Good Gut Guide

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Gut health is crucial for overall well-being, as the gut plays a significant role in digestion, nutrient absorption, and immune function.

The mouth is the starting point of digestion. The teeth chew the food to break it down into smaller pieces and mixes it with saliva. Salivary glands in the mouth secrete saliva, which contains enzymes like amylase that begin the digestion of carbohydrates. You produce about 1 to 2 liters of saliva each day, and saliva contains various components that help fight off pathogens, including antibodies, enzymes and antimicrobial proteins. These substances help to neutralize bacteria and viruses, reducing the risk of infections. It's always important to chew your food well to enable the digestive process to begin.

The mouth lining secretes mucus that lubricates food, making swallowing easier, and helps protect the mouth from abrasion. The mucosa lining the mouth and throat, and other parts of the gastrointestinal tract contains specialized immune cells that monitor for invaders and initiate immune responses when necessary.

The stomach is the muscular sac that mixes the food with gastric juices. The stomach secretes hydrochloric acid (HCl) and enzymes that create a highly acidic environment.. This acidity helps to break down and digest food, and kill bacteria that may be ingested with food thus protecting against infections.

- Highly Acidic environment is needed to digest (pH 1.5-2.5) meat and eggs
- Moderately Acidic (pH 1.5-3.5) for dairy
- Less Acidic (pH 3-4.5) for plant foods - fruits, vegetables, legumes, nuts, grains

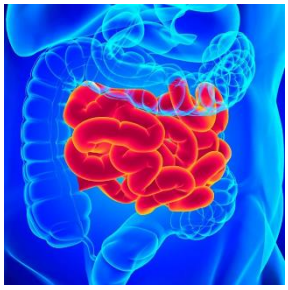
This is because the proteins in the animal products tend to be a lot more complex than the plant proteins. This is especially important for those who have heartburn, acid reflux or peptic ulcers. Plant foods make the best diet because the environment in the stomach is going to be far less acidic.

The time spent in the stomach for also varies according to the foods. Animal products tend to spend more time in the tummy on average:

- Red Meat (e.g., beef, lamb): 3 to 5 hours
- Poultry (e.g., chicken, turkey): 2 to 3 hours
- Fish: up to 2 hours
- Eggs: Hard-boiled or Fried: 2 to 3 hours
- Scrambled or Poached: 1 to 2 hours
- Dairy: Milk and Yogurt: 1 to 2 hours
- Cheese (e.g., hard cheeses like cheddar, soft cheeses like mozzarella): 2 to 4 hours
- Juicy Fruits (e.g., watermelon, citrus): 20 to 40 minutes
- Denser Fruits (e.g., apples, pears): 30 minutes to 1 hour
- Leafy Greens (e.g., spinach, lettuce): 20 to 30 minutes
- Starchy Vegetables (e.g., potatoes, corn): 1 to 2 hours
- Legumes: Beans, Lentils, Chickpeas: 2 to 3 hours
- Nuts (e.g., almonds, walnuts): 2 to 3 hours
- Seeds (e.g., sunflower seeds, chia seeds): 1 to 2 hours,
- Whole Grains (e.g., brown rice, quinoa): 1 to 2 hours

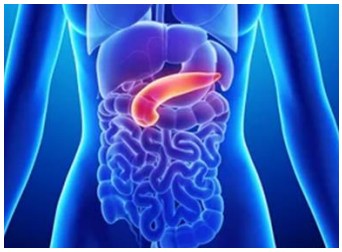
Those who are struggling with any stomach condition, will improve the health of their gastrointestinal tract by having a diet of predominantly fruits, vegetables, seeds and wholegrains with shorter transit times.

The stomach can expand and contract significantly to accommodate varying amounts of food. Its elastic walls can stretch to hold up to 1-1.5 liters of food and liquid when fully distended. It is also lined with a thick layer of mucus that protects its inner walls from the corrosive effects of stomach acid. This mucosal barrier prevents ulcers and ensures the stomach's own tissues are not damaged during digestion.



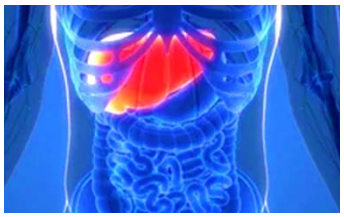
The small intestine is a long, coiled tube where most digestion and nutrient absorption occurs. The average length of the small intestine in an adult is approximately 6 meters. However, this can vary widely, ranging from about 4.5 to 9 meters.

The inner surface area of the small intestine is vastly increased by its intricate structure. The lining of the small intestine is highly folded and contains villi (tiny, finger-like projections) and microvilli (even smaller projections on the villi), which dramatically increase the absorptive surface area. The total surface area is estimated to be around 30 to 40 square meters, roughly the size of a tennis court. This large surface area is crucial for efficient nutrient absorption.



The pancreas produces digestive enzymes and bicarbonate, which are released into the small intestine to aid in digestion. It also produces insulin, which helps regulate blood sugar levels.

The liver produces bile, which helps digest fats. It also processes nutrients absorbed from the small intestine, and detoxifies harmful substances in the blood.



The gallbladder is a small little sac that lies adjacent to the liver. It stores and concentrates bile from the liver, and releases it into the small intestine to aid in fat digestion.

The large intestine, or colon, absorbs water and electrolytes from undigested food. It also houses beneficial bacteria that help with digestion and produce certain vitamins. It turns the undigested food into solid waste and sends it to the rectum to be stored before it is passed from the body.

Many people suffer from chronic health problems in these organs. The following are some of the gut disorders:

- Gastroesophageal reflux, commonly known as acid reflux, is a condition where stomach acid flows back up into the esophagus. This happens because the muscle at the bottom of the esophagus, called the lower esophageal sphincter, doesn't close properly or opens too often.
- Peptic ulcers are sores that develop on the inner lining of your stomach, the upper part of your small intestine, or sometimes your esophagus. They happen when the protective lining of these areas is damaged, allowing stomach acid to create open sores.
- Gallstones are solid particles that form in the gallbladder. Gallstones can be as small as a grain of sand or as large as a golf ball and can cause pain and other problems if they block the bile ducts.
- Leaky gut, also known as increased intestinal permeability, is a condition where the lining of the small intestine becomes damaged, causing undigested food particles, toxins, and bacteria to "leak" through the intestinal wall into the bloodstream. This can lead to inflammation and trigger an immune response.
- Irritable Bowel Syndrome (IBS) is a common disorder that affects the large intestine. It causes symptoms like cramping, abdominal pain, bloating, gas, and diarrhea or constipation, or both. IBS is a chronic condition that requires long-term management.
- Inflammatory Bowel Disease (IBD) is a term used for chronic conditions that cause inflammation in the digestive tract. The two main types of IBD are Crohn's disease and ulcerative colitis.
- Constipation is when you have infrequent or difficult bowel movements. It often means having fewer than three bowel movements a week or passing hard, dry stools that are difficult to expel. This can cause discomfort and a feeling of being bloated or full.

One of the most amazing aspects of our gut is the bountiful biome, otherwise known as the microbiome or flora. It really is front and central to the gut health and indeed plays a powerful role in our overall health. It is made up of all bacteria, viruses, fungi, yeast and archaea that live on and within us. The human microbiome contains around 100 trillion microorganisms, outnumbering human cells by about 10 to 1. However, due to the small size of these microbes, they make up only about 1-3% of our body mass. It is very genetically diverse and has approximately 200 times more genes than the human genome. The majority of these microorganisms reside in the gut, with the large intestine having the largest population. Each person's microbiome is unique, much like a fingerprint. It is influenced by factors such as diet, environment, genetics, age, and lifestyle.

This biome plays several essential roles in maintaining health:

- Bacteria in the gut can break down complex carbohydrates, fibers, and polysaccharides that human digestive enzymes cannot digest..
- Some gut bacteria synthesize essential vitamins such as vitamin K and certain B vitamins (e.g., biotin, folate, and B12)
- The friendly flora helps in the development and function of the immune system. It trains the immune system to distinguish between harmful pathogens and harmless microbes, preventing overreactions that can lead to allergies and autoimmune diseases.
- The biome produces antimicrobial substances and maintains an environment that inhibits the growth of pathogens.
- It maintains the integrity of the gut lining, prevents harmful substances and pathogens from entering the bloodstream.
- The biome influences the metabolism, including fat metabolism, energy balance, and insulin sensitivity.
- Many people have heard of the Gut-Brain Axis. Flora in the gut communicates with the central nervous system via neurotransmitters, modulation of immune responses, and signals through the vagus nerve. This in turn affects the mental health through mood, behavior, and cognitive function.
- Certain gut bacteria can metabolize and detoxify harmful compounds, including drugs, environmental toxins, and carcinogens, reducing their harmful effects on the body.

Several factors can harm the human microbiome, disrupting the balance of microbial communities and potentially leading to health issues. Some of the key factors include:

- Antibiotics
- Medications

- Infections
- Excess sanitation
- Environmental toxins
- Diet: high fat/sugar; low fibre
- Stress
- Poor sleep
- Smoking & alcohol
- Age
- C-section / Not breast feeding

There are several factors can help build and enhance the human microbiome and promoting a healthy balance of microorganisms in and on the body. The most important one is fibre. Fibre is a complex carbohydrate and a crucial component of a healthy gut diet. The two primary categories are soluble and insoluble fiber; equally as important for their own individual reasons.

Soluble fiber dissolves in water to form a gel-like substance. Pectins, beta-glucans, gums, and psyllium are all types of soluble fibre. Some of the highest sources of soluble fiber include: oats, legumes (such as beans, lentils, peas and chickpeas), barley, flaxseed, chia seeds, psyllium husks, sweet potato, broccoli, brussel sprouts, carrots, apples, citrus and berries.

Soluble fibre benefits:
- Builds the biome – prebiotic
- Supports the gut barrier
- Improves nutrient absorption
- Regulates bowel movements
- Relieves diarrhoea
- Regulates the blood sugar
- Reduces LDL cholesterol
- Manages weight
- Reduces risk of bowel cancer

Insoluble fiber is a type of dietary fiber that does not dissolve in water. Instead, it remains intact as it moves through the digestive system. Cellulose, hemicellulose, and lignin (which are all major component of plant cell walls) make up the insoluble fibre category. The highest sources are wheat brain, brown rice, celery, green and red cabbage, carrots, apples berries, grapes with their seeds, legumes (such as kidney, pinto and black beans, chickpeas and lentils, nuts (such as almonds, walnuts and pecans), flaxseed, chia seed, popcorn and psyllium husks.

Insoluble fibre benefits:
- Prevents & relieves constipation
- Regulates the pH of the intestines
- Manages the weight
- Reduces bowel cancer risk
- Prevents haemorrhoids

There is a special kind of starch – resistant starch - that is highly beneficial and functions like a both a soluble and insoluble fibre. It resists digestion in the small intestine and ferments in the large intestine, producing beneficial short-chain fatty acids. It provides many of the benefits of both. Barley, oats, brown rice and legumes such as beans, chickpeas and lentils are all great sources. When potatoes are cooked and then cooled, the starch undergoes a process called retrogradation, increasing the resistant starch content. For those who love their chilled potato salad, they are going to get a huge boost to their gut and overall health.

Short-chain fatty acids (SCFAs) are a group of fatty acids predominantly produced in the colon by the fermentation of dietary fibers - the soluble fiber and resistance starch - by the gut microbiota. SCFAs provide a significant energy source for the cells lining the colon, and is essential for maintaining the integrity and function of the lining of colon. They help lower the pH of the colon, creating an acidic environment that inhibits the growth of pathogenic bacteria and maintains a healthy balance of gut microbiota. By providing this energy source and a healthy pH, this gives protection against irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD). SCFAs involved in sugar metabolism in the liver, and regulates fat metabolism. Together, they influence the overall metabolism and can impact body weight regulation. This can help prevent metabolic disorders such as obesity and type 2 diabetes. SCFAs have anti-inflammatory and immune modulating properties and help to prevent autoimmune diseases. These fatty acids also act as special signaling molecules, influencing gene expression and cell differentiation. This can help to protect against cancer

The recommended daily intake of fiber is at least 25 grams for women and 38 grams for men. However, most people consume less than half of these amounts. When increasing fiber intake, however, it is important to drink plenty of water. Fiber works best when it absorbs water, helping to form soft, bulky stools. Increasing fiber intake too quickly can lead to gas, bloating, and cramping. It's best to gradually increase fiber intake to allow the digestive system to adjust. Refining grains removes the bran and germ, which significantly reduces the fiber content. Whole grains retain all parts of the grain, making them a better source of fiber compared to refined grains.

There is one diet that is very high in fibre and resistant starches and that is the Whole-Food Plant-Based Diet. This diet emphasizes the consumption of minimally processed plant foods while excluding or minimizing animal products and processed foods. It is rich in fruits, vegetables, legumes, nuts, seeds, and whole grains.

Benefits of the Whole-Food Plant-Based Diet on gut health:
- High in fibre (with all the benefits outlined above)
- Enhances biome diversity

- Improves digestion & nutrient absorption
- Reduces inflammation
- Supports immunity
- Provides immense variety nutrients

Although there has been much research done on the amazing health benefits of the Whole-Food Plant-Based diet in the last decade or so, this diet has ancient origins. About 600 years before Christ, we have probably the first recorded Controlled Trial Study in history in the first chapter of the Daniel in the Bible. This was long before the modern scientists came up with this method for obtaining scientific evidence. This type diet that was tested. Daniel and his three friends – Hananiah, Mishael and Azariah – were young princes in Israel, and they were captured by Nebuchadnezzar, king of Babylon, and brought back to his kingdom. Nebuchadnezzar was an amazing leader who took all the young, strong, skillful and wise people captured from surrounding nations, and instead of killing them all, he would

educate them in the Babylonian University, and also feed them of all the best food from his own table. This was all the really rich foods and alcohol to drink. However, Daniel and his friends had a strong relationship with God and they knew the laws of health that God have given them. They understood that the food and drink offered by the King would not be helpful to their health or spirituality. They spoke to the master in charge of all the young wise men and asked if they could only eat plant-based foods and drink water. Essentially, Daniel and his three friends became the experimental group, whilst all the other men with similar demographic background – wise, strong, skilful and young – were the control group eating all the rich food from the Kings table. Although, their master thought they would become unhealthy when compared to all the other wise men, they proved his hypothesis wrong. In just ten days, they appeared much healthier and stronger than all their companions. The master allowed them to continue on their diet for the three years of their education and then they came before King Nebuchadnezzar. The King tested all the wise and learned men and found Daniel and his three friends ten times better in all wisdom and understanding. There was no magic in their diet or in their healthy choices, but working with divinely given principles of health, and the faith they had in their Creator produced such an amazing outcome.

There are a number of other aspects of our lifestyles that can impact the gut health. Smoking and alcohol intake are two of the most harmful aspects.

Smoking
- Disrupts the biome
- Reduces production of SCFAs
- Increases intestinal permeability
- Impacts gut motility
- Induces inflammation
- Reduces gut blood flow
- Increases risk of all gut disorders

Alcohol
- Disrupts the biome
- Reduces production of SCFAs
- Increases gut permeability
- Inflames the gut
- Reduces nutrient absorption
- Damages the gut lining
- Weakens gut immunity
- Risk factor for liver diseases

To improve your gut health and many other aspects of your overall well-being, don't smoke or drink alcohol.

On the other hand, drinking water and staying well hydrated is paramount for optimal gut health. The benefits of drinking water:
- Enhances digestion & nutrient absorption
- Supports gut barrier
- Maintains bowel regularity
- Aids peristalsis
- Facilitates a healthy biome
- Improves blood flow
- Required for detoxification
- Reduces risk of gut disorders

Exercise has a very positive impact on gut health:
- Boosts digestion and nutrient absorption
- Strengthens the gut barrier
- Improves bowel regularity
- Promotes biome growth and diversity
- Enhances SCFAs production
- Reduces gut inflammation

Among its numerous benefits, sleep plays a critical role in maintaining gut health:
- Supports biome growth and diversity
- Regulates biome circadian rhythms
- Influences the digestive enzymes and hormones
- Protects the gut lining
- Supports gut motility
- Promotes mental well-being
- Improves immunity
- Reduces inflammation

The biome is influenced by the environment, including where we live, who we interact with, and what we eat. People living in rural areas tend to have more diverse microbiomes compared to those in urban settings. As often as you can, get out in nature and visit a variety of different natural environments – gardens, farms, mountains, rivers, beaches for example. Interacting with pets, can also expose the body to a variety of microbes and promote microbial diversity.

Sunlight exposure helps the body produce vitamin D, which is crucial for a healthy immune system. A well-functioning immune system supports a balanced gut microbiome by

controlling harmful pathogens and promoting beneficial bacteria. Vitamin D also plays a role in maintaining the integrity of the gut barrier, preventing harmful substances from passing through the gut lining and reducing inflammation. Adequate levels of vitamin D are associated with greater microbial diversity in the gut, which is a marker of a healthy microbiome. Exposure to sunlight increases the production of serotonin, a neurotransmitter that contributes to feelings of well-being and happiness and reduces stress and anxiety. This promotes a healthy gut environment through the gut-brain axis. Finally, adequate sunlight exposure has anti-inflammatory effects, which can benefit the gut by reducing chronic inflammation that can disrupt the gut microbiome and gut barrier function. To reap the benefits of the sunlight safely, go into the sun on a daily basis for ¼ of the time it would take you to get sunburnt.

One of the key areas affected by stress is the gut. The relationship between stress and gut health is complex. Chronic stress can contribute to a range of gastrointestinal issues, from functional disorders like irritable bowel syndrome to inflammatory conditions like Crohn's disease and Ulcerative colitis. Stress effects on the gut:

- Leaky gut
- Impaired immunity
- Altered digestion
- Reduced gut blood flow
- Changed gut motility
- Increased gut sensitivity
- Biome imbalances
- Increased gut pathogens
- Reduced SCFAs production

Reducing stress can have a profound impact on gut health. It will help enhance digestion, increase blood flow to the digestive organs, normalize gut motility and decrease its sensitivity, maintain the gut barrier, regulate the bowel movements, balance the gut biome and increase short chain fatty acid production, among many other benefits through the gut-brain axis.

Several herbs are known for their potential to support gut health and promote a healthy microbiome. These herbs often have antimicrobial, anti-inflammatory, or prebiotic properties that can benefit the gut flora.

Slippery elm bark/ Marshmallow root

Actions

- Soothing to the gut
- Prebiotic
- Anti-inflammatory/ Antioxidant
- Relieves constipation and diarrhoea

Indications:

- Gastro-oesophageal reflux disease
- Irritable Bowel Syndrome
- Inflammatory Bowel Disease
- Constipation and diarrhoea

Dose: Heaped teaspoon twice daily

- Caution when taking medication

Goldenseal Root

Actions

- Antimicrobial and Prebiotic
- Anti-inflammatory
- Protects and heals the gut lining
- Supports gut immune function
- Enhances digestion
- Relieves indigestion, bloating and gas

Indications

- Some gut infections
- Peptic ulcers
- Inflammatory bowel disease
- Leaky gut

Dose: 0.5-1.5g dried root daily

- Not to be used in pregnancy

Barberry Bark

Actions

- Antimicrobial and Prebiotic
- Anti-inflammatory
- Protects and heals gut lining
- Enhances digestion
- Relieves indigestion, bloating and gas
- Protects liver cells from toxins

Indications

- Inflammatory bowel disease
- Leaky gut
- Gallstones and gallbladder inflammation
- Liver inflammation

Dose: 2-3g dried bark daily

- Not to be used in pregnancy

Peppermint

Actions

- Relieves abdominal pain, bloating nausea and gas
- Anti-inflammatory
- Enhances digestion
- Antimicrobial and Prebiotic

Indications

- Irritable Bowel Syndrome
- Indigestion

Dose: 3g of dried leaf daily

Chamomile

Actions

- Anti-inflammatory
- Relieves spasms, cramps, bloating and gas
- Promotes digestion
- Antimicrobial and Prebiotic

Indications

- Peptic ulcers
- Gastro-oesophageal reflux
- Irritable bowel syndrome
- Inflammatory Bowel Disease

Dose: 3-6g dried flowers daily

Garlic

Actions

- Anti-inflammatory/ Antioxidant
- Antimicrobial
- Prebiotic
- Gut barrier protection

Indications

- Irritable bowel syndrome
- Leaky gut

Dose: 2-4g of dried garlic daily, or 2-4 fresh cloves daily

Lemon Balm
Actions
- Antimicrobial and Prebiotic
- Anti-inflammatory / Antioxidant
- Relieves spasm, cramps, bloating and gas
- Anti-anxiety effects

Indications
- Gut symptoms related to anxiety
- Irritable bowel syndrome

Dose: 3g dried leaf daily

Ginger
Actions
- Anti-inflammatory/ Antioxidant
- Alleviates nausea and vomiting
- Relieves spasms, cramps, bloating and gas
- Enhances digestion
- Accelerates gastric emptying
- Antimicrobial and Prebiotic

Indications:
- Conditions associated with nausea and vomiting
- Indigestion
- Irritable bowel syndrome
- Gastroparesis

Dose: 1g dried root daily

Meadowsweet
Actions
- Anti-inflammatory/ Antioxidant
- Antimicrobial
- Soothes the stomach
- Enhances digestion

Indications
- Gastritis
- Gastro-Oesophageal Reflux
- Peptic Ulcers

Dose: 3g dried flowers/leaves daily
- Caution: do not use in children or those with salicylate sensitivity

Liquorice Root
Actions
- Anti-inflammatory
- Antimicrobial
- Protects the gut lining

Indications
- Gastro-Oesophageal Reflux
- Peptic ulcers
- Inflammatory Bowel Disease

Dose: 2-6g of the dried root daily
- Caution: not to use in pregnancy or the elderly, high blood pressure, liver, kidney and heart disease, and it interacts with a variety of medications**.**

Wild Yam
Actions
- Anti-inflammatory/ Antioxidant
- Relieves spasms, cramps, bloating and gas

Indications
- Irritable Bowel Syndrome
- Inflammatory Bowel Disease

Dose: 1-3g dried rhizome daily

Dandelion Root
Actions
- Laxative
- Enhances digestion
- Supports liver and gallbladder function

Indications
- Constipation
- Poor digestion
- Liver or gallbladder disease

Dose: 2-8g dried root daily
- Caution: do not use is there is blockages in the bile ducts or bowel obstructions, and some individuals may be allergic to his herb

Probiotics definitely do provide some benefits. The caution to this is that they tend to only do this whilst taking them. When you cease them, any good bacteria from the supplement tends to disappear if it was not a natural part of your own flora to begin with. But it is certainly helpful for short term use in the following situations:
- Antibiotic associated diarrhoea
- Infectious diarrhoea
- Constipation
- Irritable bowel syndrome
- Stress and anxiety
- Inflammatory bowel disease
- Cholesterol
- Liver health
- Weight management