

“Death begins in the colon”  
– British Medical Society

Useful Tips

for Proper

Digestion

and

Relief from

Constipation

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# Digestion & Elimination

Except for the common cold, digestive problems are the most common reason people seek medical advice. They are the third largest category of illness in the United States ... For many of us, disease and death do begin in the digestive system. [Elizabeth Lipski in *Digestive Wellness*]

Material for the human body is furnished by foods. But foods cannot be assimilated directly into the human system. To penetrate the cell membrane barrier, they need first to be broken down into simpler and smaller units. The digestive system through an elaborate and synchronized process accomplishes conversion of foods into absorbable nutrients & their subsequent assimilation. Expulsion of undigested material as well as the elimination of wastes is also a function of the digestive system. The ancient science of life, *Ayurveda*, since antiquity has assigned primary importance to proper functioning of the digestive system. No matter which ailment one may be suffering from, a *vaidya* (ayurvedic doctor) will invariably inquire first about diet & digestion.

Digestive malfunction is directly responsible for a host of acute and chronic diseases, viz. gastritis, peptic ulcers, vomiting, pancreatitis, constipation & diarrhoea, gallbladder stones, malabsorption of nutrients, and the life-threatening stomach & colon cancers. Within the last few years many new health books have appeared in the marketplace emphasizing the importance of the digestive system and modifying the adage, ‘you are what you eat’ to ‘you are what you eat, digest and assimilate’.

Since the digestive system is the conduit through which the body receives nourishment for maintenance, growth,

repair, and energy to operate its myriad functions, any malfunction also affects other systems of the body. Constipation, for example, can induce even such mind-altering states as sluggishness and depression.

The term ‘digestive system’ in addition to digestion, also includes the processes of absorption of nutrients in to the circulatory system and the lymph, and elimination of wastes & undigested food. ‘Digestion’ by itself, though, is typically used to denote the mechanical and chemical breakdown of food into simple molecules which can be absorbed and worked upon by the system.

### Functioning of the Digestive System

Many organs conjointly form a tube called gastrointestinal tract (GI tract) or alimentary canal through which the food is moved and processed. Along the way, secretions from many supporting organs are emptied into the GI tract to aid the digestive process.

Mouth: Food is mechanically pulverized by the action of teeth in the oral cavity and lubricated with secretion from the salivary glands. An enzyme, amylase, in the saliva begins the process of chemical breakdown of food by acting on sugars and starches.

Stomach: Food passes through the tubular structures pharynx & oesophagus into the stomach where breakdown of starches continues until the secretion of hydrochloric acid by the stomach lining increases the acidity and lowers the pH below 4.5 [a measure of acidity and alkalinity; please see later in this chapter for an explanation of pH]. The main activity carried out in the stomach is the breakdown of proteins into smaller fragments by the enzyme pepsin in a highly acidic environment. Except for some water and salts, little absorption occurs in the stomach, for the food has not

been converted to small enough units yet.

Small Intestine: Two or more hours later the chyme (as the partially broken mixture of food is now known) begins entering the small intestine where secretions from pancreas, liver, and gall bladder continue the digestive process. The environment is now alkaline, that is pH is higher than 7, essential for the effective action of pancreatic enzymes. These act on truncated proteins, carbohydrates and fats and convert them to such small fragments that they can be finally split into nutrient molecules by enzymes present in the lining of the small intestine itself. Over 90% of the nutrients are absorbed in the small intestine and enter the circulatory system or the lymph.

Large Intestine or Colon: Food residue on reaching the large intestine is worked upon by the beneficial bacteria which abide in the colon. In deriving sustenance from this seeming waste, the bacteria release the remainder of nutrients. These along with excess water and salts are then absorbed by the system. The waste material passes in to the rectum as faeces.

There are two major functions of the digestive system: DIGESTION including assimilation and ELIMINATION. Both are discussed below.

## Digestion

Among nutrients from the food, three require elaborate processing before their assimilation into the system becomes possible. Complex carbohydrates (thousands of simple carbohydrate units bonded together) have to be broken down into separate sugar (glucose, fructose, lactose, etc.) units before they can cross the membrane barrier of the absorbing cells. Similarly, proteins – chains of thousands of amino

acids – need to be truncated to afford individual amino-acids for assimilation. Lipids too, are clipped into smaller fragments before absorption. The chemical breakdown of complex molecules of food is accomplished by the action of a special class of biochemical compounds called enzymes.

## Enzymes

It is certain that no factory fabricated by man has so far come even close to the complexity, intricacy, and efficiency of the human body. Thousands of chemical reactions are incessantly taking place in a live system. To carry out most of these reactions in a modern laboratory would require enormous resources in terms of energy, reagents, and time. The enzymes accomplish myriad reactions extremely fast in the controlled environment of the cell. Enzymes are protein molecules manufactured by living cells and belong to a class of compounds collectively known as catalysts, that is, they facilitate reactions but don't get permanently altered. Enzymes catch hold of molecules in such orientation that assembly to larger molecules or breakdown to smaller entities becomes possible. Enzymes can be thought of as the artisans who carry out the actual work in all the thousands of chemical reactions for growth, maintenance and repair within the body. Some 80,000 or more of these enzyme-systems, each of which is extremely efficient in typically promoting one specific reaction, are already known and more are still being discovered.

The term 'enzyme-system' is oft used to denote the fact that in addition to the protein-enzyme itself, smaller molecules, such as vitamins and minerals, are also needed as co-artisans before reactions can actually occur. Enzyme activity is quite sensitive to environmental factors such as

temperature, pH, concentration, and reaction medium. They work optimally within a specific range of each of these factors and their activity is reduced, sometimes drastically, outside these ranges. Some of these factors are considered below to illustrate this dependence and to highlight conditions that foster better digestive action.

### pH explained

pH is a scale to measure acidity or alkalinity (also known as basicity). All reactions at molecular level in the body are determined, facilitated or inhibited by the acidity or basicity of the medium. Most enzymes are pH specific, that is, they will work at specific concentrations of acid or base and be sluggish or totally inactive at others. Therefore a basic understanding of the chemical concept of acids and bases is helpful for healthy living.

Pure water is electrically neutral, for the very small but equal number of positively and negatively charged ions present therein cancel out each other's electric charge. By convention, a fluid with an excess of positively charged ions is called an acid, and an excess of negatively charged ions makes a fluid basic.

How acidic or basic is a medium? Scientists have devised a scale, the pH scale, from 0 to 14, to specify the degree of acidity or basicity of a medium. Neutral water has a pH of 7. Numbers above 7 denote that the medium is basic and increasing numbers towards a peak of 14 signify greater basicity. Numbers below 7 signify acidity and *decreasing* numbers towards zero mean greater acidity. That is, in pH scale increasing numerals 0–14 signify: greatest acidity at 0 – neutrality at 7 – to greatest basicity at 14. The pH scale is similar to the Richter scale (for denoting the intensity of earthquakes) in as much as both are logarithmic

scales. An earthquake with a measurement of 5 on the Richter scale is *10 times* more severe than the one of 4! It is the same with the pH scale. A liquid with a pH of 4 is 10 times more acidic than a liquid of pH 5. Or, a fluid of pH 9 is ten times more basic than a fluid of pH 8.

As an example of enzyme activity dependence on pH, consider the digestive enzyme amylase, a constituent of saliva. Amylase splits complex carbohydrates optimally between pH 6.7 – 7.5 (i.e. slightly acidic to slightly basic) within the oral cavity. It can continue to function in the stomach, albeit sluggishly, until pH drops to 4.5. Activity of amylase ceases below pH 4.5.

Digestion of proteins is a laborious process for the body. The protein splicing enzyme pepsin functions optimally at the very acidic pH of 1.5 – 2.5 in the stomach; at higher pH its activity drops precipitately.

**Temperature:** Most enzymes function optimally at or slightly above the biological (in this case, body) temperature of 37<sup>o</sup> Celsius (98.6<sup>o</sup>F). Therefore, cold and chilled liquids consumed with meals can lower the temperature in the stomach sufficiently to make the enzyme activity sluggish and therefore result in indigestion, etc., in the short-run and myriad chronic problems in the long run. This might be one reason why an otherwise nutritionally correct diet may end up providing inadequate amounts of nutrients. The tradition of sipping warm or hot beverages with or immediately after meals might have entered the folk wisdom perhaps from the observation that it improved digestion. From what we know today of the process of digestion, this can of course be ascribed to a boost to enzymatic activity.

**Concentration:** Food mixed with saliva enters the stomach wherein much digestive activity takes place. Too

little fluid in the GI tract will hamper thorough mixing of enzymes with the food-paste. Too much liquid will lower the concentration of enzymes and acid thereby retarding the enzyme activity at the active sites. It is therefore advisable to intermittently sip moderate amount of fluid with meals to ensure thorough mixing.

Spices: are they bad for you?

Much debate about the merit of spices goes on the world over. A blurb in *Newsweek* of November 24, 1997 reported that Americans bought a whopping 40% of worldwide sales of indigestion medicines in 1997, and wondered whether this national sickness was due to millennial angst or consumption of spicier foods, implying that spices may lead to indigestion. Actually, American indigestion may not be due to spices at all but might well be a consequence of excessive consumption of meat, cold liquids including carbonated beverages, processed foods, and overeating.

One of the tenets of healthy eating, is 'Eat Local'. It has always been a matter of seeming contrariety as to why the spices (which generally have a heating effect in the body) grow in hot climates and why people in those regions consume them. Some nutritionist suggest that consumption of spices such as chillies, ginger, cinnamon, black pepper, cloves, etc., cools the body down by evaporation of sweat. This may indeed be one of the reasons for the consumption of spices in hot climes, but I believe it is not the primary factor.

In cold countries, much energy is needed to maintain a constant body temperature. The digestive fire of the body furnace is therefore strong in order to sustain a high energy output. In tropical countries, on the other hand, with higher ambient temperatures, the body is typically striving to cool



down the system. Which in Ayurvedic terminology would mean that the digestive fire, *vaishvanara*, is weaker in hot climes. It is an observable fact that even in tropical countries, people experience good appetite during winter, and individuals in cold countries experience sluggish digestion and weaker appetites during hot summer season.

In tropical countries, spices are believed to stoke the weaker digestive fire and to stimulate production of digestive juices. This means that resorting to cold, bland, uncooked foods and chilled beverages during hot weather or climate will place greater strain on the system and may lead to indigestion and disease. Cooked, that is partially broken down, food actually is easier on the system if the digestion is weak. [Susan E. Brown, Ph.D., *Better Bones, Better Body*, New Canaan, CT: Keats Publishing 1996, p 269]

This hypothesis also provides an explanation for the fact that spices grow and are a part of the diet in hot climes. As examples one could cite the fiery foods of Mexico & southeast Asia, famous curries of the Indian subcontinent, and sharp spicy food of Southern China? Jung Chang in her informative book about the Chinese cultural revolution years writes, “Aunt Jun-ying cooked delicious spicy Sichuan food, which is quite different from the *bland northern food* [italics added]”, [Jung Chang, *Wild Swans: Three Daughters of China*, London: Flamingo imprint of Books division of Random House 1976, p 274] underlining the fact that even in the same country, the nearer to equator one lives geographically, the spicier the food gets. Sichuan is one of the southernmost provinces of China.

Prof. S.I. Rizvi and Mr. P. P. Srivastava of Allahabad University Department of Biochemistry in India found that higher consumption of chillies was beneficial for human physiology. [*The Times of India*, 19 August 1999] A study by scien-

tists at the prestigious Cornell University in New York found “that populations which enjoy a wide range of spicy foods tend to live longer than those on milder diets. This ... could be due to the antibacterial qualities some spices ... such as garlic, onion, cinnamon and cumin ... include cloves ...” [*The Sunday Times of India Review on Health & Fitness*, 6 February 2000] Perhaps a better digestion with help of the spices may also be responsible for this salubrious effect.

### Guidelines for good digestive function

\* Thorough chewing pulverizes food for better mixing and breakdown, aids digestion of starches by action of higher quantity of saliva enzyme, and keeps the teeth, gums and jawbone healthy by providing exercise.

\* Chilled beverages and cold foods are harder to digest as they retard the action of enzymes. Conversely warm liquid taken in moderate quantity with the meal ought to boost enzymatic activity.

\* Sitting down peacefully to eat meals avoids heartburn, acidity, indigestion, and ulcers.

\* Frequent overeating may permanently weaken the digestive system by placing excessive stress. Besides, superfluous nutrients get converted to fat and lead to obesity.

\* Proteins are the hardest food to digest. Unlike other nutrients, they require enzymes which work in a strong acid medium which over time can be injurious to the tissues of the stomach. Also with age, protein digestion may become sluggish due to retarded production of acid. Excessive protein intake should therefore be avoided.

\* Spices such as cumin, coriander, pepper, ginger, etc. are an aid to the digestive process. They presumably work by stimulating stomach, liver, and pancreas to secrete adequate amounts of digestive enzymes.



\* For good digestion, Ayurveda, the ancient system of medicine of India recommends, after a meal: sit for 10 minutes, if feasible, in *vajrasana* (see picture for the posture); walk for 10 minutes and; lie down on the left side (this aids breathing through the right nostril, stoking the digestive fire, *Vaishwanara*) for 10 minutes.

# Elimination

The colon is a sewage system, but by neglect and abuse it becomes a cesspool. When it is clean and normal we are well and happy; let it stagnate, and it will distill the poisons of decay, fermentation and putrefaction into the blood, poisoning the brain and nervous system so that we become mentally depressed and irritable; it will poison the heart so that we are weak and listless; poisons the lungs so the breath is foul; poisons the digestive organs so that we are distressed and bloated; and poisons the blood so that the skin is sallow and unhealthy. In short, every organ of the body is poisoned, and we age prematurely, look and feel old, the joints are stiff and painful, neuritis, dull eyes and a sluggish brain overtake us; the pleasure of living is gone. [[http://www.gpact.org/death\\_begins\\_at\\_the\\_colon.php](http://www.gpact.org/death_begins_at_the_colon.php)] (retr 21 Dec 2020)

“Death begins in the colon” warns the British Medical Society [David & Anne Frahm in *Healthy Habits*, Putnam 1993]. The importance of efficient elimination of the body wastes (mostly by-products of energy cycle, aged dead cells and metabolic by-products, undigested & unabsorbed food, fluids maintaining balance of water and electrolytes) can hardly be overstated. Body wastes, if not removed, poison the whole system. Even a machine, for instance a car, will not work properly if wastes accumulate. Of the elimination problems, incidence of chronic constipation is alarmingly high in all societies. This problem is so rampant in the United States that Americans spend as much as \$500 per capita on laxatives annually.

Constipation can be caused by many factors including anxiety, processed foods, sedentary life style, lack of adequate sleep, etc.

Following are some suggestions and guidelines to overcome this debilitating condition:

1. Some people benefit merely by increasing fruits and raw vegetables in their diet.

2. Should you be one of those who do not benefit from a bigger vegetable & fruit regimen, an increase of whole grain breads, unleavened bread, whole grain pasta, brown unpolished rice, and pulses [beans, peas, lentils] in your diet may be of significant help.

3. Chew the food well. An ancient saying asserts: ‘Eat liquids and drink solids’. To form this salutary habit, children used to be told to masticate each morsel of food 32 times. Chewing pulverizes food in to fine particles and facilitates the action of enzymes in chemical breakdown of food.

4. Avoid too much liquid with meals. Sip liquid, preferably water, in small quantity at intervals rather than drinking all at the end.

5. Enzymes break down food to the absorbable constituent molecules. They generally function best at the biological temperature, i.e. 37 degree Celsius (98.6°F) or slightly higher. Sip half a glass of warm or hot water with your meal to aid their action.

6. A squatting position on Indian-style toilet (also known as: Squat Toilet, Asian Toilet, Turkish Toilet) facilitates bowel movement. In squatting posture, thighs press the abdomen, which results in internal pressure on the colon, and the ankles exert put pressure on the hips and rectum, to facilitate expulsion of wastes. “It is believed that certain constant pressure on the abdomen sometimes activates the peristaltic reflex [the contractions of the intestines which move the waste matter to the rectum] and causes renewal of the desired habits of elimination”. [J.E. Rodale, ed.,

*Encyclopedia of Common Diseases*, Emmaus, Pennsylvania: Rodale Books, Inc., 1973, p 623]

Experts also point out that squatting provides the anorectal tube a better orientation for elimination of the wastes. In the United States, suppliers now run ads in health journals offering contraptions which used in conjunction with the Western style toilet can provide a comfortable squatting seat.

Additional advantages of a squatting seat include better hygiene, since no part of the body need touch the toilet seat, and strengthening of the muscles, tendons, and cartilages of the complex knee joint.

7. Lying flat on your abdomen for the last part of sleep will help generate an urge to eliminate by exerting pressure on the colon.

8. Drinking a glass or two of cool or warm water (experiment for yourself) immediately after getting up initiates an urge to eliminate. If the urge is not immediately apparent, walk for a few minutes or sit in *vajrasana* (see picture towards the end of 'Digestion' section).

9. Do not delay going to the toilet once you get an urge to do so. One of the most frequent causes of chronic constipation is the habit of suppressing this urge, typically indulged in by late-nighters.

10. Walking 4-6 Kms. daily is one of the best remedies for even chronic constipation. Needless to say, it is of course an excellent tonic for general health as well.

11. Drink a cup or glass of warm whole milk half to one hour before going to bed. Do not eat anything.

12. If needed, a dose of the homeopathic medicine *Nux Vomica* x30 at bed time will facilitates elimination. Consult a homeopath for how often can this be taken.

## Constipation: Summary of easydo routines for relief

1. Eat lots of whole grain foods such as bread, pasta, etc. Limit intake of oils and butter. Eliminate or minimize processed foods in diet.
2. Chew well.
3. Moderate amount of liquid (warm or hot water is excellent) to be sipped with the meal.
4. Avoid cold foods, and no cold liquids with meals.
5. Walk 4-6 kms. a day, part in the morning, if feasible.
6. Drink a glass of water just before going to sleep.
7. Before leaving the bed, lie for some minutes on the abdomen.
8. Drink a glass or two of normal or warm water after getting up. Walk until 'have to go'.
9. Use *Indian*-style toilet.
10. Respond to the urge to eliminate ASAP.
11. A cup of warm whole milk 0.5–1 hour before bed time.
12. Nux Vomica x30 at need.

## Aspiration

विश्वं पुष्टं ग्रामे अस्मिन्ननातुरम् ॥

– *Yajurveda* 16:48

In this village [global village],  
may all sentient beings be robust and healthy