THE CORY HOLLY SERIES

The Enigma of the Ectomorph

HOW TO GAIN WEIGHT THE NATURAL WAY

Book Six

Audio eBook Series

The Cory Holly Series

Five Steps To Health (Book Six)
How To Gain Weight The Natural Way
by Dr. Cory Holly
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The CoryHolly SERIES

The Enigma of the Ectomorph

How To Gain Weight
The Natural Way

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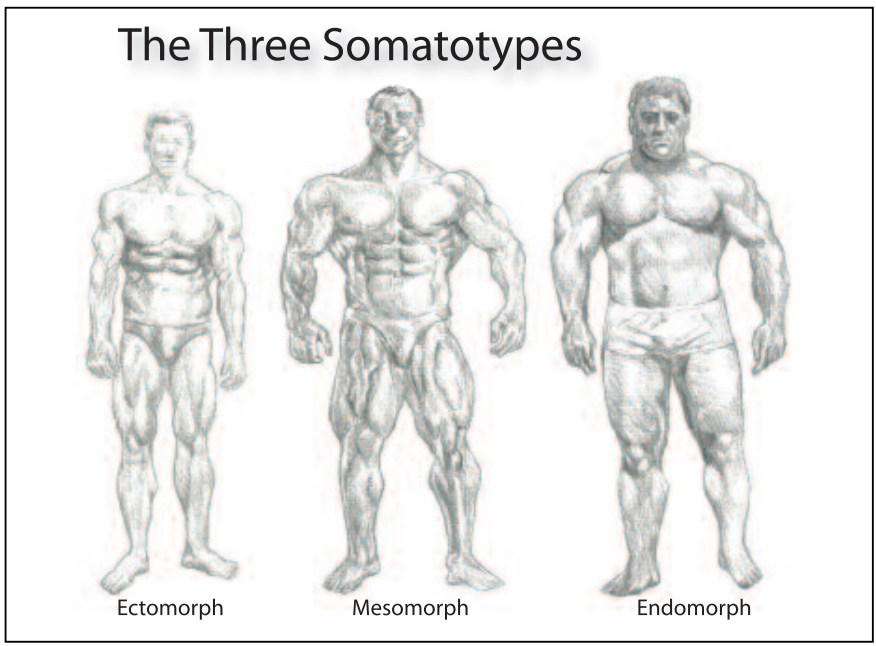
Introduction

We all have the makings of some very unique body types, but in general certain characteristics of our genetic size, cellular make-up and body shape tend to dominate, thus creating a visual contrast controlled by unique biochemical, thermogenic, enzymatic, neurological and hormonal release sequence patterns.

In the Atlas of Man, American psychologist William H. Sheldon, revealed a system of classifying human physical types and body shape called 'somatotyping'. Sheldon categorized human beings by a natural genetically predetermined body build, appearance and temperament.

By exploring the link between body and temperament (mind), and interviewing thousands of people, he discovered three basic components or body types that stood out which he called endomorph, mesomorph and ectomorph.



In essence, the endomorph is round, corpulent and pear shaped. Arms are shorter and legs have large bones. The mesomorph is broad shouldered, thick chested, narrow waisted, lean and muscular. Finally, the ectomorph is slim and linear and small boned with long arms and a thin neck.

Most of the North American population (80%) by nature display endomorphic characteristics thus explaining in part the widespread incidence of obesity. A genetic predisposition to gaining body fat is what separates an endomorph from an ectomorph. An endomorph is in essence the opposite of an ectomorph.

Ectomorphs. We have all seen them. They are the mothers and fathers, husbands and wives, sons and daughters and friends and colleagues we know who can't gain weight no matter how much food they eat.

In fact they're often mentioned in conversation because it's a true spectacle to watch someone gulp down that much food without packing it on or showing any outward physical evidence of such action.

Ectomorphs are by nature, slender, lean and long and secretly many endomorphs envy then for it. Ectomorphs tend to miss meals, stop eating under stress and seldom have a sweet tooth. They will certainly eat sweets on occasion but definitely not to the same extend of an endomorph.

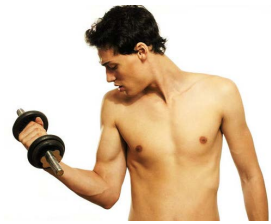
Ectomorphs also tend to chew and eat their food very slowly and these people are known as bad early risers. They don't like getting up early in the morning, and especially performing or doing anything that requires a lot of effort.

The monkey on the back of an ectomorph plays with their mind and says things like, *"You're so skinny, you look like a toothpick",* or *"You're less of a man or woman, literally.*"

The ultimate effect of this mental dialogue often works to lower self-esteem. An ectomorph with a concave or flat chest can be just as terrified, sensitive or shy about revealing their physique publically as an endomorph who shudders at the thought of someone catching a glimpse of their 'rear end reality' or cottage cheese thighs.

Both ectos and endos often hide themselves under clothing in the name of fashion for the same reasons.

Chapter One



The True Hard Gainers of the World

Ectomorphs are definitely the true hard gainers of the world. They are the ones who can eat and eat without gaining weight, fat or muscle even if they are sedentary.

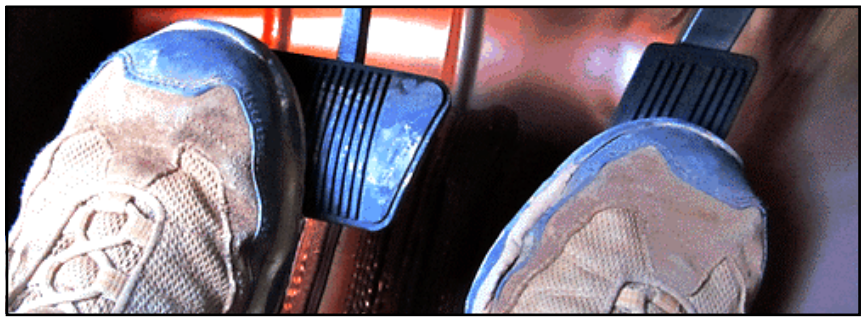
They have thin muscles and are characterized by long backs, necks and legs. By nature (genetics) they are more linear in appearance with less bumps and bulges than the meso or endomorph body type. Hyper or fidgety is an accurate description for many ectomorphs.

Ectomorphs have a fast metabolic rate and are the envy of most easy gainers. Their metabolism is dominated by the metabolic side of catabolism. This means that the rate at which matter and the molecules inside their body are broken down or deconstructed often exceeds the rate new ones are put together or constructed.

Absorption of digested food into the blood stream from the gastrointestinal track is less than average in the ecto machine due to a decreased transit time of food matter from mouth to rectum. Because food after being converted to a semi-solid state (chyme) travels through the intestine of an ecto relatively quickly, ectomorphs are very seldom constipated.

In addition, up to 16% of the energy obtained from food and absorbed into the body is converted into heat and released thermogenically, instead of being converted into living matter. This in part, help keeps an ecto's metabolism continuously revved up.

It's like having one foot on the break of your car with the other foot pressed down on the gas peddle at the same time. Imagine how much gas you would burn without going anywhere.



To balance the equation in favour of anabolism (growth), simple calorie loading would seem to be a logical approach, at least in theory. Eat big to get big is the perceived methodology.

However, although the demand for calories is greater in the ectomorphic model and a positive intake of calories is essential, ectomorphs can typically achieve daily positive calorie status by stuffing themselves with thousands of extra calories without any physical evidence on the scale or an increase in the size of their muscles.

So what happens to these extra calories? This I describe as the 'enigma of the ectomorph' and it is this phenomenon which breaks the calorie theory in half, proving that the chemistry of food digestion, absorption, assimilation and translation into flesh and bones is much more complex then the simple notion of just adding and counting calories.

Although ectomorphs will experience a gradual reduction in metabolism after age 35 to 40, they tend to remain slim life long. Slim or lean is often used as a single reference point of wellness by the general public.

However, ectomorphs can still develop insulin resistance, arteriolosclerosis, nervous system exhaustion and many diseases at a relatively young age by ignoring health principles associated with fitness and good nutrition, especially if they smoke cigarettes for stimulation, which they often do. So, optimum health and wellness must be built and measured from the inside out.

To gain 'weight', the ectomorph must take a rational approach. First, the difference between weight and mass must be understood. Enter body composition science.

In addition, muscle doesn't grow larger without the stress of added load. So if extremely lean individuals want to gain weight, they absolutely must weight train. How can someone gain functional muscle without any imposed demand?

However, and this is a very important point, ectomorphs must train and eat in a manner designed for their unique metabolic state or they will typically build strength only, without much difference in size, and it's the size that most ectomorphs want.

Standard fitness protocols taught by many personal trainers will lend themselves to improve overall health, but they are virtually useless if the objective is to add significant mass to an ecto frame.

Ectomorphs must combine the principles of powerlifting and bodybuilding and become what I refer to as 'powerbuilders'.

Remember, every living thing on this planet is subject to the catabolic forces of stress including cosmic radiation, gravity, oxidation and entropy.

If any one of us ignores the anabolic advantage of resistance training we will absolutely lose muscle, connective tissue, ligaments and bone density. It's a medical fact as absolute as death and taxes. The medical term for describing how we tend to lose functional lean mass over time as we age is sarcopenia.

Ectomorphs should train with weights every second or third day. Basic compound movements work best like squats, bench press, weighted chins, bar dips, and dead lifts.

Reps should be combined to no more than three to six for fast-twitch muscle fibre development and eight to twelve for slow-twitch muscle fibre development.

Work sets, not including warm-up sets, should generally not exceed more than two. After major compound movements, one or two isolation exercises are more than adequate to recruit additional muscle fibres using eight to twelve reps. This will help develop a network of capillaries around the major muscles and contribute to added size.

Ecto's should be careful not to expend too much energy on aerobic activity or work related physical activity and avoid stimulants, especially tobacco. A great number of ectomorphs smoke due to adrenal exhaustion and low blood sugar syndromes.

A Case Study of an Ectomorph

At age twenty-eight, Susan is an extremely lean ectomorphic server who works at a busy restaurant. Her friends can't believe how skinny she is.

Susan can burn hundreds of extra calories a day delivering meals to her customers and by the end of her shift, she literally feels run off her feet.

On breaks throughout her busy day she usually sneaks in a puff or two from a cigarette although if you were to ask her, she would say she doesn't smoke.

Typically she misses breakfast, eats sporadically and often on the run. Even without the physical activity of her work, Susan would have a difficult time gaining weight because of high levels of the hormone leptin, coupled with futile cycling and the genetic effects of uncoupling proteins scattered throughout her body, which will also help her stay lean for life without trying or even knowing why.

Leptin is a protein hormone with important effects in regulating body weight, metabolism and reproductive function. The protein is encoded by the obese or OB gene and is expressed predominately by fat cells, known as adipocytes.

Uncoupling proteins are a family of mitochondria transport proteins that play a critical role in thermal regulatory heat production and maintenance of basal metabolic rate. Brown adipose tissue, located around the neck and between the shoulder blades, is able to dissipate energy as heat via uncoupled mitochondrial respiration.

Keep in mind that in the ectomorph model, elevated cortisol tends to erode muscle. Cortisol can also lead to insulin resistance and increased

fat storage especially in the endomorph. Thus it is important to recognize the varying effects of cortisol on human body composition.

Not everyone has the same response. Prolonged cortisol elevation doesn't necessarily contribute to a reduction of total mass, in fact, for many people elevated cortisol is associated with stress and binge eating, thus resulting in the accumulation of added storage fat around the gut.

But for the ectomorph this is not the problem, for them it works in the opposite direction, it melts them down and makes it almost impossible for them to put on any mass be it fat or muscle.

To make matters worse, Susan actually rides her bicycle to work to save money on gas and parking, which makes the challenge of adding body mass to her frame almost next to impossible.

Thus, the overall impact of her lifestyle, in and of itself, is highly catabolic, let alone what her natural, inherent metabolism has on her normal structural tendencies. Susan will have to make some definite changes if she really wants to add more meat to her bones.

Ectomorphs have a high tolerance for good quality fat. A dietary matrix of 20 to 30% protein, 40 to 50% carbs, and 30 to 40% fat is generally recommended. Low glycemic, slow burning carbohydrates should be the mainstay.

Although, beans, peas, legumes and raw nuts and seeds will offer the density of calories (energy) required, low calorie, high-water volume fresh fruits and vegetables are still necessary to consume for their flavonoids, polyphenols, antioxidants and positive effects regarding health and disease resistance.

High-calorie protein shakes are good for snakes between meals. Add dates or nut butters for extra fuel. Ectomorphs should never go to bed hungry but the great dilemma of this body type is their tendency to become anorexic under stress.

They also tend to miss meals, leave food on their plate and avoid eating schedules based on clockwork. They often find the process of eating to be boring and if eating gets in the way of a phone call or work commitment, they will almost always ignore the food or simply forget about it.

To be successful in their ambition, ectomorphs dedicated to building a high quality muscular physique must rely on objective science to overcome their natural tendency. They must train heavy, provide adequate time for healing and recovery, de-emphasize physical activity in terms of volume, maintain a positive calorie intake, strive for blood sugar balance, eat enough protein throughout the day to ensure a positive nitrogen balance and emphasize anti-catabolic supplements.

Dietary supplements including vitamin C, magnesium, niacin, melatonin, tryptophan, acetyl-L-carnitine, CLA, EPA, HMB and phosphatidylserine will help to modify the stimulatory neurobiochemistry of an ecto responsible for driving metabolic rate up and keeping it stuck in overdrive.

The goal is to sedate the system overall and bring everything down. Camomile, Gentian and Thistle teas, B-12 injections and yeast tonics are known to stimulate the appetite.

Most ectos simply don’t eat enough. This is part of their enigma. Ectomorphs must learn to relax the body and quiet the mind through meditation. Catnaps taken at various times throughout the day are ideal.

I ask all my ecto clients to lie down on the floor around three or four in the afternoon for ten minutes to cool things down. This helps to lower cortisol and adrenaline, but it's tough for an ecto to do. These guys and girls are just wired for sound.

Above all, ecto's must learn to be patient, accept their genetic predisposition and believe in the possibility of achieving their body weight desires.

Here is where the serenity prayer comes in.

"Grant me the serenity to accept the things I cannot change,
Courage to change the things that I can and,
Wisdom to know the difference."

Or you can simply go with what Popeye said,

"I yam what I yam"

Chapter Two

The Enigma of the Ectomorph

For the true ectomorph or hard gainer, the two most important limiting factors that prevent normal weight gain and muscular development are metabolism and appetite.

Metabolic rate is governed by genetics, but through training, science and nutrition, it is possible to calm things down in the same way we can speed things up for the endomorph.

Food must be consumed according to the clock, not according to latent hunger caused by not eating for an entire afternoon or full day.

Hard gainers waste a significant amount of energy from food thermogenically, through a process called futile cycling. Demand for energy is high due to basal metabolic demands, so high in fact that hard gainers seldom experience the satisfaction of building larger muscles as a consequence of training. A poor appetite doesn't help matters either.

The appestat is a mechanism in the brain that dictates the amount of food consumed before feelings of satiety arrive. As we all know, everyone's appetite varies and the appetite and minor emphasis on food observed in the ectomorphic model doesn't make the objective of gaining lean mass any easier. You simply can't build something out of nothing.

Ectomorphs typically can't gain weight no matter how much food they eat or how hard they train. Over time, after spending months in the gym and unfortunately often training incorrectly, the accretion of mass is

viewed as an impossible task of fleeting fancy. The metabolic rate of an ectomorph is driven by the chemistry of their brains and uncoupling proteins that allow energy to escape through proton channels in the inner mitochondrial membrane of cells.

Over-expression of human UPC-3 produces a marked reduction in body weight and body fat, suggesting that enhancement of UCP-3 expression or stimulation of its activity, is a normal function of ectomorphic physiology, in other words, they've got things going on inside of them on a genetic level that many of them are not even aware of, but here's the great news. With supplements we can safely alter this gene expression in the opposite direction and this is an absolute key and vital point to consider. It's possible to take dietary supplements to help you achieve your goals.

A single exact mechanism that describes the relationship between the effects and production of excitatory neurotransmitters, neuroinhibitors, uncoupling proteins and appestat function in humans is yet to be revealed. Like the riddle of steel, we have the enigma of the ectomorph.

However, individuals who cannot gain weight and struggle to hold on to what they have when exposed to physical or mental stress display anorexic behaviour patterns regarding the consumption of food. This behaviour provides clues as to what is going on inside the body of a true ectomorph.

Certainly, UPC's or uncoupling proteins, and the brain and nervous system are behind the biochemical throttle responsible for revving up the metabolic rate of an ectomorph into a catabolic state.

Hard gainers tend to put a low to nil priority on food, convert a higher percentage of food matter into heat and are often sinewy and wiry in appearance. They are sometimes viewed as nervous or hyper people

that fidget constantly. We should keep in mind, that an underweight condition can negatively affect performance and often lowers self-esteem. Thin, wiry individuals with a linear appearance that reveals no muscular bulges along the frame possess many type A personality traits.

They often suffer from anxiety and nervous system related problems and are prone to neurological damage and trauma. So, how can a hard gainer increase his or her lean body mass?

Here's a summary of the most important principles:

- Increase your food intake (supply your biological demand)
- Sedate the mind and calm down the nervous system
- Create a growth impulse through resistance training
- Modify aerobic activity
- Minimize unnecessary fuel expenditure
- Reduce or eliminate empty carbs and damaged fats
- Eat clean - don't eat crap, junk or fast food
- Consume slow burning, energy dense fuel
- Maintain a positive nitrogen balance
- Decrease thermogenesis with supplements
- Stimulate the appetite
- Improve your sleep habits
- Avoid stimulants
- Consume liberal amounts of clean fats and oils

Energy expenditure is an important concern; physical activity should be minimized as burning fuel in volume will quickly deplete what reserves, if any, are available. Workouts should be brief and intense. Forcing down thousands of extra calories usually doesn't do anything except leave the ecto athlete with a bloated feeling.

Meals should be planned in advance and eaten according to a pre-set time schedule. Initial habits must be forced until they become routine.

Ectomorphs can often work right through the day without eating and although it is important not to force food down, muscle cannot be synthesised from thin air. Training for strength and mass should help improve the appetite and create a desire for nourishment; if it doesn't, suspect zinc and B-12 deficiency.

If you work out and you still don't have an appetite, you absolutely have a problem. Anyone who works as hard as it takes to build that kind of mass, who has no appetite in response, must have problems in the brain, in the central nervous system or related to your digestive system.

MENTAL STRESS is a big factor. How you think about yourself and the habits of negative thought, if they're present and at work inside your mind, will press against the body's natural response to exercise.

In essence, no on should eat unless they are hungry as the body prepares for the ingestion of food by secreting enzymes into the GI tract to ensure proper digestion and assimilation. Eating in the absence of true hunger often leads to digestive problems, fatigue and diminished motivation, but overeating is toxic.

Emotional overeating is not the same as making yourself eat something if you're anorexic. The answer to part of this challenge lies in the amount and quality of macronutrients, namely fats, proteins and carbs, consumed daily.

If the ectomorphic athlete can take in sufficient calories, turn his or her catabolic drive down and start converting energy transferred from food into living tissue matter, quality muscle mass will be gained along with the essential structural body fat.

Chapter Three

Seven Hard Gainer Guidelines

1. <u>Train Every Second or Third Day</u>

Train every second or third day using relatively heavy weights with low to moderate rep range. Train anaerobically and take plenty of rest time between sets. Train progressively and add weight whenever possible, be careful not to add too much weight to quickly, don't be overzealous.

This is one of the character traits I've observed in the ectomorph. Their desire to gain mass is huge, so they start to pound heavy weights too soon without any periodization; they soon reach a plateau, they get frustrated and then they just simply quit and walk out of the gym.

Focus on compound exercises; don't waste time on isolation movements or any exercise that doesn't allow you to use a significant amount of weight. Weight training is the anchor of mass control. It is the foundation. Nothing else will stimulate the biological impetus required to increase the size and density of skeletal muscle fibres.

Progressive resistance training is the only method known to facilitate growth of lean mass and with adequate rest and the right nutrition, changes in muscle dimension are inevitable.

2. <u>Minimize Aerobic Activity</u>

Avoid aerobic exercise in excess of five to ten minutes per session. Train harder but not longer. Interval training is best, walking combined with thirty second to one minute sprints.

With a metabolism like a rocket, high-volume cardio will make it impossible to gain mass. High volume cardio is catabolic, the decision has to be made to let go of work, sport or any activity that compromises the objectives of adding mass. You have to make a decision in your life and be willing to pay the price.

If you really want the mass you cannot have the mass and continue to be aerobically active as a way of life. They simply do not work together hand-in-hand if mass and size is your supreme objective.

The bottom line is that if you're trying to gain mass and lift heavy but also doing a lot of aerobic activity and moving around, the aerobic momentum will always dominate, beat muscle down and win. It will overcome the impetus that you're trying to create through heavy weight training, because it's oxidative and increases catabolism. The body just can't overcome this force, it's very powerful.

Hard gainers have very little reserve energy to spare and all body energy should be directed towards one specific end, the accretion of mass. Energy should be conserved at all times, except when required to facilitate growth.

3. Six Meals A Day

Consume a minimum of six meals per day with emphasis on high quality protein and whole natural starches like brown rice, squash, lentils, black bread, potatoes, dates, figs and yams.

Eat heavy, concentrated sources of energy; the opposite of an endomorph. Lots of good fats and heavy dense carbs that burn evenly and slowly. Each meal should include some raw food including fresh fruit or greens and raw vegetables.

4. Don't Junk Out

Avoid homogenized milk and junk food. Consume plain yogurt with active cultures, European raw white cheeses, raw nuts and seeds, unsalted peanuts in the shell with the skins and dried fruit for snacks.

Instead of water, try using goat's milk as a base for protein shakes. Add 2 to 3 tablespoons of flax or hemp seed oil. Try adding some almond butter. Ectomorphs have a high tolerance for fat, it's right through the roof, because ecto's are really motoring, and that motoring can utilize fat as an efficient fuel source, especially with your chemistry in mind.

Don't be afraid of clean, saturated animal fat from wild game or extra virgin olive oil, providing they're not damaged. Ground flax seed meal is a consecrated good slow burner. Try halva, it's a super dense delicious mix of sesame seed paste and honey and believe me, when you eat natural whole food your body will reward you for it.

5. Eat Low Glycemic Carbs

Avoid foods that jack blood sugar through the roof like sugar (sucrose-fructose), white rice and white flour. Avoid stimulants including thermogenic supplements (ephedra), black tea, coffee and cigarettes.

Based on my personal observation, a high percentage of ectos smoke tobacco, the effects of which are surprisingly calming for them, but only in the short term, because the long term effects of tobacco smoking creates nicotine dependency, increases heart rate, increases adrenaline levels, decreases oxygen supply to cells, decreases appetite, leads to adrenal exhaustion and causes significant chemically induced oxidative damage.

6. Take the Right Supplements

Add 1 to 2 tablespoons of lecithin granules to steel-cut oats (coarse oatmeal) or protein shakes. Consider calcium, magnesium, niacin, B-complex, inositol, melatonin, GABA, glycine, tryptophan and branched-chain amino acid compounds.

Emphasize supplements known for their anti-catabolic effects such as acetyl-carnitine, HMB, CLA, vitamin C, gingko biloba and phosphatidylserine (PS).

Take your vitamin packs with 2 to 4 protein shakes per day. Use whey protein isolate as a staple in conjunction with tissue proteins such as fish, beef, lamb, chicken, turkey and eggs. Remember the Q word Quality, it should always reign supreme when choosing your food.

7. Learn To Relax

Practice meditation or relaxation techniques. Take a nap in the afternoon. Get 8 to 9 hours of undisturbed sleep every night in the dark.

Try calcium loading an hour before bedtime; consider 5-HTP, tryptophan and melatonin. Use sedative herbs, such as passionflower, skullcap, hops, valerian or kava kava.

Have a cup of tea before you go to bed. Have a hot bath. Learn how to relax your central nervous system. If your mind is hyperactive and you can’t sleep, you will never gain the muscle that you dream of.

Chapter Four

Nine Keys for Optimizing Muscle Mass

1. <u>Positive Nitrogen Balance is Essential</u>

Once a consistent growth impulse has been established through resistance training you have to consider the effects of consuming protein in relation to the maintenance of nitrogen balance.

Nitrogen chemistry influences insulin growth factor, testosterone, growth hormone and other hormonal players including eicosanoids and prostaglandins that play a key role in managing the growth of muscle.

You can train your heart out and do everything possible to stimulate growth but the accretion of mass and the synthesis of new protein structure both ultimately depend on nitrogen intake and utilization.

Hard working athletes excrete a significant amount of nitrogen in their urine and sweat and if less nitrogen is consumed than excreted, lean mass will slowly erode or in the least strength and size gains will remain nothing more than a hope and a desire.

In any given 24 hour period, nitrogen intake should equal or preferably exceed nitrogen loss. This is the basis of protein determination. When you think of muscle growth, think nitrogen. Think N, the big N, and when you think of nitrogen, think of high quality lean protein.

Nitrogen content is what separates protein from both carbohydrates and fat because neither carbs nor fats contain any nitrogen.

Maintaining a positive nitrogen balance is more than just eating a specific amount or quantity of protein; protein quality is just as important and even more so for health and disease prevention.

This means that the biological value or BV of each individual protein source as well as the total BV of all proteins added up must be carefully managed. In addition, the effects of cooking and possible damage caused by high temperature and exposure to oxygen have to be weighed.

High quality protein such as eggs or fish can be partially or completely destroyed depending on the cooking method. Cooking does not improve the digestibility of animal flesh, in fact the bonds that hold amino acids together in tissue proteins often rupture by exposure to heat and the three dimensional shape of many naturally occurring peptides are often chemically altered irreversibly causing a significant reduction in protein bioavailability.

Proteins can act as important chaperones and chemical messengers, but these properties are completely destroyed by high temperature. Of course the more protein you can provide to the body in an untainted, non-denatured form the better.

Believe it or not, raw meat is more nutritious and biologically superior to cooked, but the consumption of raw meat is certainly not a practical notion for the masses to consider. Many people are disgusted with just the thought of eating raw fish, or what we call sashimi, let alone actually doing it.

But believe me, I can tell you this, that undercooked red meat, or rare, and raw fish or sashimi, are some of the best tissue building proteins on this planet. And many are convinced that the risk of infection from microorganisms and pathogenic bacteria is too large to eat raw meat or uncooked fish. But we should still avoid overcooking when preparing animal protein. Use moisture content after cooking as a guide. Animal proteins should be wet when eaten. Avoid eating dried out flesh.

After cooking, biological value goes way down and flesh becomes very acidic. Fast food hamburgers are a big thumbs down! The superb advantage of whey protein isolate lies in how it is extracted and filtered and utilized from the blender to your body witprihout heat.

2. Determine Amount of Protein Required

Calculate your daily protein requirements.
Log on to CoryHolly.com/articles
Refer to the Daily Protein Requirements Dosage Guideline Chart

You can't gain lean muscle tissue without maintaining a positive nitrogen balance. This principle is crucial to understand as nitrogen retained in the cell after absorption from the GI track based on supply and demand with respect to training is the basis of both adding mass and preventing sarcopenia.

Quantity of protein is essential. When you focus on quality you can get by with less, but you still need a minimum amount. That's why it's important to determine your biological need based on your lean body mass and athletic class.

Most ecto's need no less than 3 grams of protein per kilogram of their lean mass per day. Ectos aren't fat, by any means. They walk around in a state that is the envy of most people, but secretly inside they want the mass, they want the fat, they'll take anything, they'll even buy it.

You can't store protein, and if you do consume less than what you require long term you will ultimately force your body to cannibalize lean mass from existing muscle, organs, bones, and cartilage. The body will use itself as fuel, especially under the guidance and influence of cortisol, which elevates under stress in response to training and all stressful events.

So once you've established a good foundation of essential nutrients, that act synergistically, to allow growth and facilitate the use of carbohydrates, proteins and fats, you must focus on the quantity and quality of protein.

3. 8:1 Mass to Growth Ratio

It would be great if we could convert an equal amount of protein consumed directly into muscle, but we simply can't. It takes approximately 8 pounds of protein consumed to build 1 pound of protein in your body. Of course this is an average figure and in some cases it could be as low as 4 or as high as 12.

This is where genetics can provide certain advantages where one individual can respond to nutrition and training faster on less fuel or less protein than another individual to achieve the same or even better desired outcome.

With the general average of 8:1, we know that the growth process is going to be relatively slow, so accept that. Few of us are capable of consuming 8 pounds of protein per day and the protein we create is distributed throughout the body as lean mass according to biological need, not just to the mirror muscle that we so desperately want.

Muscle doesn't grow unless it has to, and even when all of the variables associated with that process are applied, it still remains a slow and arduous process.

4. Control Your Hormones

You can't affect testosterone directly with food, but you can influence it indirectly and you can certainly influence insulin and glucagon directly with food.

If we generate an anabolic effect through training, specifically resistance training, we can elicit a hormonal response and these responses can be measured. Most aerobic activity and sport are not anabolic. Things like inline skating, cycling, running, swimming, skiing and so on, these aerobic activities increase respiration and oxidation. The consequences of this overall, is catabolic.

Too much endurance training can rob the body of muscle size and strength. So if the objective is to build muscle mass, we need to stimulate an adaptive response through progressive resistance training.

Load bearing exercise facilitates the microcellular filament damage that leads to the desired adaptive response, all of which takes time and seldom occurs without distraction or interference.

If we are training and consuming sufficient quality protein, nutrition can be used to influence hormone release and interaction. Food and supplements taken in the right amount at the right time can influence events downstream that effect growth and response to training.

In this regard nutrition has a very real impact on the formation and activity of eicosanoids, prostaglandins and anabolic hormones in the body. Of course we can inject testosterone or growth hormone directly, but as we increase the dose and quantity or stack them with diuretics, amphetamines or other substances, we set the stage for possible drug addiction and multiple health risks.

Therefore, from a health and medical perspective, it is preferable to use food and training to improve our performance, size and strength, naturally.

Intense heavy lifting or sprinting elevates testosterone and growth hormone more reliably than lighter weights or low intensity exercise.

High volume, low intensity, aerobic type movement, lacks the intensity required for muscle building and hormone release. This is why intensity is emphasized as a key issue for influencing the body hormonally.

Anabolic hormones and their responses are also influenced by the ingestion of protein and certain amino acids such as the branched-chain amino acids, arginine and glycine. IGF-1, a member of the somatomedin family is just one of many substances associated with tissue growth and muscle response. It is influenced by growth hormone and growth hormone is stimulated through intense training, thus more IGF-1 is produced.

In addition to tissue proteins and whey protein isolate, free form amino acids can be taken just before and after training to aid in the propensity of growth and recovery.

5. Overcoming Fatigue Factors

Among its many benefits, taking creatine as a supplement can reduce the production of lactic acid. March right into each workout with a good supply of glycogen stocked in your liver and skeletal muscle cells. This will allow you to train harder for a longer period of time with more intensity.

Antioxidants are essential for the buffering of free radicals generated through the consumption of oxygen and for the repair of tissue damage through actual training. Water consumption is vital for the prevention of dehydration.

Dissolve a good electrolyte formula, high in potassium in purified water to improve hydration better than drinking water alone. Fatigue and human motivation are great enemies to your desire to gain muscle.

If one is feeling lethargic and tired it's difficult to get motivated to train hard enough or even at all, to liberate the responses that lead to growth and body transformation.

6. Maintain A Positive Calorie Intake From Natural Whole Foods

A positive calorie intake means you're consuming more calories or more energy than what your body is expending. If food quality is high and your anabolic drive is in gear, the extra calories will be directed towards the accretion of lean mass. Whole foods are the ticket you need for real success. The accretion of lean mass is a biological response subject to our control thus our responsibility is to provide enough of the right materials to build from.

Caloric requirements are established by a number of variables including your resting metabolic rate, training frequency, overall physical activity, age, gender, even your emotional state. Everything must be accounted for including the negative effects of sleep deprivation, incidence of colds, flu and infection, physical injury, relationship challenges, and financial stability.

7. Stabilize Nitrogen, Insulin and Glucose

Six meals per day are essential and for some even eight meals. A protein shake can serve the function of a meal. When you determine your daily intake of protein you'll realize how practical protein shakes can be. You'll also understand why eating only one or two meals a day makes it impossible to satisfy the biological demands of a healthy, fit body.

Up to 25% of your total protein can be consumed post-workout in conjunction with about 1 gram of high-glycemic micronutrient dense carbohydrates per kilogram of total weight.

Instead of empty carbs like glucose polymers or maltodextrin, use fresh or frozen fruit, such as banana, mango, papaya, kiwi, and a variety of frozen berries including blueberries, raspberries and strawberries.

These living, high-carbohydrate foods provide water, proteolytic enzyme value, health promoting vital chemicals, oligomeric proanthocyanidins, thousands of flavonoids and carotenoids, dozens of unique antioxidants and the 'life force' of nature.

Although perceived as an inconvenience, eating more frequently throughout the day remains an important strategy in body composition management. Calculated food partitioning keeps nitrogen fixed in favour of growth. Several smaller meals are utilized more efficiently then two or three.

Smaller meals also prevent stomach distension that occurs from eating large amounts of food at one time, and of course consuming two or three helpings at one time causes a massive increase in circulating insulin. This increases the risk of joint inflammation, high cholesterol, and counters the anabolic effect of training.

Frequent meals anchored with protein provide stability of insulin and glucose and protect your immune system from potential damage associated with high and low levels of insulin. They also keep you energetic throughout the day, decrease training recovery time and keep your anabolic drive alive.

8. <u>Drink Filtered Water</u>

Dehydration sets the stage for fatigue, injury and degradation of lean mass. On the other hand a well-hydrated body responds favourably to the type of training required to increase muscle mass and improve strength.

Muscle is predominately water; water loss is therefore synonymous to muscle loss. The benefits of electrolytes, creatine, ribose, glutamine and glycerol, are in part associated with their cell volumizing properties.

Increasing water volume in muscle fibres improves their capacity to contract and perform work. They become mini-anabolic protein factories. Protein synthesis is enhanced and glycogen storage is not only elevated but maintained at a higher level.

Fluids lost during exercise must be replaced systematically as a routine habit, a habit equal in importance to the training itself. Pre-hydration and post-hydration are added to the practice of sipping on water throughout the exercise period, preferably water reinforced with electrolytes and a small percentage of carbohydrates.

The major characteristics that define skeletal muscle include excitability, contractility, extensibility and elasticity. Without sufficient fluid to maintain and optimize intracellular myocyte hydration, each of these vital essential characteristics is compromised. Muscle loses its look of majesty and power in the absence of sufficient hydration.

Ideally, the quantity of filtered water consumed by everyone should be based on lean body mass, not total body weight or even thirst. The amount recommended per day is 30 millilitres per kilogram of lean mass plus an additional 1 to 2 litres per workout.

Water is so vital, so important and so basic and yet many athletes ignore its importance completely. Exercise induces water loss, so does the consumption of dry food, especially bread and food products composed of mainly flour. Consuming overcooked animal protein is another common enemy of hydration.

As a final reminder, water must be filtered, clean and free of environmental toxins, heavy metals, pathogens, infective micro-organisms, chlorine and industrial waste contaminates, all of which you can find in tap water.

And finally...

9. <u>Pre- and Post-Workout Nutrition</u>

What and when you eat before you train will dictate how much potential energy you have to work with. It defines your ergogenic capacity. Energy is everything to health and healing and in the gym it determines intensity of muscle contraction, muscle endurance and response to training immunologically.

If you observe the rules of logic and science in sports nutrition you can initiate a more productive workout every time. Your skeletal muscle reserves will be topped with plenty of glycogen and water, the body's primary fuel source in anaerobic metabolism.

Higher levels of ATP, the body's primary energy currency, and creatine phosphate only act as a bonus. Glycogen stores about 3 grams of water per gram adding to cellular hydration value. This is why it's so important to go into your workout with plenty of glycogen packed in your body. It's the primary source of fuel for intense anaerobic training.

A pre-workout protein shake is ideal. It's liquid, easy to utilize and provides an effective means for taking supplements. Tracy and I call it 'shake and take'. With respect to pre-workout nutrition, my advice is to avoid high-glycemic fruit or a meal replacement that contains high glycemic maltodextrin. Fruits considered low on the glycemic index scale include pears, peaches, green apples, cherries, plums and citrus fruits.

One of my favourite afternoon shakes consists of 1 cup frozen cherries, peaches and blueberries, blended with 50 grams strawberry flavoured whey protein isolate, 5 grams of calcium ascorbate, 5 grams glutamine, 5 grams ribose, 2 tablespoons of a mixed sport oil (omega-3 rich) and 5 grams fresh raw bee pollen in 1 cup of filtered water. I down my supplements with this shake and an hour later I'm pumping iron in the gym.

In advance of a pre-workout shake, say two or three hours prior to a workout, consume some low glycemic carbs with a high quality, low fat, protein. For example, a bowl of lentil soup with black bread with 6 ounces of chicken, turkey or salmon on top of some organic greens.

Another good example is a green salad with homemade dressing, combined with a medium to small portion of wild rice and a slice of halibut. The real challenge is knowing how much of what to eat prior to a workout to maximize glycogen storage and of course you don't want to feel bloated.

Loading up on the right carbs and omega-3 fats are best done well in advance of training. It's also better if you move around a bit after eating. Contracting functional muscles, used at low intensity can utilize and store energy more efficiently than muscles that are sedentary.

After lunch, go for a walk. You'll find this technique mildly thermogenic and useful for raising your energy potential when it's time to train after work.

Load your body with high quality fuel through out the day at intervals and think of feeding yourself to prepare for a great workout. This gives the body the time it needs to convert the glucose and natural sugars into glycogen derived from the yams, oats, squash and beans you may have eaten.

It also gives the body and opportunity to store some intramuscular fatty acids which improves energy transmission and workout recovery.

Of course, what you eat post-workout is crucial to recovery, glycogen repletion and growth. Too many athletes miss out on this biological window of opportunity. This window is unique; it's like a pulsating wormhole in space. Once it closes you can't get through until it opens again, but if you do reach it in time you can transcend time and space.

Essentially, we really need to look at the long-term effects of eating on a routine basis. Day-in and day-out, that's what determines the best results. If you eat six to eight meals a day, get the quantity of protein you need, quantify your carbohydrate and fatty acid needs, and take supplements like clockwork, it's the overall impact of this whole approach that's going to make the difference, not just what you ate before or after your workout, although what you do eat before and after is a function of the overall game plan.

It's easier to look for something to take just before a workout when you're feeling flat, as opposed to backtracking and looking at what we eat routinely and how we live. Perhaps that's why fat burners, caffeine and pep pills are so popular.

If you're not feeling strong, highly motivated or focused, if your energy is low and you're not recovering quickly, then you should really look at the habits that make up your lifestyle, like how much sleep you get, where and how you train, the quality of your food, the acid-alkaline balance of your food, glycogen saturation and replenishment, emotional state, work environment, hydration, glycemic index and the list goes on and on.

I think that a liquid protein shake engineered with high quality macronutrients, including protein, fats and carbs, is really essential to progress and post-workout recovery. For me it's an absolute must, it makes so much sense before and after training and it's so easy and convenient.

Dr. Michael Colgan calls it, 'bracketing', I call it my 'workout sandwich'. This method raises the quality and efficacy of the diet like nothing else.

After a good solid workout, muscle glycogen is diminished and tolerance for high glycemic carbohydrates is high. The immune system is on high alert, cortisol is elevated, and the entire body is responding to the damage and depletion of exercise, thus tolerance for protein and the anti-inflammatory omega-3's is also high, meaning the harder or longer you workout, the greater the tolerance.

Tolerance is also influenced by the number of months or years you've been training, exercise intensity and your athletic calibre. Post-workout is also a great time to take many of your supplements based on the principle of supply and demand.

When the window is open, take full advantage of the situation. Drive a Mack Truck right through it before it closes!

In conclusion, ectomorphs are seldom given the credit they deserve. Because they are naturally lean and slender, many people underestimate their great power and strength. They usually have enormous energy and endurance, but when they lift weights they don't grow at the same pace as their endomorphic friends, so they often quit in frustration before coming to terms with the science of their own individual biochemistry.

Ecto's must learn to conquer the nemesis of their own intemperance. They must have faith and believe in the process, work harder than most to get the mass they want and follow an objective science based exercise program. Then and only then will they gain the muscular size and lean mass they secretly long for and desire.

I have seen many ecto's succeed and when they do it dramatically affects their life. It is by far more difficult for an ectomorph to gain muscle than for an endomorph to lose body fat and keep it off for life.

Believe me, the net effect of building muscle on your physique is even better than you can possibly imagine. It will definitely change your life for the best, forever. Any ecto, who has paid the price and gained the hard earned muscle they desire, deserves a gold medal. **Go For It!**

Afterword

This book is the sixth in a series of many to follow, each forming a link in the Cory Holly Series. I invite you to join me on this journey of self-discovery and in the meantime please move on to book seven in our series titled Biological Bodybuilding.

Biological Bodybuilding is dedicated to the original, true spirit of natural bodybuilding, meaning, a noble lifestyle, dedicated to optimum health and wellness. The program includes many important training principles and nutrition strategies that Cory applied to achieve his championship winning physique. Also included are guidelines for natural health product application, injury prevention, contest preparation, and Cory's five essential keys to training success including, nutrition, consistency, intensity, sleep and attitude.

Remember to stay well and to live long with vibrant health, we must make exercise a top priority and nourish our bodies with best possible food and natural health products we can find.

This is Cory Holly wishing you all the very best of health and wellness for life.

Stay well and live free!

About the Author

Dr. Cory Holly is the Founder & President of the Cory Holly Institute (CHI). Cory completed his Doctor of Naturopathy degree at Clayton College of Natural Health in 1992. He studied exercise physiology and biochemistry at Western Washington University and apprenticed at the Colgan Institute of Nutritional Science for seven years. He currently studies philosophy, physics, biology, biochemistry, physiology, molecular genetics and human psychology online at MIT, Standford, UCLA and the Ayn Rand Institute.

As Canada's Ambassador of Sports Nutrition, Health & Fitness, Cory's objective is to strengthen sports nutrition awareness worldwide and bridge the enormous gap that exists between nutrition and fitness. Cory is the recipient of the 2003 CHFA Sports Nutrition Hall of Fame Award. The CHFA (Canadian Health Food Association) is Canada's largest trade association dedicated to natural health and organic products.

Cory has competed in a great variety of competitive sports including hockey, soccer, football, basketball, lacrosse, wrestling, track & field, tennis, table tennis, badminton, volleyball, triathlons, running, swimming, diving, gymnastics, handball, rowing, Tae Kwon Doe, boxing, bodybuilding and power lifting. He was awarded Athlete of the Year in both Junior High and Senior High School.

Cory currently competes on Canada's Masters National Team in track and field (hammer throw) and has several Natural Masters bodybuilding titles including CNBA Canada (Gold) INBA Universe (Silver) INBA Olympia (Silver) and INBA Hawaii (Gold). Each year in Vernon BC he also hosts the Cory Holly Classic (track & field meet).