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## Introduction

‘Many neurological conditions as well as autism may be improved with digestive enzymes. Is this a new special breakthrough?’

Not really. The excitement is not due to a brand new scientific discovery. Enzymes are not new, and have existed since before the dinosaurs. The big dinosaurs had to have enzymes to digest the little dinosaurs, and the little dinosaurs needed them to digest the plants they ate. So, enzymes themselves are not new. Enzymes are a natural and essential part of all living things. They are catalysts, which means they speed up biochemical reactions without being changed in the process.

‘What about enzyme therapy? That’s got to be new. I’ve never heard of it before.’

Enzyme therapy is not new either, and has been in use for ages. In the 1700s, Jean Senebier identified that gastric juices could be applied to wounds to speed healing and reduce infections. The enzymes in these juices would degrade the dead tissue and keep the wounds clean. Plant extracts were used before that for the same reasons. Enzyme therapy has been around for some time, but many times, unfortunately, the association with other elements and philosophies diminished the fundamental biochemistry involved. This has led many to see enzyme therapy as less than reputable. Currently, enzyme therapy enjoys common usage with sports injuries, pancreatitis, cancer, fibromyalgia, and viruses, among other things.

‘Okay, so what’s the story? Don’t tell me, a brilliant scientist (who should be dashing and full of charm in this story, by the way) concocted something remarkable in his lab involving enzymes to

help with the problematic symptoms of autism. He gave his formulation freely to all the needy and there was much rejoicing.’

Not exactly. Well, this story does involve a smart, thoughtful, and devoted professor-researcher type person as part of the tale, and he does come up with a ‘breakthrough’ enzyme formulation, but that is only part of it. Then the real movers and shakers came on the scene.

‘Okay, I got it...there was a beautiful young maiden with long golden hair, of course, who was desperately ill and the scientist’s formulation saved her. They married, lived happily ever after, and then they gave these enzymes freely to all the needy and there was much rejoicing.’

That’s a good ending, but not the one here. In our story, a group of parents and other concerned adults working tirelessly to help themselves and their children from an assortment of disabling problems latched onto the scientist’s enzymes. The field of enzyme therapy was ‘rediscovered,’ only this time applied to autism spectrum and other conditions. The children were improving immensely in a matter of weeks, in some cases, even in a few days. Success stories with enzymes were popping up like dandelions in the spring.

‘So what is so new about all this? Seems like it has all been done before...perhaps a new twist on an old story?’

Enzymes are not a new silver bullet miracle for all people. But certain new enzyme formulations seem to be providing a major short-cut through the current chaotic maze of alternatives. What’s new is that recent science is revealing a wealth of medical aspects to autism and related neurological conditions. Now that these are identified, it is only logical to look at what measures are effective in improving these conditions. Supplying enzymes orally is speeding up the process of improvements, and making other therapies much more effective. Enzyme therapy appears to be the next step and ties many of the other pieces in the treatment of pervasive developmental disorders together. Enzymes remain catalysts after all!

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The current criteria for diagnosing a person with autism or related conditions are based solely on behavior and noticeable outward symptoms, not on biological or medical test results. This means that if an individual exhibits a certain number of predefined behaviors then he qualifies for a diagnosis of autism or some other type of developmental delay. People have different opinions on what constitutes 'recovery.' Some believe if you no longer qualify for the diagnostic criteria, you are no longer autistic (or whatever). This makes sense. However, because other people feel that being on the autism spectrum is a matter of being neurologically wired a certain way, you never really recover. They feel that some individuals just reasonably learn how to control their behavior so it is socially acceptable. These people say the individual is not really changed in neurological wiring but has just adapted well, and 'hides' the unwelcome manifestations of his condition. Therefore, the autistic person is not 'recovered' but rather has learned coping strategies.

This book does not go into that area or argument. Nor does it consider the many behavioral therapies available. Behavioral therapies and biological ones work together for a total program. This book concerns some of the biological conditions that often accompany a diagnosis. The references of 'recovery' made here are in relation to a person being improved in physical health and reducing some of the suffering brought on by the imbalances in biological function. Many individuals may need additional therapy and assistance besides the biological concerns. It is important to understand that no one therapy will help everyone. Or no two things, or five things.

Considering autism spectrum conditions as a neurological or medical issue is relatively new. This further explains the lack of scientific studies in this area, although this is changing. But don't worry, no one now needs to be in the initial test groups with enzyme therapy. That has already been done. This book shows the type of improvement currently available with enzymes and is already used with real people in everyday life. The results and guidelines of this experience are presented here. This is for information only and not to be used as medical advice.

It turns out that a great many individuals considered on the autism spectrum, as well as those having other types of neurological

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conditions, have some fundamental disorders arising from their digestive systems. And enzymes are in an excellent position to be on the front lines in digestion. This book covers why enzymes may help these children and adults. The text is not based on theories that stretch the imagination or require a great leap of faith, rather it shows and relies on very fundamental, known biochemical principles supported by a wealth of practical research and experience.

Although enzyme therapy has been around a long, long time, not too many books are out on it, and the ones available tend to fall into a few limited areas. Some are strictly biochemical ones, like those used for physiology and chemistry. Others follow much older theories with some parts since proven true while other parts...well, need updating. Another feature of most books is that they do not address the practical everyday use of digestive enzymes.

The book is grouped into descriptions of individual experiences, practical information, technical explanations, and reference sections.

#### A note for readers

The intention of this book is to assist anyone even remotely interested in enzymes or neurological conditions. Because I am a parent, and a great number of the people I associate with are parents, and the majority of people who participated in this adventure with me are parents dealing with helping their children, I tend to write 'parents.' However, this is not meant to exclude non-parents. Definitely, all non-parents are included. I struggled with how to word things appropriately without having to resort to a multitude of clunky sentence structures or distant terms such as 'caretakers of people in healing.' I decided on 'parents and other adults' and this is meant to mean anyone giving or taking enzymes for any reason. Even if it only reads 'parents,' everyone else is included. An 'other adult' includes aunts, friends of the parents, grandparents, adults with autism conditions, adults with digestive issues, adults with autoimmune conditions, adults caring for other adults, doctors, child development professionals, researchers, school nurses, teachers, specialists in the field, students, teenagers, really bored people who just happened to pick this book up by accident, and anyone else who tends to breathe air.

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I appeal to your graciousness and ask you to please overlook the fact I was not more creative in coming up with a better way to refer to you if you are not a parent. You are very important, and I sincerely hope that you are able to find something useful here from my journey through the maze. Think on what you can use and enjoy the rest. Hopefully, this will encourage and help others in some way.

P.S. If you have any questions or concerns for me, here is my contact information. I will try to be helpful.

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## CHAPTER 8

# Enzymes and Disease

Although the use of enzymes with autism spectrum and neurological conditions is rather new, the use of enzymes with other conditions is not. In fact, the whole idea of using enzymes as a therapy for health is about as old as life itself...literally. Animals licking their wounds would be applying a steady supply of enzymes through their saliva. You can find references to enzyme therapy quite extensively throughout human history.

There is a great body of research on enzymes and various diseases. A sampling of the literature is cited in the reference sections at the end of this book, but there is much more. What is firmly established is that enzyme use has been going on for a very long time, very safely, and very successfully. Enzymes can have a huge impact on specific diseases as well as overall health in general. They fight disease through a variety of mechanisms, which makes them an ideal therapy for many biological conditions (Stauder 1995).

One of the more 'modern' researchers into enzyme therapy was Dr Max Wolf, born in 1885 in Vienna, Austria. He was a Professor of Medicine at Fordham University in New York. Dr Wolf became aware of the key role that enzymes played in the vital processes of life. He was one of the first to envision the therapeutic possibilities with a better understanding of enzymatic actions. This went on to

become his life's work. Dr Wolf's original enzyme formulation, Wobenzym, has been administered successfully for almost 40 years, with mountains of research to its credit.

Starting in the 1930s, Dr Edward Howell conducted numerous studies on the effects of enzymes in digestion and health. In one study, rats fed a diet of cooked and processed food lived about two years, while the rats that ate raw food lived about three years. The diet of cooked foods resulted in early death. He has also noted that the rats eating the cooked food showed a decrease in their brain weight while their body weight went up. The book *Food Enzymes for Health and Longevity* by Dr Howell lists over 400 scientific studies on the value of enzymes for improving health from 1904 through 1938. Reading through this literature review of these 400 studies gives a lot of insight into how the knowledge base of enzymes has evolved. Since there is such a substantial proven history for enzymes, much of the basic type studies are no longer deemed necessary.

Dr Francis Pottinger wanted to determine what happens to the body when primarily denatured, incomplete, or processed foods are eaten continuously. The Pottinger Cats Study lasted for ten years, with three generations of cats being studied. Approximately 900 cats were involved in all. He took two sets of cats and fed them only raw milk and raw meat (high in enzymes). He took three more sets of cats and fed them cooked meat and pasteurized milk (no enzymes). The cats eating the raw food were disease free and healthy generation after generation (Pottinger 1983).

However, the cats eating the cooked and processed foods were not in good shape at all. Each succeeding generation was worse than the previous one. They developed a wide variety of 'modern' ailments, including heart disease, cancer, kidney and thyroid disease, tooth loss, arthritis, reduced bone mass, difficulty in labor, diminished sexual interest, infertility, and irritability so intense that they were dangerous to handle. By the end of the first generation, the cats started to develop the same degenerative modern diseases humans get and became quite lazy. By the end of the second generation the cats had developed degenerative diseases by mid-life. By the third generation, the cats eating the cooked foods had developed degenerative diseases very early in life and some were born blind and weak, and had a much

Three months ago, on April 21, my son had his first dose of Peptizyde and HN-Zyme Prime. He ate a complete restaurant meal of gluten and casein filled food. He had no adverse reaction. I took all the information about the enzymes to my son's pediatrician. She sent a request to the school that the enzymes be given with any diet infractions. We continued to give him the enzymes with each meal and allowed more planned infractions. We saw none of the previous negative physical or behavioral reactions - including no aggression. In fact, we started seeing an increase in many areas of development. At a school conference, my son's teacher and speech therapist insisted they were seeing significant changes that they attributed to the enzymes started two weeks earlier. At four weeks, with a much-expanded diet, my son's teacher called me with more increases in behavior. She saw a new enthusiasm for learning, a large increase in problem-solving skills, significantly more peer interaction, and an overall happier child.

Within a few more weeks, my son was completely off all previous dietary restrictions. The only side effect was wetting, which has since decreased by 90% or better. We now see the following behaviors on a consistent, daily basis:

1. Eye Contact: Increase of at least 500% since taking the enzymes. Eye contact now could be categorized as 'typical.'
2. Sound Tolerance: Previously could not tolerate brother's voice about 90% of the time and either had to leave the room or would scream at his brother. He now responds typically to his brother's sometimes excessive talking.
3. Initiating Conversation: Pre-enzyme, conversations were almost exclusively about his narrow field of interest (Legos, computer games). Now initiates conversations about a range of topics. Asks questions that reach outside him, such as, 'So, Mom, did anything wonderful happen to you today?' and 'What did you talk about while I was gone?'
4. Obsessiveness: No longer obsessed with Legos. Pre-enzyme, would always have a Lego flyer, book or instruction manual in his hand. Legos are now a favorite hobby, but not an exclusive obsession. Now asks to do a variety of activities.

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5. Affection: Gives more spontaneous hugs; says, 'I love you' more. Overall, he is significantly more affectionate with parents and grandparents.
6. Empathy: Shows genuine concern for brother, which was not seen before enzymes. Yesterday and again today, my older son asked what was wrong with his younger brother when he looked upset. Today, I hung a picture on the refrigerator the younger boy made. My older son has never even noticed any artwork by his brother. Right after getting home from school, he saw the picture and said, 'Wow! He made a great picture! I need to congratulate him!'
7. Self-stimulatory Behavior: Hand-flapping decreased significantly, especially in brightly lit stores. Since adding back zinc the last few days, stimming has decreased even more. He shows an overall decrease of at least 50%.
8. Self-injurious Behavior: Biting and hitting self when angry or stressed has decreased about 75% after enzymes. Since adding back zinc, these behaviors disappeared.
9. Transitioning: Previously, changing activities would usually result in back-talking or tantruming. Since enzymes, these behaviors have decreased about 80%. He now back-talks in a more typical way, not as an automatic and exaggerated response to all changes and requests. He is significantly better able to handle changes in daily routine, such as wearing mismatched pajamas or brushing teeth in a different bathroom.
10. Desire for Physical Activity: Pre-enzyme, we had to force our son to go outside to play. He is now compliant and even enthusiastic at the suggestion at least half the time.
11. Physically: His skin is less pale. Relatives comment he looks healthier. Circles under his eyes have lessened and his face looks more filled out. Stools are firmer, no longer light colored.
12. Interaction with Brother: By far, the most notable change. He plays with his three and a half-year-old brother cheerfully all the time now. This is one of my greatest joys. Before the enzymes, he usually preferred his brother to be far away from him. I could always pick up on a new food sensitivity

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The measles virus may have ended up in the patients' gut after receiving a standard measles-mumps-rubella vaccination (MMR). This has not been conclusively determined in every case, but may be the case for some. The virus should have been subdued and immobilized, lying dormant and harmless in the body. This is normally how the body builds up immunity to disease. In the gut, certain agents of the immune system in the mucosa lining usually conquer any viruses. However, if the intestinal mucosa is damaged or is deficient this can leave an opening for a virus to be reactivated, get out of control and become industrious in the gut. The same doorway results from having a weakened immune system.

There is a subgroup at least of children with autism conditions that show atypical results from immune system testing (Jyonouchi et al 2001; Gupta et al 1998; van Gent et al 1997). It appears that viruses are existing quite comfortably in their hosts and the children have altered immune system function. What happens now? Possibly the viruses lead to some gastrointestinal and/or neurological problems (Uhlmann 2000). The immune system is working at a higher level constantly. It is overburdened on a daily basis, yet cannot completely destroy or subdue the virus. Besides measles, other identified viral possibilities acting in the same way include the stealth virus, herpes virus, or viral encephalitis, which can produce autism-like symptoms. Remember, the pervasive developmental disorders are only diagnosed by observable behaviors and not on any specific physiological testing. There are a multitude of biochemical situations that could lead to these expressed behaviors.

There is evidence that viruses can cause dysfunction in the brain and damage the protective coating, called myelin, around the nerves. This leaves the nerves exposed and susceptible to damage (Singh Jan 1998, Oct 1998). Dr Singh presents a discussion on why autism has an autoimmune basis and why this most likely involves a virus. You can read 'Autism, Autoimmunity and Immunotherapy' at: <http://libnt2.lib.tcu.edu/staff/lruede/singhfeature.html>, or contact the Autism Autoimmunity Project. Viruses are also suspect as agents in many autoimmune diseases.

It may seem that a successful virus would soon overpower and conquer its host. Such a virus may appear to win out. But if it ultimately

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kills its host, the virus is wiped out too. A successful virus will milk whatever resources it needs from its host, but not to the point that the host finally dies, or cannot provide the nourishment the virus needs to keep on going. At least some individuals appear to be hosting such viruses inside them and living in this state.

So what do you do about a virus once it becomes a problem? A basic therapy against such viruses needs to focus on the immune system: improving its ability to function, strengthening it, and enabling it to work at a more typical rate and manner. Some people are seeing improvements with particular antiviral medications. However, because of the nature of viruses, this may be more of a cross-your-fingers-and-hope-for-the-best therapy. Researchers are working to improve this as best they can.

Enzymes? Our industrious pal the digestive enzyme has a little trick of its own. Enzymes, particularly the proteases, turn out to be an excellent therapy to use against a virus, working on several levels. Many viruses are surrounded by a protective protein film, something a protease enzyme can digest away. Eliminating this coating leaves the viruses unprotected and vulnerable to antivirals and destruction.

Is there any evidence that enzymes are effective in the treatment of viruses? In 1995, Dr Billigmann published the results of a study with enzyme therapy as an alternative in the treatment of the virus Herpes zoster. In a controlled study with 192 patients, one of the objectives was to confirm that enzyme therapy had been effective with this virus in a previous study. The other objective was to compare the effectiveness of enzymes with that of a standard drug called acyclovir. The high costs of treatment with this drug and others often meant that Herpes zoster patients would not receive medicinal therapy. They concluded that overall the enzyme preparation showed identical efficacy with the drug acyclovir, and thus also confirming the results of the prior study. The Herpes zoster virus has been successfully dealt with since 1968 with enzymes. Enzymes are considered one of the best therapies with very few side-effects while also providing significant pain relief for the patient (Bartsch 1974; Scheef 1987). Bartsch eventually felt it was unethical to treat patients with viral conditions with anything other than enzyme therapy because the enzymes proved far superior as a treatment.

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helpful for some people depending on their physiology and diet, but many people just need ample supplies of the basic ones. Too many different types of proteases may start to cancel each other out. Also, certain combinations of enzymes have synergistic benefits that are not seen if given separately or not in the appropriate combination. This is the 'art' and science of making targeted products.

Part 3. Look closely at the amount of activity of the enzymes. Enzyme strength is measured in terms of activity. Enzymes may be present, but unless they are functional, they will not do any good. While most food, supplement, and drug comparisons use weight (such as milligrams), the most important measurement with enzymes is the activity and potency of the enzyme. A product label should list enzyme strength in standard activity units rather than by weight. To measure activity of digestive enzymes, tests or assays determine the quantity of digestion that occurs under specific conditions. This activity depends on concentration, quantity, pH, temperature, and substrate.

When you review the labeling on a digestive enzyme package, look for Food Chemical Codex (FCC) units. This labeling certifies that the enzymes went through thorough testing for activity and potency. The American food industry accepts these units as set forth by the National Academy of Sciences. Some companies promoting enzymes list measurements based on dosage, weights such as milligrams (mg), or a other things. Weight, dosage, and any other units do not give any information on enzyme activity – 220 mg per capsule does not tell anything about enzyme activity. You may have 220 mg of nothing, or 10 percent activity or 90 percent activity. FCC labeling is the only national standard for the evaluation of activity and potency of enzymes in the United States. If the product you are interested in only gives weight in milligrams or in units you do not understand, you can call the company and ask about the specific ingredients and activities. FCC Units:

- amylase – DU or SKB (Alpha-amylase Dextrinizing Units)
- cellulase – CU (Cellulase Unit)
- glucoamylase – AG or AGU (also AU or AG)  
(Amylo-Glucosidase Units)

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- invertase – IAU or INVU (Invertase Activity Units)
- lactase – LacU (Lactase unit) or ALU (Acid Lactase Units)
- lipase – LU or FIP (Lipase Units)
- maltase – DP (degrees diastatic power)
- malt diastase – DP
- pectinase – PGU or Endo-PGU (Endo Polygalacturonase Units)
- protease – PC, HUT (Hemoglobin Unit Tyrosine base) or USP
- papain protease – FCC PU (Food Chemical Codex Papain Units)
- acid fast protease – SAPU (Spectrophotometric Acid Protease Units)

The higher the activity number, the quicker the food is digested. A lower number will still be digesting food, but it will take longer. Since enzymes do not get used up in the process, we do not 'run out' of enzymes before all the food is digested, BUT the stomach and intestines are absorbing food, completely broken down or not, at the same time. Since we are 'on the clock,' with possible unbroken-down peptides (or other food components) being absorbed, we want the food to be digested by the enzymes before it gets absorbed in a partially broken-down state.

FCC labeling example: If Product # 1 has 15,000 HUT of protease and Product # 2 has 45,000 HUT of protease. Product #2 can break down three times more protein than product # 1 in a given period of time. This is how to compare digestive enzyme activity and formulations.

#### Part 4. Compare pricing – Calculating cost comparisons

Once you have picked a product that contains the enzymes you need to meet your goals, and you see that the label lists certified activity units, you have several ways to further compare products.

What is the cost per capsule?

To find out what the cost per capsule is, first find out how many capsules are in the bottle from the label. Capsules are better because the process of making tablets is hard on enzyme integrity or activity. Write this number down as Number of Capsules per Bottle. Next, add the price for the bottle, any extra discounts, taxes, and/or shipping charges to find the Total Cost per Bottle. Now divide the Total Cost per Number of Capsules. This gives you the Cost per Capsule.

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