



# Whole Grains *and* the Microbiome

There are approximately **50 trillion** microbial cells in and on our bodies.

*A diet rich in whole grains nourishes the healthy gut bacteria helping them to work inside your body to improve overall health.*

*New and wonderful medical research presented by Robert Martindale, MD., PhD Chief of Gastrointestinal and General Surgery, Medical Director of Hospital Nutrition Services and Malissa Warren, Registered Dietitian in the Department of Surgery at Oregon Health & Sciences University*

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## The Human Microbiome

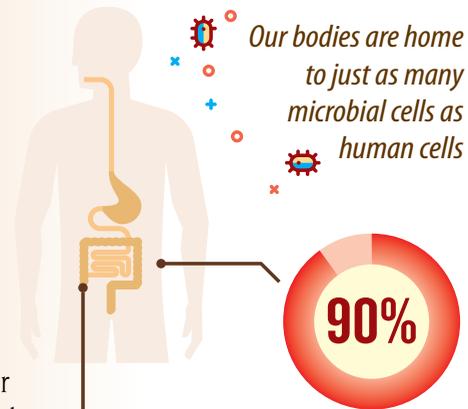
Did you know that you have nearly 50 trillion microbial cells in and on your body? You have just as many microbial cells as you do human cells. The microbial cells make up the microbiome.

These microbes live in our mouth, stomach, intestines, nose, lungs, reproductive organs, and on our skin.

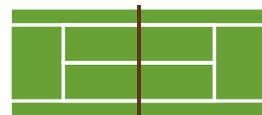
No two people are exactly alike and each person has a distinct microbiome.

Our microbiome is affected by:

- Genetics
- Food
- Where we live and travel
- The people and pets in our lives
- Hygiene
- Sleep patterns
- Medications



Up to 90% of all disease can be traced back to the gut and the health of the microbiome



**3,000 sq ft**

The surface of the GI tract is roughly the same size as a tennis court

## You Are What You Eat

Did you know that you will consume between 35–40 tons of food in your lifetime? Making the right dietary choices is important in keeping your microbiome, and in turn your body, healthy.

Foods that help good microbes grow in the intestinal tract include:

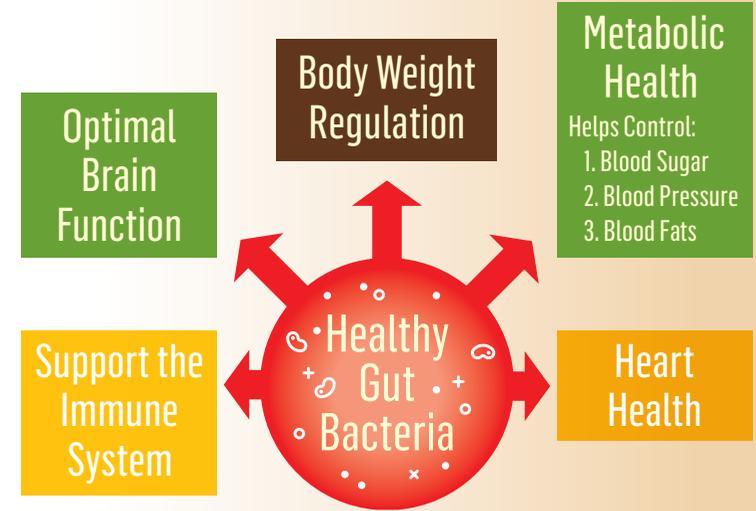
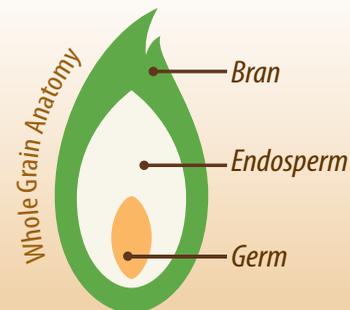
- Whole grains
- Fruit and vegetables
- Nuts and seeds
- Fermented foods such as yogurt, kefir, kombucha, kimchi, tempeh, and sauerkraut

Dietary changes can impact the microbiome in as little as 24 hours so your food choices have a daily impact.

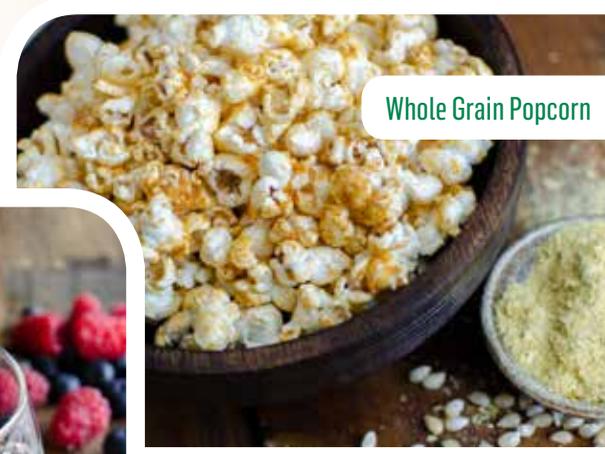
2015-2020 Dietary Guidelines for Americans recommend that **at least** half of your grain intake come from whole grains, though we say eating all whole grains is best. The average American falls far short, eating only 1.5 ounces of the recommended 3 ounces per day.

Choose Whole Grains for Your Microbiome:

- Whole grain flours
- Whole wheat bread, pasta, or crackers
- Brown rice
- Buckwheat
- Bulgur
- Whole and rolled oats, and oatmeal
- Popcorn
- Barley
- Quinoa
- Farro
- Amaranth
- Kamut
- Freekeh
- Rye
- Sorghum



Whole Grain Muesli Parfait



Whole Grain Popcorn



Whole Grain Buckwheat Salad

## Whole Grains, the Microbiome and the Heart

Increased whole grain intake is associated with a significantly lower risk of type 2 diabetes, heart disease, and obesity.

Even a modest daily intake of whole grains shows a reduction in heart and vascular disease.

Multiple mechanisms are acting to help minimize the hardening and narrowing of arteries (atherosclerosis), which is the main cause of heart and vascular disease.

Whole grains enhance beneficial microbes that produce chemicals, which can decrease atherosclerosis.

Beneficial microbes act on the nutrients from whole grains to lower fats in the blood stream.

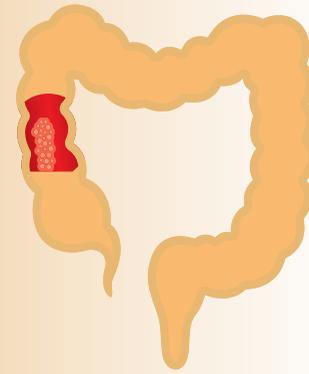
Whole grains contain fiber, vitamins, minerals, and phytoestrogens (hormone like compounds found in plants) that can be favorable to cardiac health by:

- Lowering blood pressure
- Lowering serum fats and cholesterol
- Improving glucose control
- Decreasing cell stress
- Lowering total body inflammation

Whole Grain Granola



## Whole Grains, the Microbiome and Cancer



Cancer has multiple causes. We know that some types of cancer are hereditary and have a genetic origin. Other types are closely associated to lifestyle factors such as physical activity, smoking, environmental exposures, and diet.

A lot of research on cancer and diet shows that

increased intake of whole grains is associated with improved health, as well as decreased cancer risk and deaths from cancer.

The microbiome, the total sum of all the bacteria and other microorganisms living on and in our bodies, has become a focus to explain, in part, why people with higher whole grain consumption have a decreased incidence of most cancer types.

The anti-cancer effects of the whole grains occur through changing the intestinal environment to an anti-cancer bacterial mix. The interaction between the diet and gut bacteria produce chemicals that can have an anti-cancer effect.

Whole Grain 3-Seed Bread



## Whole Grains, Microbiome and the Brain



Studies published in the last 24 months are starting to show the importance of the bacteria living in our intestine and how these bacteria communicate with the brain. This connection, at first, seems counter-intuitive, but as we learn more about the importance and the variety of active chemicals that

are produced by these beneficial bacteria living in our intestine, it becomes clear. These beneficial bacteria can produce many helpful chemicals from the digestion of whole grains.

Recently it has been shown that manipulation of the bacteria in the gut can affect the brain and behavior in several ways that may act to:

- Decrease anxiety
- Improve mood and symptoms of depression
- Alleviate symptoms of autism
- Improve attention which may be helpful in some cases of ADHD (Attention Deficit Hyperactivity Disorder)
- Improve symptoms related to severe cases of OCD (Obsessive Compulsive Disorder)
- In animal research, Alzheimer's disease has been improved and in some cases progression of the disease was prevented.

*Healthy food is the best medicine®*



*Eat wisely you're irreplaceable®*

*Life Insurance You Eat®*

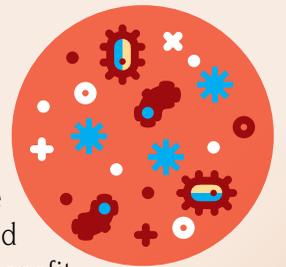
## Whole Grains, the Microbiome, Obesity and Diabetes

New studies show that people who eat a diet rich in whole grains have fewer incidences of type 2 diabetes than those who eat very little whole grains. Whole grains help to increase the number and types of bacteria, which are associated with better glucose tolerance.

The microbiota of people with diabetes has fewer bacteria that produce chemicals beneficial in helping with glucose control. By decreasing the amount of "good" bacteria, the end result is insulin resistance (requiring more insulin for glucose control), a liver that becomes packed with fat, and higher prevalence of obesity. Short chain fatty acids produced by beneficial microbes can:

- Stimulate insulin secretion
- Increase feelings of fullness or decrease appetite
- Improve utilization of glucose

We have learned that by taking stool (live bacteria) from a lean person and transplanting it into the gastrointestinal tract of a person with metabolic syndrome (obesity, high blood pressure, and poor glucose control), they will benefit from better glucose control.



For more information and to view references for this information, please visit [BobsRedMill.com/gut-health](http://BobsRedMill.com/gut-health)