ENZYMES 101

See if you can answer a question about enzymes. What is the primary function of proteolytic enzymes (enzymes that break down protein) in the body? If you said digestion then you don't know as much as you might have thought and reading this article may change your life. Digestion is one of the last things that a proteolytic enzyme does and yet more than 99% of healthcare providers don't know that. In fact, most people don't know what enzymes are or what they do for the human body. Ever wonder why some people get grey hair in their 20's and some don't get it until they are in their 60's or even 70's? Grey hair may come from a deficiency in an enzyme called catalase. If I take catalase, is it possible for my hair to go from grey back to color? Yes, it is possible!

Why do we all become deficient in enzymes?

The older we get the less enzymes our body makes. By age 30 we have already lost 20% of our enzyme production. Enzyme production in our bodies is down 40% by age 40 and 60% by age 50. By the time we reach 60 years old we have lost a whopping 80% of our enzyme production. You might be thinking, *Wait a minute, don't we get enzymes from other places besides our pancreas and our own body?* Yes, our body does depend on food for a source of enzymes. A large amount of enzymes are in food but not in the majority of our foods anymore because of modern food processing. Unfortunately, most of our food is heated above 118 degrees Fahrenheit, which is the temperature where enzymes are destroyed. Now you are left with a food supply without enzymes, which leaves our body to do all the work. Here is where it gets interesting. Most experts on enzymes agree on a common theory: your body makes base enzymes that can be converted on demand into any of the systemic or digestive enzymes based on the need. However, remember there is a limited amount that the body can make each day and that number decreases over time. So your body could decide to make digestive enzymes to break down your lunch instead of enzymes to help control your blood sugar or break down scar tissue. Your body could decide to help the immune system or cardiovascular system instead of breaking down your foods which can lead to food allergies and leaky gut. There are so many possibilities as to what happens when you don't have enough enzymes but one thing is certain. Everyone needs them.

What are Enzymes and how do they work?

Enzymes are reaction starters. Enzymes start and facilitate chemical reactions in the body. Reactions that would take 78 million years only take 22 mili-seconds because of enzymes. Each enzyme is very intelligent. It is programed and designed to do a very specific job. It can even go back and check its work in some cases. There are over 3,000 different types of enzymes in the body and the majority of them are proteolytic (protein eating). These enzymes are responsible for almost 25,000 different reactions in the body. So essentially these enzymes will transform or change something very specific into another very specific thing in the body when needed. Every chemical reaction in the body needs an enzyme so it can happen. See why digestion is not at the top of the list of most important things enzymes do?

What are the major different types of enzymes?

There are 3 major categories of enzymes in the body:

1. Proteases–break down proteins
2. Lipases–break down fats
3. Amylases–break down carbohydrates

Proteases and Lipases are involved all over the body. They have systemic functions and operate in every system of the body so we refer to these as "*Systemic Enzymes".* Amylases are involved almost exclusively with digestion. So the majority of enzyme reactions that take place in the body involve proteolytic enzymes or systemic enzymes that function throughout the entire body.

What are the major functions of Systemic Enzymes?

(Enzymes that facilitate chemical reactions throughout the entire body)

1. Anti-inflammatory
2. Cardiovascular health
3. Immune system regulating
4. Anti-fibrotic
5. Energy building/fat loss

Anti-inflammatory

Whenever there is an injury or a problem in the body, the immune system sends CIC's (Circulating Immune Complex which is formed after an antigen and antibody combine). The CIC's go to the problem area and create inflammation and swelling which lead to pain and more pain. Anyone who has ever injured themselves can relate to this. The CIC's are a good thing in many ways because they pave the way for the healing process but they also promote the release of more CIC's which cause more swelling, inflammation and pain. They float around and can be deposited in various tissues and become harmful. They can be filtered out by the liver, spleen or in various other ways. CIC's can also be broken down by specific enzymes. So taking enzymes could be a huge benefit to somebody who is auto-immune and has an over abundance of these CIC's floating around.

There are different kinds of CIC's. There are ones that are inflammatory as discussed above, and ones that are not inflammatory which are vital to our body and our life similar to the ones involved in the gut lining and kidney function. Systemic enzymes can break down the inflammatory CIC's without affecting the CIC's needed for organ function. This is something NSAIDS can't do. Furthermore, they are safe even in high doses and have no LD-50 or toxic dose. In other words, they are completely safe.

Cardiovascular Health

Systemic enzymes can eat plaque in the arteries and thin out blood to take the strain off of the heart for people with thicker blood than normal. They also clean excess fibrin in the blood, which is the liver's job and therefore make life easier for the liver. They make blood cells less sticky and eat dead material floating around in the blood. The right systemic enzymes can make a huge difference in someone's cardiovascular health.

Immune System Regulating

Enzymes play a huge role in immune system regulation. They can down regulate or up regulate. In the case of the autoimmune patient (rheumatoid arthritis, lupus, MS, celiac or any other auto immune disease) systemic enzymes at a therapeutic dose given orally can calm down the immune system and eat the excess antibodies resulting in less of the body attacking its own tissue. These enzymes can also boost a low immune system if needed by producing more natural killer cells and by improving the efficiency of white blood cells. Another amazing fact about these enzymes is that they will choose which function is needed and do it. So essentially these systemic enzymes help balance unbalanced immune systems. Another amazing thing that systemic enzymes do for our immune system is to help kill viruses. These enzymes can easily tell the difference between proteins that belong in our body and ones that do not. The next time that you or someone you know has a fever and you want to bring it down, you should know that enzymes do their best work as temperatures rise. 104 degrees Fahrenheit is where they are at their maximum effectiveness. Not saying you should let a fever get that high but just keep it in mind that the warmer the body gets, the better enzymes can help the immune system.

Anti-fibrotic

Enzymes eat scar tissue and fibrosis. As we begin to age which starts in our 20's, we begin to see a decline in our enzyme production. With less and less enzymes to break down fibrin our bodies become more scarred over time internally and externally. Things like uterin fibroids, endometriosis and arterial sclerotic plaque and other forms of scar tissue begin to spider their way through our bodies over time. As we age and we see our wounds heal thicker and less pliable with scars becoming more visible. If we replace these lost enzymes we can control and even reduce the amount of scar tissue our bodies have. Even things like pulmonary fibrosis and keloids can be reduced. The applications are limitless when using enzymes to reduce scar tissue in the body.

Energy building/Fat loss

Many people try to lose weight by cutting calories but instead of easily dropping pounds they find themselves low on energy. Fat reserves are the body's way of storing energy for the future in case there is no food available. Lipases are needed to break down fat but if you don't have enough of them then it may be very difficult to lose weight or have energy while trying to do it. This knowledge suggests that it is possible for systemic enzymes to increase metabolism, decrease appetite and overall decrease weight in a large percentage of the population.

What to do about it?

Eating raw whole foods is a great way to increase the amount of enzymes in your body. You can also take enzyme supplementation orally. Supplementation works well but you need to make sure the products you choose come from pure sources. Whenever possible buy microbial and fungal derived enzymes instead of plant and animal enzymes. All enzymes are not created equal. The extra effort to make sure you are taking the best enzymes available will go a long way when it comes to the health of you and your family.