/17/14
Your gut bacteria are continuously affected by your environment, and by your diet and lifestyle choices. If your microbiome is harmed and thrown out of balance (dysbiosis), all sorts of illnesses can result, both acute and chronic. Unfortunately, your fragile internal ecosystem is under nearly constant assault today. Some of the factors posing the gravest dangers to your microbiome are refined sugars and processed foods.

Scientists Redefine What's Healthy in Newest Analysis for Human Microbiome Project
University of Michigan Medical School, 4/18/14
As scientists catalog the trillions of bacteria found in every nook and cranny of the human body, a new look by the University of Michigan shows wide variation in the types of bacteria found in healthy people. Based on their findings published April 16 in *Nature*, there is no single healthy microbiome. Rather, each person harbors a unique and varied collection of bacteria that's the result of life history as well as interactions with the environment, diet and medication use.

Diet Rapidly and Reproducibly Alters the Human Gut Microbiome
Nature, 1/24/14
Long-term dietary intake influences the structure and activity of the trillions of microorganisms residing in the human gut, but it remains unclear how rapidly and reproducibly the human gut microbiome responds to short-term macronutrient change.

Exploring the Invisible Universe That Lives On Us — and in Us
National Public Radio, 11/4/13
This article contains a video that provides a microbiome 101. It is approximately five minutes long and covers what the microbiome is, how lifestyle factors affect it and its impact on health.

The Microbiome
Tufts Nutrition Magazine, Summer 2013
Three percent of your body mass is composed of microbiota. Despite being small by weight, this collection of thousands of species living in and on your body play a significant role in your health.

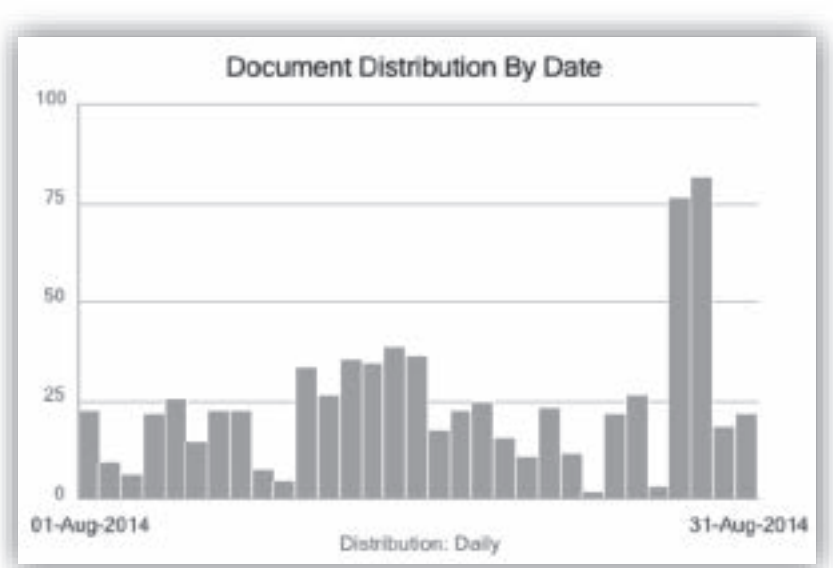
Who Has the Guts for Gluten?
The New York Times, 2/23/13
While it has been established that the gluten-free diet is an effective treatment for managing celiac disease, questions linger regarding the uptick in prevalence. Theories for factors driving this increase range from changes in the body's microbial ecosystem to lower breastfeeding rates.

Topic: Microbiome

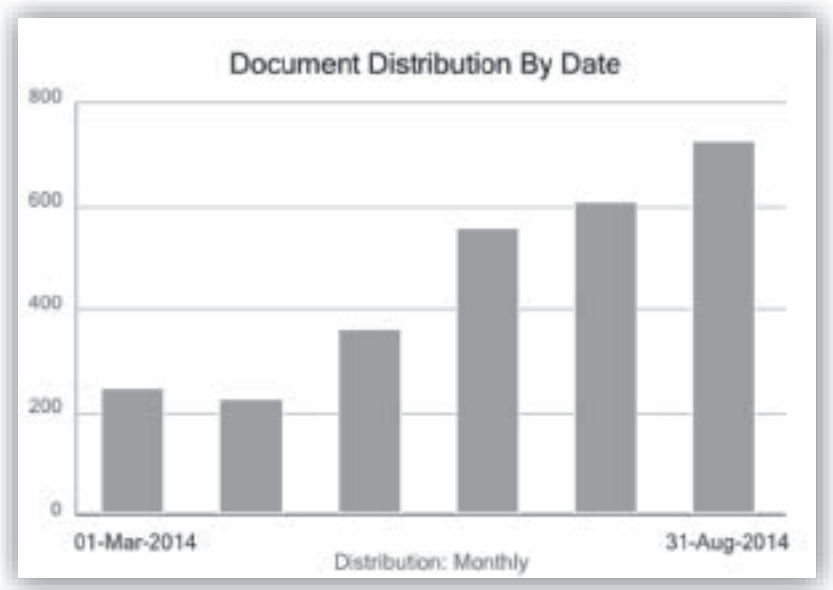
Media Charts

While mentions of the microbiome remained fewer than other hot topics, there has been a steady increase over time in the volume of media coverage. Since September 2013, mentions nearly quadrupled in volume, with an uptick in the consumer-facing media coverage about its impact on humans and health.

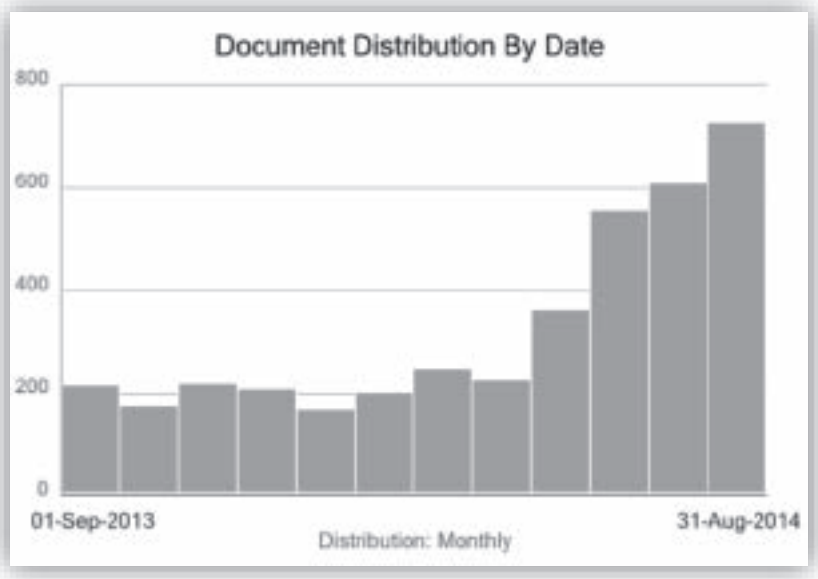
Microbiome Mentions (Past Month)



Microbiome Mentions (Past Six Months)



Microbiome Mentions (Past Year)



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GFF Holding Statement: Microbiome

GFF is dedicated to monitoring and advancing the science surrounding grains' impact on health. The field of microbiome research is rapidly growing and represents both an opportunity and a threat for the grains industry. GFF will continue to work with the Scientific Advisory Board and other "friends" in the research space to evaluate emerging research and formulate its approach to microbiome messaging.

Questions & Answers

What is the microbiome?

The term microbiome refers to the collective genes of a person's microbiota, the ecosystem of organisms that live in and on your body, including bacteria, fungi and viruses.

Why should investors be concerned about the microbiome?

Emerging research shows that the microbiome can have a huge effect on a person's health. While historically associated with helping maintain proper gastrointestinal health, it is now being linked to other measures of health, such as immune-system health, brain health and even weight maintenance. With that, the general body of research surrounding the microbiome is in its infancy and is an area GFF is monitoring closely.

How do grains affect it?

Grain-based foods have been shown to have both positive and negative effects on the microbiome. There is published evidence linking fiber and whole grain intake with better measures of gut health. However, a Tufts University clinical trial is currently underway comparing the effects of a whole-grain, high-fiber diet with a typical Western diet rich in refined grains on participants' immune-system health; this has the potential to cast enriched grains in a negative light. Findings from this study will not likely be available for another one to three years due to the duration of data collection and often long timeline for publication in an academic journal.

Is grain consumption responsible for the increased rates of celiac disease and gluten sensitivity?

No. However, there is a suggested link between a compromised microbiome and gluten intolerance. If emerging research shows that refined grain consumption has a negative effect on gut microbiota, there is potential for a domino effect implicating grains in the development of celiac disease/gluten sensitivity.

Microbiome
The microbiome represents a complex opportunity – and threat – for GFF. Recognizing that research around the microbiome is still in its early stages, there is published evidence linking fiber and whole grain intake with better measures of gut health, which is positive for the industry. Likewise, acknowledging the suggested link between a compromised microbiome and gluten intolerance, there may be a cascade of issues for GFF if the scientific community's work indicates a domino effect: the Western diet (rich in refined grains) leads to compromised healthy gut bacteria/proliferation of harmful gut microbes, which leads to gluten intolerance and/or poorer overall health.

Do we have a public position that can be used?

YES

Positive issue platform

- Variety
- Nutrition
- Health
- Process
- Choice
- Insights
- Origin

NO

Holding statement

Refer to external experts

RESOURCES

GFF Partners:
WFC
HGI

Sylvia Melendez-Klinger, MS, RD, LDN, CPT
Hispanic Food Communications

GFF Scientific Advisory Board:
Julie Miller Jones Ph.D., LN, CNS
St. Catherine University
Shelley Case, RD
Case Nutrition Consulting Inc.

Additional Resources:
AND
IFIC

Document & monitor

GRAIN FOODS FOUNDATION