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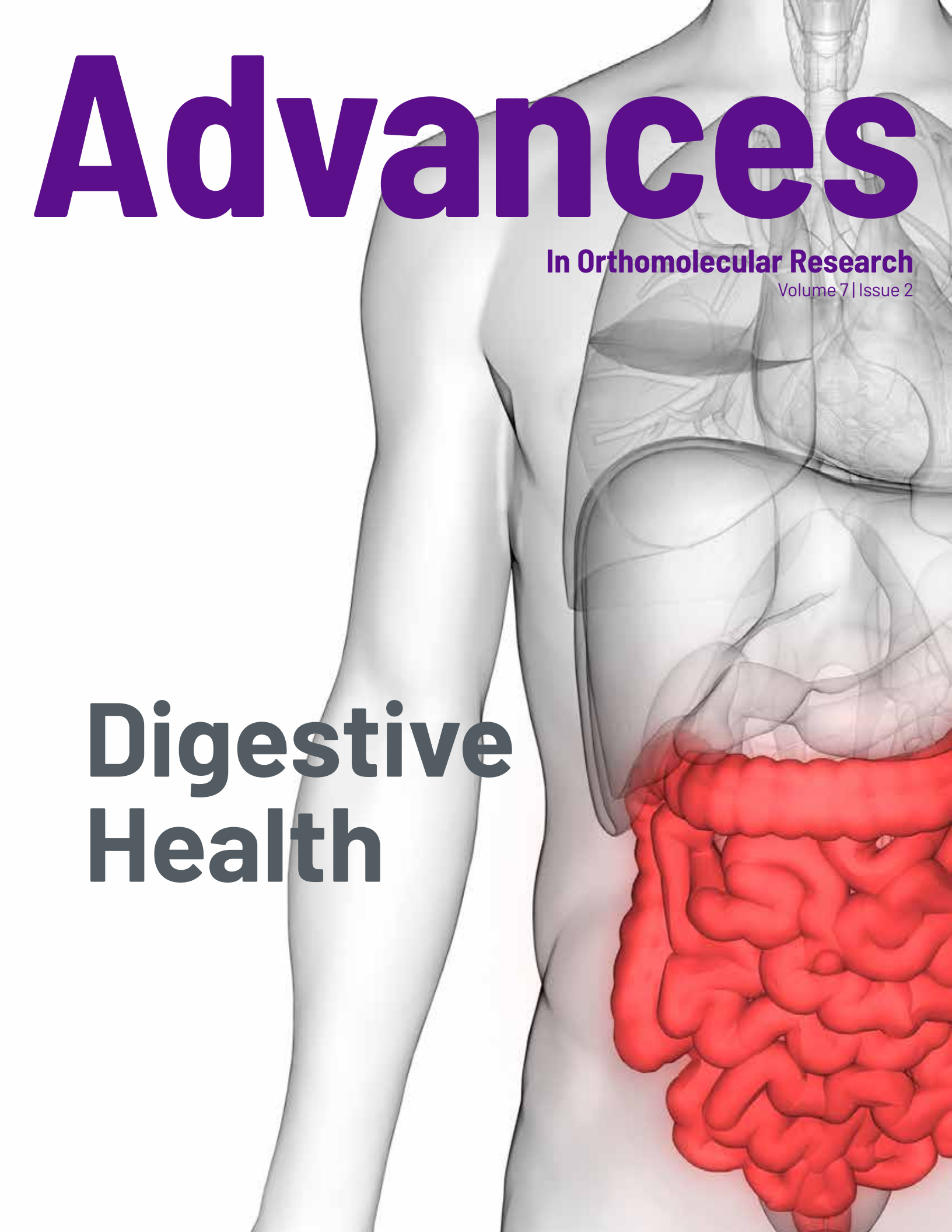

Digestive Health

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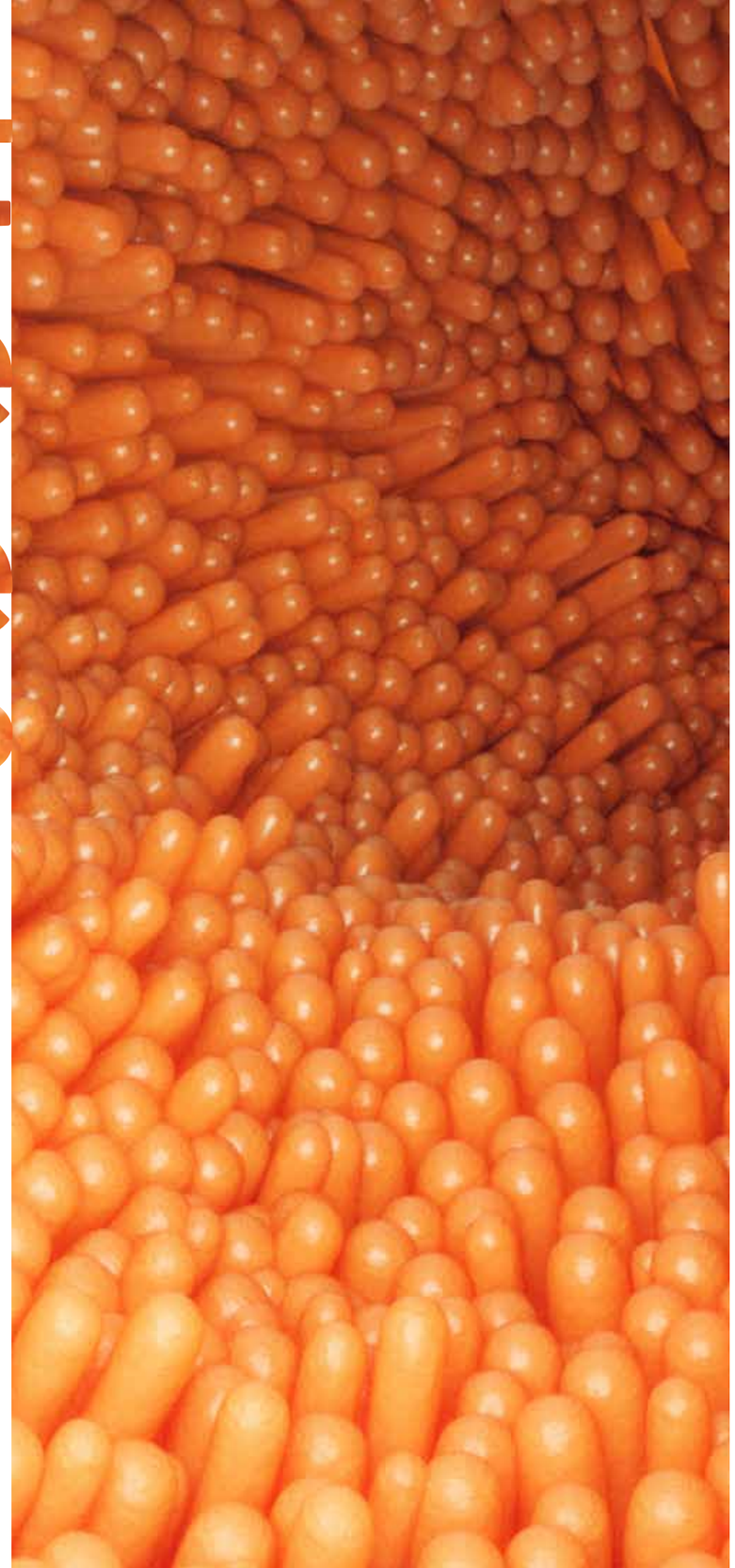
What are Digestive Enzymes?



By NavNirat Nibber, ND

An enzyme acts as a key facilitator of a chemical reaction, expediting the reaction so that biological processes can occur in a timely fashion. Our digestive system relies on these enzymatic reactions to help us break down and absorb foods to obtain nutrients. While vital for our survival, our key macromolecules – carbohydrates, lipids and proteins are just that, macro or very large molecules. These large and bulky nutrients from our food may be trapped in complex fibrous matrices or may be complex sugars with many chains and sidechains. Enzymes ensure we are able to breakdown these complex molecules so that when they reach the colon they are recognized and properly absorbed into the bloodstream or through lacteals into the lymphatic system and ultimately can be used to produce fuel for our cells.[1,2]

Key Terms

Enzyme
Proteins which will facilitate or catalyse a reaction, enabling it to happen faster than without it. Imagine enzymes in the form of a lock for which only specific keys will fit.

Substrate
The key that fits into each specific lock is known as a substrate. Digestive substrates are often larger molecules that require breakdown or modification to be properly absorbed into the system.

Rate limiting factor
Often the step within a chain reaction that is required for progression of the chain; it may be the most energetically costly, or time intensive step.

What are the types of enzymes available for digestion?

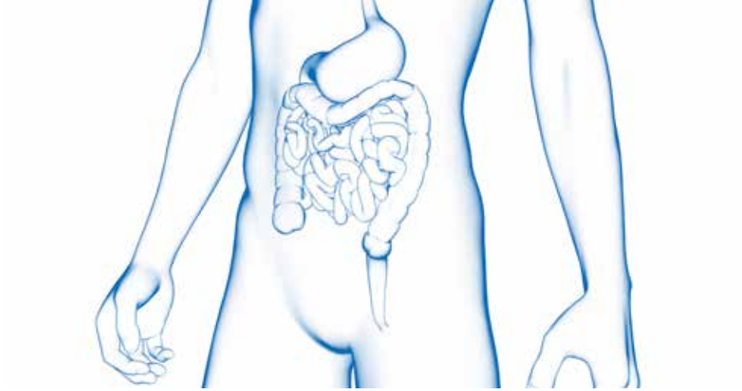
Digestive enzymes are classified based on substrates (i.e., our macromolecules).

1. Proteases and peptidases break down proteins into smaller peptides and amino acids. We want free amino acids because these then can be sequenced to form proteins. Proteins and their larger form peptides are integral to our cellular functions starting with DNA replication, building the cells of the immune system, building muscle, and oddly enough to make more enzymes! The digestion of dietary proteins is imperative because nine out of 22 amino acids are essential, meaning our bodies cannot produce them and must obtain these amino acids from food or supplements. Proteases such as pepsin, trypsin and peptidase are released in the stomach, duodenum and small intestine for protein digestion at multiple points.[1-3]

2. Lipases: This category of enzymes helps digest dietary or supplemental fats into their smallest components: fatty acids and glycerol. These fatty acids can then be "burned" (i.e., metabolised) for our cellular fuel ATP. While the glycerol backbone goes on to produce more fats which have a number of functions in the body including incorporation into membranes to keep tissues flexible, or for hormone production.[2]

3. Enzymes that digest Carbohydrates are all uniquely named depending on the sugar being broken down. These enzymes all work to ensure the carbohydrates such as starch and sugars get converted into the simple sugars such as glucose which then produce ATP. Salivary and pancreatic amylase, maltase, lactase, alpha galactosidase, and many more enzymes are present along the GIT. Further, certain foods: fruits, vegetables, meat and algae have their own enzymes. Fruits such as papaya and pineapple which contain papain and bromelain that defend the fruits from bacteria and other microbes and can help us digest these fibrous fruits.[2]

4. Nucleases: these enzymes digest genetic material to form the smallest material required for coding the genetic sequence, nucleic acids, sugar and phosphates.[2]



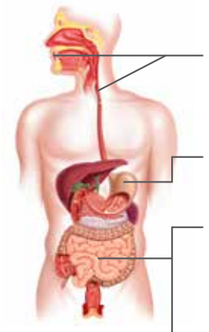
Digestive enzymes are present all along the GI tract facilitating various stages of food breakdown. Beginning in the salivary glands in the mouth which produce amylase, to the pancreas and liver where protease, lipase and additional amylases are present. Secretions are stimulated by mechanical and hormonal cues.

Between meals (while fasting) enzymatic secretions are stimulated by the cyclic contractile pattern of the migrating myoelectric complex (MMC), whereby bursts of enzymatic secretions from the pancreas, contraction of bile from the gallbladder follow the muscular contractions of the MMC. Considered to be "housekeeping" or "maintenance" secretions, this influx of enzymes into the intestinal lumen ensure any lingering food particles are properly digested.[2,3]

Alternatively, digestive secretions follow meals. These secretions occur in three phases: the cephalic, gastric and intestinal phase. The cephalic phase requires the cues from the parasympathetic nervous systems key modulator, the vagus nerve. These cues (through release of acetylcholine from the vagus nerve) will ensure the proper stimulation of acinar cells which release proteases, lipase and amylase into the duodenum.[2]

The gastric phase occurs when the contents of the stomach expand it such that the distension itself stimulates the glands to excrete enzymes.[2]

Finally, the intestinal phase occurs when there is a significant change in the pH of the duodenum, indicating the chyme has moved from the stomach into the small intestine. Further stimulation of exocrine glands occurs through hormones such as CCK.[2]



	Carbohydrate digestion	Protein digestion	Nucleic acid digestion	Fat digestion
Oral cavity, pharynx, esophagus	Polysaccharides (starch, glycogen) → Salivary amylase → Smaller polysaccharides, maltose			
Stomach		Proteins → Pepsin → Small polypeptides		
Lumen of small intestine	Polysaccharides → Pancreatic amylase → Maltose and other disaccharides	Polysaccharides → Trypsin, Chymotrypsin → Smaller polypeptides → Aminopeptidase, Carboxypeptidase → Amino acids	DNA, RNA → Nucleases → Nucleotides	Fat globules → Bile salts → Fat droplets (emulsified) → Lipase → Glycerol, fatty, acids, glycerides
Epilithelium of small intestine (brush border)	→ Disaccharidases → Monosaccharides	Small peptides → Dipeptidases → Amino acids	→ Nucleotidases → Nucleosides → Nucleotidases → Nitrogeous bases, sugars, phosphates	

Impacts of undigested food

A breakdown in this digestion cascade can have serious repercussions relating to nutrient deficiencies, dysfunctional MMC, and alterations in the microbiota. Nutrient deficiencies such as iron, vitamin B12, protein, and more can cause serious health concerns, including anemias, impaired immunity and increased risk of infection, hormonal changes, mood swings and more.[3,4]

Undigested food is also metabolized by the colonic microbial flora, which can increase gas production (carbon dioxide, methane, and/or hydrogen), the increased intra-abdominal gas can increase feelings of discomfort, abdominal pain, bloating, flatulence, and irregular bowel movements.[5]

Who needs to supplement with enzymes?

The human body in all its complex glory generally produces sufficient stomach acid, enzymes, and gastric motility to ensure proper mechanical and chemical digestion of food to fully extract nutrients. However, there are clear instances where chemical digestion with enzymes is hindered. Both direct and indirect tests can provide insights into the secretion, and activity of digestive enzymes. Tests such as fecal fat, fecal chymotrypsin, and fecal elastase are the most common indirect tests for pancreatic secretion and may be ordered when individuals are unable to tolerate certain foods.[1,2]

1. Genetic enzyme deficiencies: certain individuals may have genetic predispositions to insufficient production or forming faulty digestive enzymes for certain food types. For example, a group of inborn errors that impair proper storage of glycogen. Glycogen storage diseases (GSDs) are characterized by hypoglycemia after short fasting periods.[4,5]

2. Nutritional status: malnutrition relates to insufficient access to energy from food and may explain depressed enzyme function due to insufficient building blocks to form the enzymes themselves. This is often the case for insufficient enzyme function in relation to the amount consumed. Overconsumption of certain foods can overburden or saturate the available enzymes and cause discomfort.

   Lactose intolerance is an example of a common lactase deficiency, and enzyme that quickly digests lactose in the small intestine so that little or no lactose reaches the colon. However, this intolerance is often dose dependent as many individuals are able to consume small doses of dairy containing lactose with no symptoms while larger doses yield significant symptoms.[5] These symptoms occur due to the fact that the lactose that was unable to be degraded is then fermented by the microbial flora producing gases causing bloating and flatulence and can cause loose stools and diarrhea.[5]

3. Functional digestive disorders (including pancreatic insufficiency, malabsorption, SIBO, intestinal permeability defects, bowel resection, food allergies, IBD and more): a number of inflammatory conditions can have indirect impacts on the enzyme functioning through inflammatory interference, and damage or clearance of enzymes. For example, short bowel syndrome is a malabsorption disorder that is caused by either the surgical removal of the small intestine, or due to the complete dysfunction of a large segment of the bowel. Many small bowel syndrome patients suffer from deficiencies in vitamins A, D, E, K and B12, folic acid and minerals calcium, magnesium, iron, zinc, which can manifest as anemia, easy bruising, muscle spasms, poor blood clotting and bone pain, all of which are due to the decreased colonic absorption of nutrients present in food.[5,6]

Research review for supplementation for exogenous digestive enzymes

A preliminary study published in 2009 offers a proof of concept relating to the gluten detoxification properties of two food-grade enzymes, aspergillopepsin (ASP) from Aspergillus niger and dipeptidyl peptidase IV (DPPIV) from Aspergillus oryzae. The study evaluated how efficiently these enzymes are able to hydrolyze gluten. ASP markedly enhanced gluten digestion relative to pepsin and cleaved recombinant a2-gliadin at multiple sites in a non-specific manner, further supplementation of ASP with DPPIV enabled detoxification of moderate amounts of gluten in the presence of excess casein. This makes it an ideal option for management of gluten and casein sensitivities[7].

Another example of exogenous enzyme supplementation is alpha-galactosidase, an enzyme that breaks down carbohydrates found in legumes, and cruciferous vegetables. In 2013 Di Nardo and his group investigated the role of alpha-galactosidase supplementation in pediatric patients with predominant gas-related symptoms[8]. Alpha- galactosidase is thought to reduce gas production following a meal rich in fermentable carbohydrates, by breaking them down before they can be metabolized by the colonic flora thus preventing the formation of gas. This randomized, double blind, placebo-controlled, parallel group study, enrolled 52 pediatric outpatients with gas-related disturbances (defined as at least once per week for at least 12 weeks). Patients received either placebo (n = 25) or α-galactosidase (n = 27) to children before every meal three times per day for two weeks. Outcomes for children were measured using a validated visual scale for children the Faces Pain Scale-Revised (FPS-R), adults and physicians also had to submit subjective assessments or reports to measure the degree of discomfort. After two weeks of supplementation the oral α-galactosidase (* continuation of their normal diet), improve gas-related symptoms in children and adolescents. These symptoms included belching, abdominal distention and of course passing wind. Symptoms improved within a few days, particularly in reduction of the severity and frequency of bloating and flatulence. Though it is important to notice that the effect did not persist this did not persist after subject stopped the treatment. Meaning that this treatment while helpful in managing symptoms does not correct the underlying cause of dysfunction.

In another clinical study published by Glade and colleagues in 2019, an enzyme combination containing the fungal carbohydrase's amylase, cellulase and lactase as well as lipase and bromelain (a protease found in pineapple) was given to bedridden nursing-home patients. Total digested protein concentration increased significantly, which means faster and higher availability of protein for absorption and use in crucial pathways required by the body.

So, is supplementing the answer?

Given that many symptoms of digestive discomfort arise from insufficient endogenous enzyme function, it stands to reason that digestion is improved through exogenous supplementation of such enzymes. When used appropriately enzyme supplementation can help improve the digestibility of many foods, which can improve nutrient absorption, and decrease or even eliminate many of the gastrointestinal complaints resulting from improperly digested food. The caveat of course being that supplementation needs to be "appropriate" meaning that the enzyme type, source, duration of supplementation, and adjunctive treatments must be considered.

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Fibre:

How it aids digestion

By Krista Powell

Eating a diet high in fibre is healthy and keeps the digestive system working smoothly. This isn't new information to most people. How and why fibre is enacting these positive effects might be less clear however. Fibre is a collective term to describe a diverse variety of plant parts that are resistant to breakdown by the enzymes in the small intestines, but undergo fermentation in the large intestines.

Soluble vs Insoluble Fibre

Not all fibres are the same. Soluble fibre is gel forming and found in foods like beans, oats, barley and pectin as well as guar and xanthan gums. These fibres are carried through the digestive system to the large intestine where they are broken down into useful nutrients. Because soluble fibre forms a viscous gel in the large intestine, it keeps stools from moving through too quickly and increases the absorption of vitamins and minerals.[1]

Insoluble fibres are derived from cellulose and are found in copious amounts in vegetables and cereal grains like wheat and corn. Water insoluble fibres help to regulate bowel movement by absorbing water and increasing bulk, softening stools and accelerating movement through the intestinal tract. The beneficial bacteria found in the colon use insoluble fibre as fuel to stimulate growth. They ferment the fibre to form short chain fatty acids that support the health of surrounding bowel and improve gut flora.

Full of Fibre

High fibre foods usually require more chewing, meaning it takes longer to eat a meal. Slowing down and being mindful of the food being consumed reduces the chances of overeating. It also increases satiety or the feeling of fullness. An added benefit of high fibre foods is that many are also lower in calories. Vegetables like broccoli, Brussels sprouts, carrots and kale are high in fibre, low in calories and full of vitamins and minerals. Eating fibre packed meals will mean eating slower, eating healthier and feeling full for longer.

Consuming more food than required puts unnecessary strain on the digestive system. It can also lead to constipation, bloating or cramping. Constipation can result in straining during bowel movements, which increases the risk of developing hemorrhoids. Being continually constipated can also weaken the pelvic floor muscles and put undue pressure on the bladder.

Incorporating More Fibre into Your Diet

When increasing fibre intake, be sure to do it gradually. While fibre is healthy, adding it to your diet all at once can lead to digestive upset and discomfort. The daily recommended intake for fibre is 25 grams for women and 38 grams for men.[2] Add some high fibre foods into your meal plan and work your way up to the ideal amount over time.

Here are some fibre friendly tips to keep in mind when grocery shopping:

- Choose whole grains whenever possible
- Beans, lentils and peas are great additions to soups and stews
- Substitute brown rice and whole-wheat pasta for the white varieties
- Nuts and seeds are an easy, high fibre snack
- Add lots of fruits and veggies to your cart
    - Passion fruit – 25 g/cup
    - Avocados – 13 g each
    - Raspberries – 8 g/cup
    - Acorn squash and green peas– 9 g/cup (cooked)
    - Collard greens and Swiss chard – 8 g/cup (cooked)
    - Artichokes – 7 g each
    - Apples – 4 g each
    - Mangos – 4 g each

These are just a few of the delicious, high fibre options available. It make take some time to find the right combination but there is a multitude of ways to add fibre to your diet. Take it slow, increasing fibre gradually and you'll be feeling the digestive benefits of a high fibre diet in no time.

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Icing Out Heartburn

By Brady Bateman

Almost everyone will experience heartburn at some point throughout his or her life. Typically described as a burning feeling within the chest, neck, throat and even the face, heartburn can often be a precursor to more serious health problems.

Symptoms of heartburn are typically made worse by bending over, lying down, or eating large meals and may leave a bitter taste in the throat and mouth. Discomfort caused by heartburn may spread in waves upwards into the throat and may cause problems swallowing, burping, nausea or bloating.

What Causes Heartburn?

Heartburn occurs when stomach acid and the contents of the stomach back up (reflux) into the esophagus, the tube, which leads from the throat to the stomach.

An incomplete closing of the valve (the lower esophageal sphincter, or LES) between the esophagus and the stomach typically causes reflux. When this valve is functioning properly, it closes when food leaves the esophagus and enters the stomach. Another cause may be a hiatal hernia, which happens when part of the stomach pushes through the diaphragm into the chest.

Certain foods may also play a role in promoting or worsening the symptoms of heartburn including:

- spicy foods
- citrus fruits
- tomato products
- fatty or fried foods
- peppermint
- chocolate
- alcohol

Other health conditions or lifestyle choices can worsen your heartburn, including

- spicy foods
- citrus fruits
- tomato products

The Bigger Picture

Mild heartburn normally occurs about once a month, with moderate heartburn occurring roughly once a week. Severe heartburn occurring every day may be a sign of a more serious issue.

Heartburn on its own is not a cause to worry, however, severe heartburn accompanied by symptoms such as bad breath, a hoarse voice, tightness in the throat and wheezing or a variety of other symptoms may be an indicator of a more serious problem such as gastroesophageal reflux disease (GERD). A persistent inflammation of the lining of the esophagus occurs in GERD and can lead to other health problems. Heartburn may also be related to an infection with Helicobacter pylori (*H. pylori*) bacteria.

There are a number of potential risk factors for the development of GERD, the most common of which being obesity and aging. The risk of GERD increases with age because of the body's natural loss of efficiency in carrying out normal digestive processes. Other risk factors for the development of GERD are

- having a hiatal hernia,
- pregnancy
- excess alcohol consumption
- smoking
- dry mouth
- asthma
- diabetes
- connective tissue disorders such as scleroderma

GERD Statistics

A recent systematic review showed that the prevalence of GERD is 18.1–27.8% in North America, 8.8–25.9% in Europe, 2.5–7.8% in East Asia, 8.7–33.1% in the Middle East, 11.6% in Australia, and 23.0% in South America.[1]

The highest numbers of GERD are observed in the USA (26.2%), Norway (26%) and Sweden (25.9). Different rates have been reported within these countries, but the differences were not significant. An interesting finding from the USA concerned different ethnic groups: the prevalence rates were 38% in Hispanics, 14.7% in Asians, 29.9% in Caucasians and 22.1% in African Americans.[2]

The rates of GERD worldwide are continuing to increase, as well as the number of studies which are monitoring the prevalence and severity of GERD and its related symptoms.

Conclusion

As the prevalence of heartburn and related conditions such as GERD continues to climb, it is important to understand how diet and lifestyle choices impact the severity and longevity of symptoms we may face. Speaking with a qualified health care practitioner is the first step in understanding the best ways to combat heartburn.

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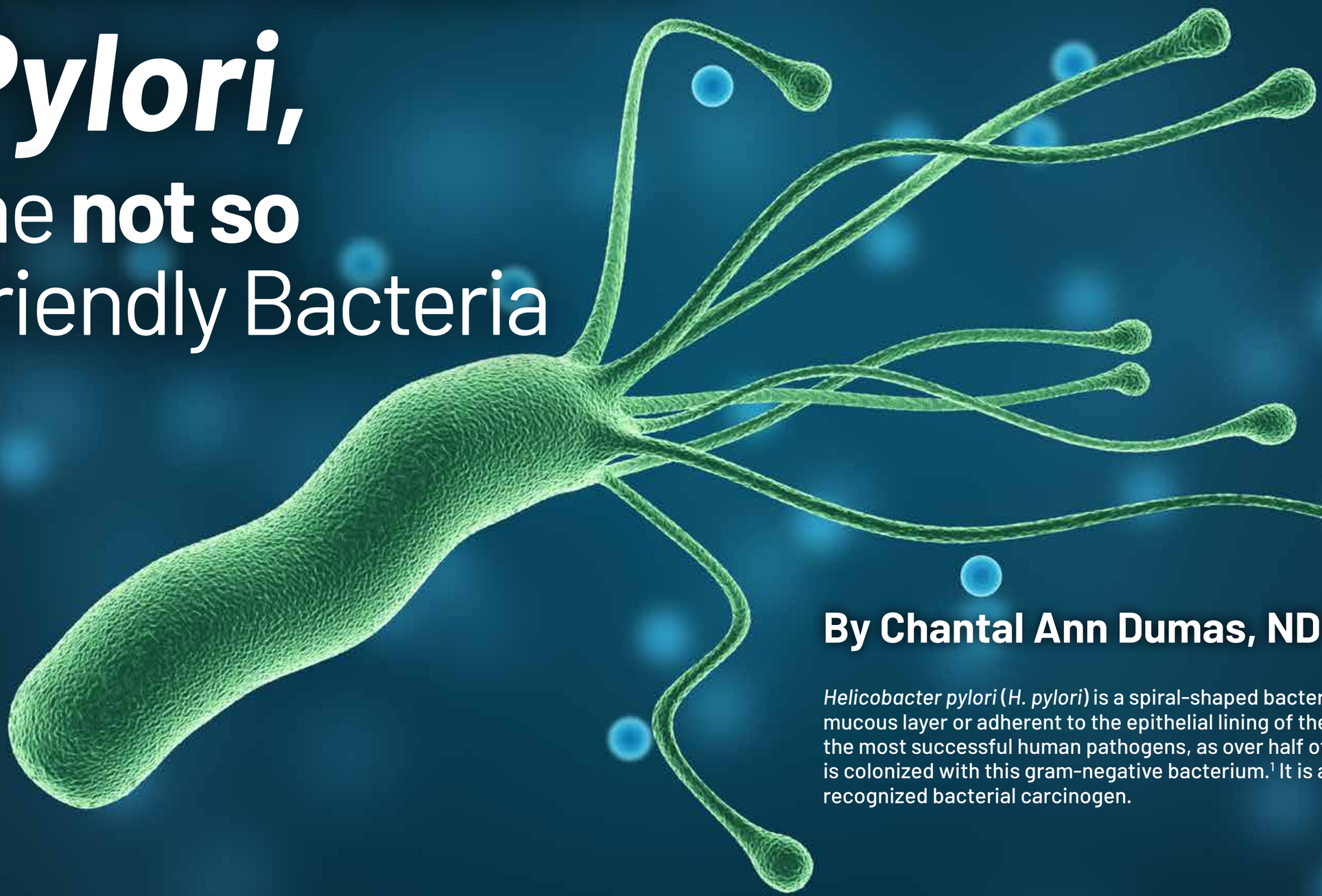
Helicobacter Pylori, the **not so** Friendly Bacteria



By Chantal Ann Dumas, ND

Helicobacter pylori (*H. pylori*) is a spiral-shaped bacterium found in the gastric mucous layer or adherent to the epithelial lining of the stomach. It is one of the most successful human pathogens, as over half of the world's population is colonized with this gram-negative bacterium.[1] It is also the first formally recognized bacterial carcinogen.

H. pylori. Infections

Unless treated, colonization usually persists lifelong and *H. pylori*. infection represents a key factor in the etiology of various gastrointestinal diseases, ranging from chronic active gastritis without clinical symptoms to peptic ulceration, gastric adenocarcinoma, and gastric mucosa-associated lymphoid tissue lymphoma.[1] Disease outcome is the result of the complex interaction between the bacterium and the host. Gastric acid secretion and immune gene polymorphisms (small genetic variations) largely determine the bacterium's ability to colonize a specific gastric niche in the host.[1]

According to data from the Centers for Disease Control and Prevention (CDC), these bacteria are accountable for up to 90% of duodenal ulcers and up to 80% of gastric ulcers.[2]

Other stomach problems associated with *H. Pylori*[2]

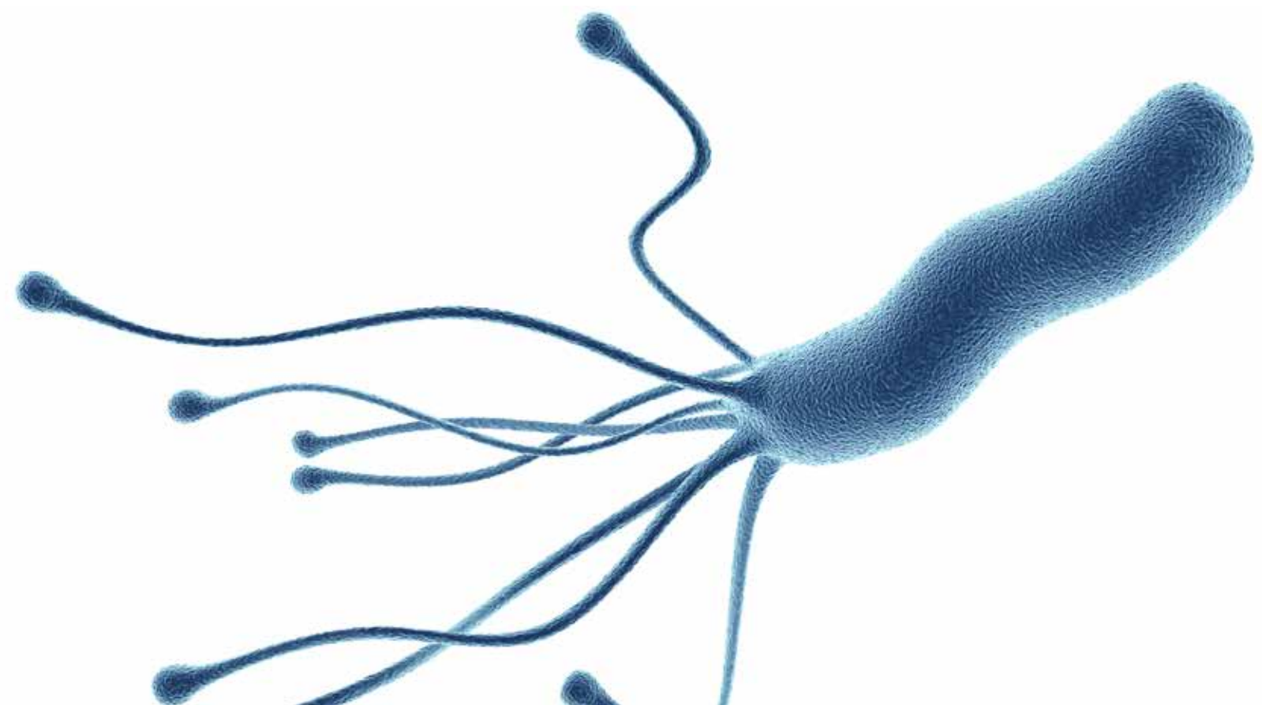
- Bloating
- Frequent burping
- Nausea
- Vomiting
- Burning pain in the abdomen
- Bleeding
- Loss of appetite
- Unexplained weight loss

Conventional Treatment

Therapy for *H. pylori* infection consists of 10 to 14 days of antibiotics in conjunction with gastric acid suppression by H2 blocker or proton pump inhibitors. However, negative side effects such as nausea, diarrhea, and loss of appetite associated with this regimen can lead to patient's noncompliance.[2] The increase in antibiotic resistance is also starting to affect the efficacy of treatment.[1] According to the CDC, these are the two major reasons for treatment failure.[2] Current anti-H. pylori therapy fails in more than 20% of cases.[3] As a result, interest in natural eradication of *H. pylori* is growing.

Top Three Natural Options

Many in vivo and in vitro studies on natural *H. pylori* treatments have been done. Natural therapies have been shown to maintain low bacterial levels and are proven useful in preventing the adverse effects of antibiotics, modulating the immune response, gastroprotection, and the general promotion of health.[3]



1. Probiotics

The direct role of probiotics in the treatment of gastrointestinal infections is increasingly being documented as an alternative or a complement to antibiotics, with the potential to decrease the use of antibiotics or reduce their side effects. Probiotics have natural advantages, such as safety, immunomodulation, and antipathogen ability, and are often used to treat gastrointestinal diseases alone or in combination with conventional drugs.

Most probiotics are deemed to colonize the human gut, and certain species, such as *Lactobacillus spp.*, can colonize the human stomach, directly or indirectly antagonizing *H. pylori*. It has been reported that taking probiotics alone can diminish bacterial load, whereas using probiotics along with antibiotics can improve the eradication rate and alleviate side effects and restoring the gastrointestinal microbiota.

Among the different probiotic options, Lactobacillus-containing and *Bifidobacterium*-containing probiotic compound preparations are well-documented. Recently, some *Lactobacillus strains* (*L. gasseri Chen* and *L. plantarum*) have been reported to be able to inhibit *H. pylori* adherence to gastric epithelial cells. The *L. acidophilus*, rhamnosus and plantarum species have also exhibited interesting benefits.[4]

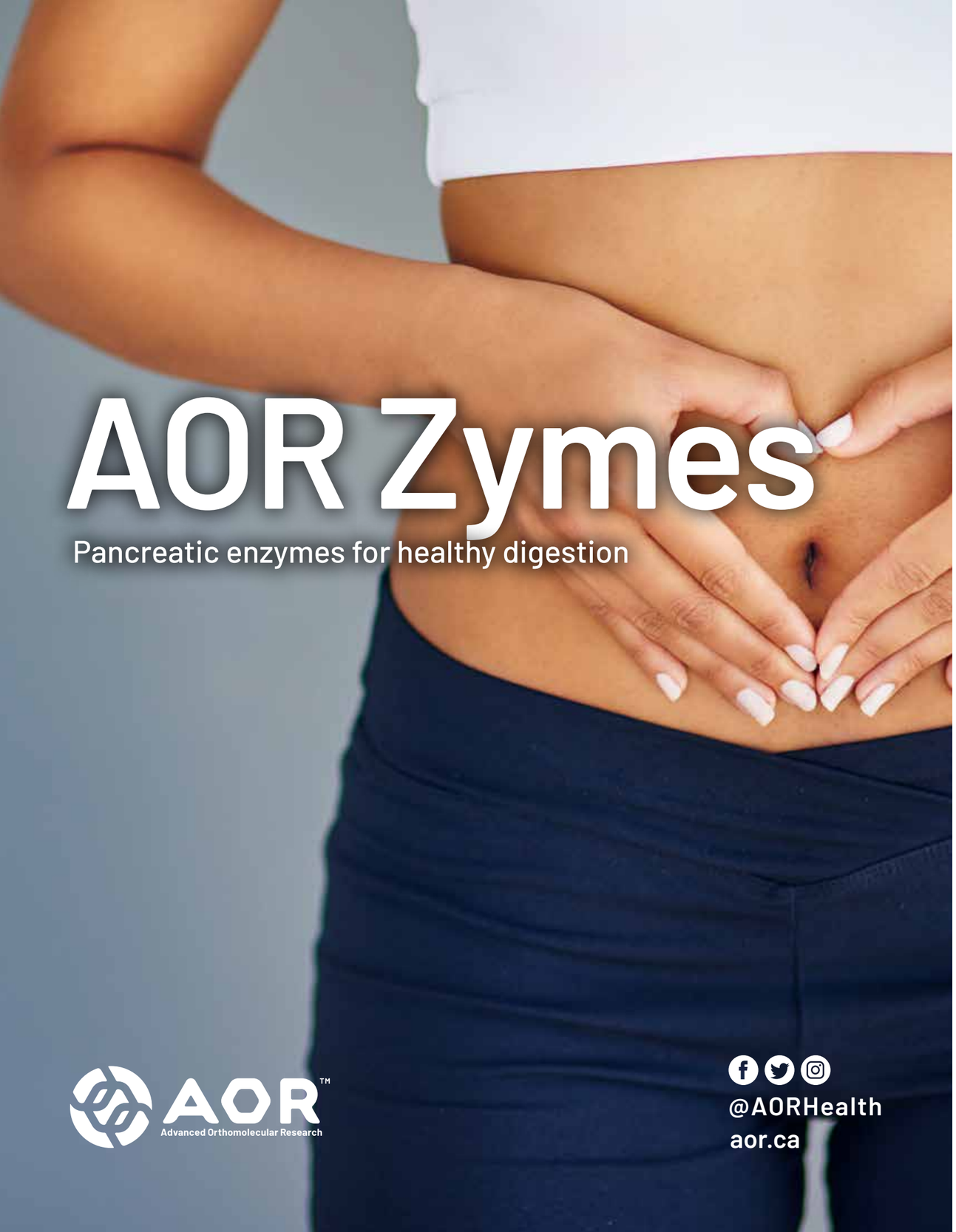
Bifidobacterium is another favourite genera used for the prevention of gastrointestinal infection.[4] *Bifidobacterium* exerts an in vitro anti-*H. pylori* effect and inhibits adhesion to the mucosa by competition.[5] Several studies have demonstrated a direct relationship between various probiotic strains and the in vitro inhibition of *H. pylori* growth. Amongst them, *Lactobacillus acidophilus*, *Lactobacillus casei* strain Shirota, and *Bacillus subtilis* exhibit an antagonistic effect on *H. pylori*.[5]

Several mechanisms have been hypothesised based on in vitro studies of host intestinal epithelial or immune cell responses to probiotic strains. Probiotic bacteria can inhibit *H. pylori* by either immunological or non-immunological mechanisms.[5] Among these mechanisms, probiotics can reduce the release of inflammatory factors by regulating the local immune response of the host.[6] Th1-type cytokines tend to produce the proinflammatory responses responsible for killing intracellular parasites and for perpetuating autoimmune responses.[7] There is in vitro evidence that probiotics dampen the Th1 response triggered by *H. pylori*.[6] Probiotic bacteria also attenuate *H. pylori* associated hypochlorhydria and secrete bacteriocidal metabolites that inhibit or kill *H. pylori*, or compete with the bacteria for the adhesion site on gastric epithelial cells.[1] In prospective human studies, probiotic monotherapy effectively decrease *H. pylori* density and it has also been shown to eradicate the bacteria in up to 32.5%, although subsequent recrudescence is likely, according to the authors.[1]

Traditional *H. pylori* eradication therapies have shown efficacies below 80% in several studies, and their use has been accompanied by antibiotic-related side effects. Some recent studies have reported that supplementing standard therapies with probiotics can improve the efficacy and tolerability of Helicobacter pylori eradication therapy.[8]

Though utilization of probiotics alone does not lead to the eradication of *H. pylori*, a growing body of recent evidence suggests that regular intake of probiotics suppresses the *H. pylori* infection in humans, maintaining lower levels of this pathogen in the stomach.[9] Based on the results of meta-analysis, different authors have concluded that probiotics could not be recommended to be used as a single agent for eradication therapy. However, their use associated to standard treatment as an adjunct will improve the eradiation rates and decrease treatment-related side effects.[10] Diarrhea in particular was significantly reduced in subjects receiving adjuvant probiotics, compared with controls.[11]

Regular and long-term intakes of probiotic may have a favorable effect on *H. pylori* infection in humans, particularly by reducing the risk of developing disorders associated with high degrees of gastric inflammation.[12]



2. Bovine Lactoferrin

Lactoferrin (Lf) is an iron-binding glycoprotein found in high concentrations in milk and in several mucosal secretions such as saliva and tears. Lf is also at high concentrations within a type of white blood cells called polymorphonuclear leukocytes.[13] This amazing molecule is an important factor in the host defense against a wide range of gram-negative and gram-positive bacteria.[14] Two different mechanisms appear to be involved in the antibacterial action of Lf at the mucosal surface. First, the high iron-binding affinity of the protein causes a bacteriostatic effect by depriving bacteria that require iron as an essential growth nutrient.[15] Secondly, Lf has been shown to directly damage the outer membrane of gram-negative bacteria by causing the release of its lipopolysaccharides and altering its permeability.[16]

3. *Pistacia lentiscus* (Mastic gum)

Pistacia lentiscus is an evergreen shrub uniquely cultivated in southern Chios (Greece) and known as Chios mastic gum (CMG). It has been used as a traditional medicine over the last 2500 years. More than 120 chemical compounds have been identified in the resin and several plant extracts and compounds have been studied for their antibacterial, anti-inflammatory, antioxidant, antiulcer, antidiabetic, cardioprotective and anticancer properties in vitro and in vivo.[17] In 2015, Pistacia lentiscus resin was recognized as a herbal medicinal product with traditional use in mild dyspeptic disorders by the European Medicines Agency (EMA).[18]

In a 2009, randomized, pilot study, the researchers studied the effect of pure mastic gum on *H. pylori* eradication in patients suffering from an infection confirmed by a urea breath test (UBT). 52 patients were randomized in four groups Group A (1,050 g of CMG per day for 14 days), Group B (3,150 g of CMG per day for 14 days), Group C (1,050 g of CMG plus 40 mg of pantoprazole per day for 14 days) and Group D (40 mg of pantoprazole plus 2 g of amoxicillin plus 1 g of clarithromycin for 10 days). *H. pylori* eradication was tested by a UBT five weeks after completion of the eradication regime. Eradication was confirmed in 4/13 patients in Group A and in 5/13 in Group B. No patient in Group C achieved eradication whereas 10/13 patients in Group D had a negative UBT. All patients tolerated CMG well and no serious adverse events were reported. The researchers concluded that Chios mastic gum has bactericidal activity on *H. pylori* in vivo.[19]

Conclusion

H. pylori is a widespread and lifelong infection which can cause discomfort and has the potential to evolve in serious diseases when remained untreated. Conventional treatment regimes involving antibiotics are associated with side-effects leading to compliance issues and antibiotic resistance and thus, are not fully effective. Natural options such as probiotics combinations, bovine lactoferrin and Chios mastic gum are well documented, safe, and effective options. These natural supplements have complementary mechanisms of action so they can be combined for a synergistic effect or taken as adjuncts to conventional drugs.

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Take the **Gall** out of

Gallstones

By Cassy Price, BBA

Your gallbladder is a small organ below the liver in the upper right abdomen. It houses a digestive fluid called bile that's released into your small intestine when you eat fats. The bile is released into the first part of our small intestine called the duodenum. This is where most of the digestion happens. The bile helps to process and digest the fats.

Gallstones are hardened deposits of digestive fluid that can form in your gallbladder. They can range in size from as small as a grain of sand to as large as a golf ball. Although it is not 100% clear what causes gallstones, there are a few potential reasons:

Other stomach problems associated with *H. Pylori*[2]

1. Excess cholesterol in bile: having too much cholesterol in your bile can lead to yellow cholesterol stones that may develop if your liver makes more cholesterol than your bile can dissolve.

2. Excess bilirubin in bile: bilirubin is a chemical produced when your liver destroys old red blood cells, however, some conditions can lead to your liver producing excess bilirubin resulting in pigment gallstones. These hard stones are often dark brown or black.

3. Dysfunction of the gallbladder: in order for your gallbladder to be healthy and function properly, it needs to empty its bile completely. If this doesn't happen, the bile becomes overly concentrated and can lead to stone development.

Roughly 80% of gallstones are made of cholesterol, with the other 20% being made of calcium salts and bilirubin.

Lifestyle Impact

Some risk factors for gallstones are uncontrollable such as age, race, gender and genetic predisposition. According to the Canadian Liver Foundation, gallstones occur in up to 20% of Canadians by the age of 60, with women between the ages of 20 and 60 being three times more likely to develop gallstones than men. Why are women at a greater risk? It is because of their hormone levels. Estrogen increases cholesterol in the bile, and progesterone slows the emptying of the gallbladder.

However, many risk factors are related to diet and lifestyle choices. Factors such as excess weight or rapid and excessive weight loss, eating a diet high in fat or low in fibre and blood sugar imbalances can all influence the development of gallstones.

Supporting Your Gallbladder

Supporting your liver and gallbladder function can help to reduce your risk of developing gallstones. Some of the things you can do include:

- Adequate fibre intake: it is recommended women take in 25 grams and men get 38 grams of fibre per day. You can do this by increasing your intake of fibre rich foods such as fruits and vegetables, legumes, nuts and seeds. You may also look at including a supplement like AORs Solufibre in your daily routine to support your diet.

- Regular exercise: gallstones are associated with a sedentary lifestyle, which means increasing your daily activity level can help to minimize this risk factor. It is recommended that you get at least 150 minutes of physical activity per week to prevent weight gain and improve your health. That is just over 20 minutes a day!

- Reduced fat intake: poor eating habits and consuming foods high in sugars and fats can contribute to gallbladder disease and gallstones. Increasing nutrient-rich foods in your diet while reducing processed and fried foods may improve gallbladder function and prevent complications.

- Detoxification support: the liver and gallbladder are both detoxification organs that work hand in hand during the digestive process. You can help to support their function with herbs such as:

    - Milk thistle: an herb that protects and regenerates the liver, has been used medicinally as a traditional remedy for over 2000 years. While it may support the liver and gallbladder, there are no studies evaluating its effects on gallstones.

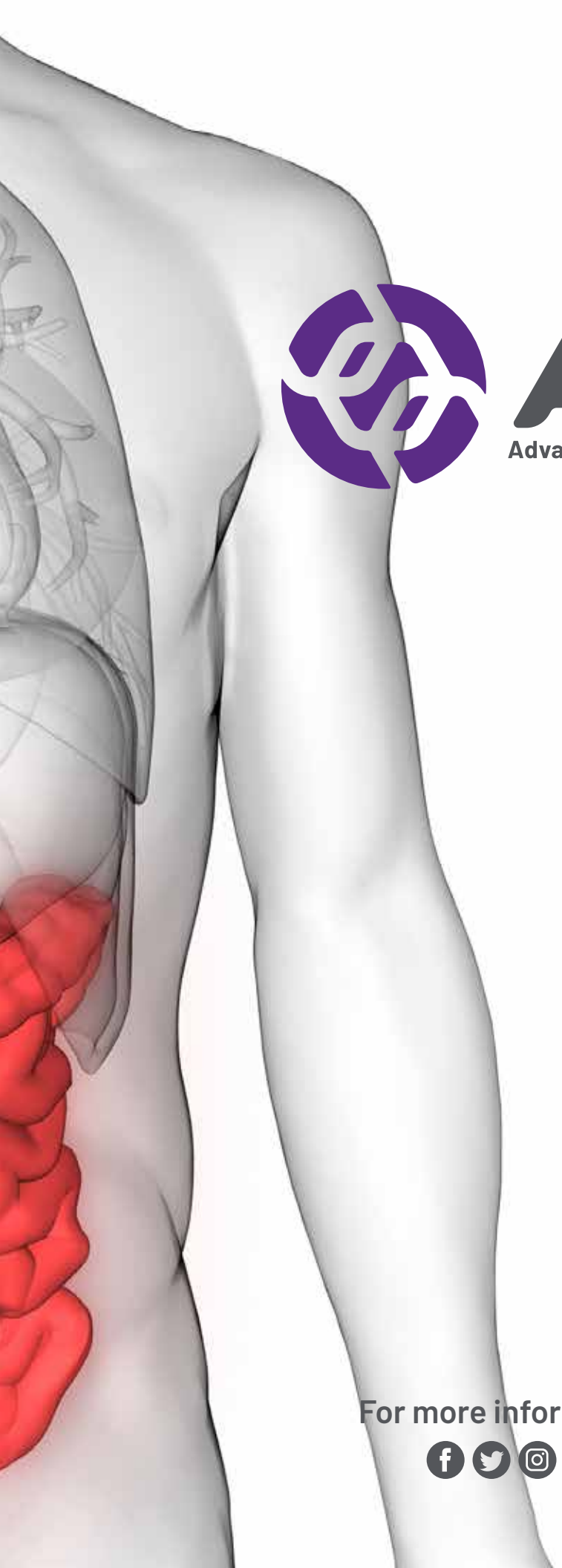
    - Chanca Piedra: modern clinical trials have suggested that this herb promotes the flow of bile through the gallbladder to help reduce the incidence and severity of gallstones.

    - Curcumin: the combination of curcumin and piperine has been found to prevent the development of gallbladder stones in one study, lowering the saturation of blood lipids and cholesterol in bile.

    - Magnesium: Magnesium can be a helpful component for the emptying of your gallbladder. Magnesium deficiency has been associated with alterations in cholesterol levels and insulin hypersecretion, which can lead to formation of gallstones.

- Acupuncture: may help relieve some of the pain from gallstones by reducing spasms, easing bile flow, and restoring proper function. More research is needed to specifically look at the benefits of acupuncture for the treatment of gallstones.

Not all gallstones require intervention. Gallstones that cause no symptoms typically require no treatment and many times go undetected. If you have gallstones that require treatment, it is best to discuss your options with a qualified health care professional.



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