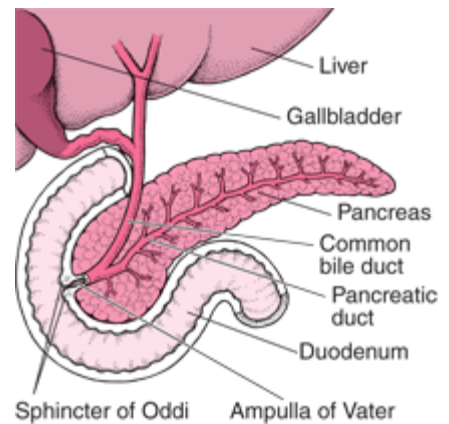


# WHAT DO YOU KNOW ABOUT ENZYMES?

By John Appleton

In 2008 I read a book 'THE MISSING NUTRIENT' which focused on a very often overlooked aspect of nutrition that is just as important as the vitamins and minerals that sustain us. The book was about enzymes (proteins) which function as biological catalysts that breakdown the foods that we eat so we can benefit from the nutrients they contain. Enzymes are required for every single chemical reaction that takes place in the body, thus they have a very significant role in our health. It is likely that in the not too distant future they will be used therapeutically for preventing and treating many common chronic illnesses including cancer, heart disease, arthritis and even neuro-developmental conditions.



Scientists have identified at least 3,000 enzymes that are active in the human body but in this article we are going to look at those which are important for digestion. It's important to remember that in the western world most visits to a doctor are in some way related to digestive disorders. It is estimated that in America 100 million people are affected by digestive disorders. Digestive disorders are responsible for more hospitalizations than any other category of medical problems in the United States and it is likely to be much the same in New Zealand. When we think of what Hippocrates said 2,500 years ago "*All disease begins in the gut*" the relevance of a properly functioning digestive system is obvious. There are three main classes of digestive enzymes – Amylases digest carbohydrates/starches – Lipases digest fats and Proteases digest proteins.

A very common example of the way enzymes work is when we see Bananas turning brown. This is the result of an enzyme known as polyphenol oxidase. Interestingly we can circumvent this process by heating the banana which inactivates the enzyme.

We have two sources of enzymes when it comes to digestion those which we should obtain from the foods we eat and those which are produced by a small organ known as the pancreas (most often associated with the production of insulin). Only foods in their natural states contain active enzymes so the problems for us arise due to a disturbing fact that over time we have been cooking more and more of our foods which destroys the essential enzymes that are needed for digestion. It is interesting to note that 'Man' is the only animal that cooks his food. Even most so called health foods are cooked or otherwise heated. Milk is a good example - pasteurization kills the enzymes and one in particular known as phosphatase which is essential for the absorption of Calcium. Could this be why calcium ends up as a component of plaques in our arteries? Foods that have been subjected to heat are enzyme dead – even frozen foods have had the enzymes processed out of them. It doesn't take much heat to destroy the enzymes in foods. 49 degrees will do it (just over 10 degrees above body temp).

This all means that we have to rely on our pancreas to produce the enzymes needed in order for the foods to be properly digested and the nutrients extracted. Some years ago while reading about the pancreas I recall reading it can be likened to a 'bank account' that can't be overdrawn. It seems that there is a limit to the enzymes that our pancreas can produce.

When we are young we can get away with eating 'fast foods' and other enzyme depleted foods because there is plenty of 'money' in the enzyme 'bank' in our pancreas. As we age though enzyme production drops off and we start to feel the results of enzyme depletion. An 18 year old for instance produces 300 times as much amylase as a 70 year old.

It is said that enzyme production in the body declines by approximately 13% as each 10 years passes and thus if we continue eating enzyme depleted foods, ultimately we will reach a state of enzyme poverty – could this be better defined as 'old age'? In the early part of last century Dr Edward Howell a pioneer in his field, is acknowledged as the first researcher to recognize and delineate the importance of the enzymes in food to human nutrition. Dr Howell looked at 12 studies where animals were fed only cooked food and he found that they had a pancreas weight which was 3 times that of animals that were fed raw foods. In much the same way as an enlarged heart can be the result of an overworked heart so it is with an overworked pancreas. One can only speculate about the impact an overworked pancreas might have on the incidence of diabetes that is of major concern throughout the western world.

In "The Missing Ingredient" I was surprised to learn that in times of enzyme deficit (when there is a shortage of digestive enzymes) the immune system steps in to help us digest our food. A condition known as Digestive Leucocytosis is the immune system's response, calling on white blood cells (rich in enzymes) to break down the food. The problem is that if our immune system becomes involved with digestion, it is not able to focus on its main role – that of fighting disease. It's very interesting to ponder a link between the time when our ability to make enzymes declines and the increase in the manifestation of chronic degenerative diseases.

We need all the enzymes because each food we eat has a particular enzyme required for the digestion of that food. No other enzyme will do it. Most of us know about 'Lactose Intolerance' (lactose is a milk sugar) a condition brought about by a deficiency of an enzyme called lactase. The digestion of lactose in milk is not possible without this important enzyme. Simply by supplementing with lactase, this deficiency problem can be overcome.

It is commonly believed that when we eat, the food conveniently drops into a pool of acid in the stomach and there it is broken down before it ends up in the small intestine where the nutrients are extracted. If only it were as simple as that. If we are eating enzyme rich foods, what drops into the stomach would be enriched with digestive enzymes which would then predigest the food for approximately one hour resulting in as much as a 75% breakdown. It is after this process that the acid which inactivates the enzymes is introduced and takes over the job of breaking down what is left. After this process it's then on to the small intestine where the acid is neutralized and the pancreas contributes additional enzymes to complete the process.

If however our food is cooked or in other ways enzyme deficient, the process of pre-digestion can't take place and our food sits around for an hour waiting for the stomach acid. The unfortunate thing is that because the pre-digestion phase hasn't taken place, the food can often enter the small intestine only partially digested. The pancreas is then 'called on' to pull out all stops to produce massive amounts of enzymes in order to complete the process. It is not difficult to understand that the less digestion that takes place prior to the food reaching the small intestine the greater the stress is on the body to deal with the problem. It's worth bearing in mind too that as we age we are producing less and less stomach acid and thus the problem is exacerbated.

All of this points to many reasons for considering how we might improve the situation without resorting to a raw food only diet. Many people around the world take high potency digestive enzymes with their meals and they note significant improvements in many areas of their health. I have concluded that supplementing with digestive enzymes makes a lot of sense and I have started my own enzyme protocol using a very high quality product I have sourced from the U.S. [www.transformationenzymes.com](http://www.transformationenzymes.com)

Many good health food stores however sell digestive enzyme products (but quality is paramount with this type of product). For anyone wishing to look into this more closely there are some excellent books on the topic including - Dr Edward Howell's book "*Food Enzymes For Health and Longevity*" Dr Jeffrey Bland's "*Digestive Enzymes*" (Dr Bland is regarded as one of the world's leading scientists in the field of nutrition). "*Enzymes for Digestive Health and Nutritional Wealth*" by Karen DeFelice is excellent too.

**More information: John Appleton – Ph: (09) 489-9362 [appletonassoc@xtra.co.nz](mailto:appletonassoc@xtra.co.nz)  
[www.johnappleton.co.nz](http://www.johnappleton.co.nz)**