Colgan Institute Canada Ltd
988 North End Road, Salt Spring Island
British Columbia, Canada. V8K 1L7
Ph: 250-537-2069; Fax: 250-537-2148
Web: www.colganinstitute.com

Secrets of Weight Management

by Dr. Michael Colgan

Before starting any fat loss program, that is going to be successful and is going to last, you have to get at least three essential elements organised so that they work together to alter your body permanently. Without these three elements, you are unlikely to succeed. They are:

The Right Foods

The Right Exercise

The Right Supplements

We will look at each one separately, then show you how to combine them into a program that will keep you lean for life.

The Right Foods to be Lean for Life

Seems simple enough to get the right foods. Ask your doctor or your pharmacy. Right? Or get an official government report. That will tell you surely? After all, the US National Institutes of Health (NIH) and Department of Agriculture (USDA) have hundreds of scientists working to formulate Dietary Guidelines for Americans, and they spend multi-millions of our tax dollars each year on this work. To quote the US Government, these guidelines are, *the cornerstone of Federal nutrition policy*.[1]

It is obligatory to follow and recommend them for all physicians, dieticians, hospitals, health centers, and anyone else who gets, and wants to continue getting, government money. These guidelines are repeated in the nutrition information in every pharmacy. To avoid government umbrage, they also form the basis of mass-produced food advertising. **They are all dead wrong!**

As I have documented repeatedly,[2-5] official nutrition guidelines are formulated not to support health but to support commerce. Despite all the scientific reports, and the protestations of independence by the scientists involved, their real findings rarely get beyond the laboratory. More than 90% of the information that gets to the public, is carefully written by bureaucrats, so that it promotes the dairy, cereal, meat, and pharmaceutical lobbies, whose political contributions ensure that only those sympathetic to their causes become elected officials.

Despite the mountain of scientific evidence to the contrary,[2-5] no government is going to support nutrition policies that compromise sales of mass-produced dairy products, processed grains, feedlot meats (82% of all meat produced in the US), or the many pharmaceuticals required to treat the disorders caused by eating these foods.[2-5] To do so would jeopardise their chances of staying in power. It's nothing personal, it's just business.

But, I don't have to drag you through a tedious pile of research to prove it. Simply look around. Adult-onset diabetes, obesity, hypertension, heart disease, depression, and numerous other nutrition-related disorders are now more prevalent than ever before in history. As for weight management -- forget it. Since the US Dietary Guidelines were first formulated in 1980, America and Canada have become waddling testimony to the power of duplicitous government nutrition advice to turn us into garbage processing plants to line food manufacturer's pockets.

Where then do we get the right guidelines for the food to eat? After more than 30 years of Colgan Institute research on the subject, I am confident to tell you that we go back to the beginning. We go back to what humans ate before the development of agriculture and food processing, 8,000-10,000 years ago. Why do we have to go that far back? Because the diet before agriculture is what formed our DNA code. As Steven Hawking states in, *The Universe In A Nutshell*, (quote)

> *"There has been no significant change in human DNA in the last 10,000 years" (p165).*

It is what palaeontologists call the "genetic lag". When there is a significant environmental change, such as the advent of agriculture, it takes 20,000-50,000 years for our DNA to change to suit. We have not had agriculture and food processing long enough for DNA to change. So most of our food today does not suit the DNA code that controls the production of every one of the more than 100,000 different proteins and lipids that compose us.

You can read all the supporting research and documentation in my books, especially *Nutrition for Champions*, and get all the scientific references there.[2-5] What you need to know here, is how agriculture changed our food into the garbage foods of today, and what you can do to avoid them. The ten most detrimental changes that prevent you from controlling your weight and maintaining your health lifelong are:

Development of cereal grains and processed carbohydrates.
Development of dairy foods.
Development of feedlot and battery-fed meats.
Overload of refined sugar.
Overload of salt.
Development of processed vegetable oils.
Development of trans fats.
Decline of fresh vegetable use and loss of fiber.
Loss of vitamins and minerals.
Increased acidity of the diet.

To avoid these problems is not too difficult. We have numerous long-term clients who have followed our Weight Management Programs successfully for up to 32 years. We decided to make the knowledge generally available now, because of the epidemic problem of overweight and all its attendant illnesses that afflicts America and Canada today. Here are ten basic rules:

Diet Principle 1. Drink clean water.
There was no water pollution before agriculture and industry. Drink and cook with clean water, at least to a reverse osmosis standard of 30ppm. Don't drink public water.

Diet Principle 2. Eat fresh produce.
Leave the cans, the packages, and the frozen conglomerations on the supermarket shelf. Make organic vegetables and fruits, seeds, nuts, and spices the basis of your diet. Color your plate with as wide a variety as you can, always rich in pepper and hot peppers.

Diet Principle 3. Ditch the salt.

The excess water retention, swelling and bloating it promotes will go with it. Use no table salt and a minimum of salt in cooking. Your taste will quickly adapt as the excess sodium gets out of your body. Historical evidence shows that our ancestors before agriculture did not add salt to their food, even though rock salt was readily available.[5] Today, 80% of all salt in food has been added, primarily to preserve the food for a long shelf life.[5]

Diet principle 4. Eat a high potassium diet.
Before agriculture, the natural food available contained an average of seven times more potassium than sodium, yielding a diet of about 7000mg of potassium to 1000mg of sodium.[5] We are designed by our DNA to work best on high potassium food. Common foods highest in potassium are avocadoes, almonds, raisins, yams, almost all nuts, and bananas.

Today because of added salt, the American diet contains an average of 9,600 grams of sodium but only 2400 grams of potassium. This ratio promotes bloating, water retention, hypertension, and eventually, stroke.[5] No wonder we get so many people, women especially, complaining of swollen arms and legs developing over the course of the day.

Diet principle 5. Chuck refined sugar.
Sugar, from fruits, vegetables and wild honeys, provided only 2-3% of the calories of our pre-agricultural ancestors. For most of the world, refined sugar has been around less than 1,000 years, no time at all for our DNA to adapt. Today, the average American and Canadian eats 160lbs of refined sugar per year.

Refined sugar and its derivative high-fructose corn syrup, causes havoc with our health and body weight, because our DNA cannot deal with it. Our insulin system breaks down, and our fat runs wild. More than 90% of all cases of adult-onset diabetes are self-caused, primarily by eating sugar and highly processed carbohydrates that turn to sugar in the bloodstream.[5] Doesn't mean you cannot enjoy a chocolate truffle, or an ice cream now and then. Just don't make meals of them.

Diet Principle 6. Quit breads and cereals.
Bread was never the staff of life. That saying was a carefully contrived sales pitch for the cereal grains industry, spawned in Edwardian times, and mightily advertized since. Supported by powerful lobbying and funding, breads and cereals remained the base and major dietary group of the official Food Pyramid until the 1990s, when science finally prevailed to unseat them in favour of fruits and vegetables.[6] You still see the old pyramid, on a lot of food packaging, however. Simply ignore it. You don't need bread or cereals to be healthy and you certainly don't need them to be slim. That includes all breakfast cereals, pastas and rice, cookies and cakes, chips, stix, and bits. The less you eat of them the slimmer you become. Use a slice of wonderful bread for the treat it truly is. Don't make a meal of it.

Diet Principle 7. Dump dairy.
The oldest evidence of production of milk and dairy foods is from sites in ancient Britain in the Bronze Age only 6,000 years ago, certainly not nearly long enough for our DNA to adapt to them. It is true that northern European peoples maintain the ability to make lactase after infancy, and are therefore able to digest milk products. But that does not mean they are healthy foods. My book *Nutrition for Champions* examines recent evidence showing they are anything but healthy.[5] To remain lean for life, remove most dairy from your diet. That doesn't mean you can't enjoy a delicious slice of camembert now and then. Just don't make dairy an habitual part of your nutrition.

Diet principle 8. Dodge processed meats.
That includes not only deli meats but all feedlot and battery-fed animals. Their flesh bears little resemblance to the flesh of the wild animals our ancestors ate. Approximately 90% of our meat supply today is riddled with saturated fats that barely occur in the wild. And their proteins are distorted.[5] The same goes

for farm-raised fish. Their proteins and fats are so distorted by being fed mainly on grains, that they offer little for human health.[5] They also fatten you up to boot.

Diet Principle 9. Escape hydrogenation.
German chemist Wilhelm Normann invented hydrogenation of oils in 1902.[5] The process adds hydrogen to vegetable oils together with small amounts of metals, such as nickel or cobalt. As a result, some of the fat molecules become twisted (*trans,* from the Latin, *across*). So the mixture becomes semi-solid and stable. Commerce loves stability and the long-term shelf life it confers. Proctor and Gamble bought Normann's process and began to make Crisco in 1912.[5] So was born all the margarines, shortenings, and vegetable oils loaded with trans fats. Leave the lot on the supermarket shelf. They can only make you fat (and sick).

Diet Principle 10. Eat a Low-Glycemic, Low-Acid Diet.
Base your diet on wild, or local, organically grown, fruits and vegetables, wild meats, and wild fish and shellfish. Use my book *Nutrition for Champions* to guide you to the best low glycemic, and low-acid foods[5] These were the basis of our ancestors' diet. These are the foods most suited to your DNA. These are the foods that will keep you lean and healthy for life.

Watch our Weight Management Program on our website and we will bring you recipies that you can follow lifelong to help maintain your weight, or slowly help you to lose those few extra pounds.

The Right Exercise to be Lean for Life

The International Journal of Obesity published a meta-analysis of 25 years of controlled research studies on exercise and weight management. The averaged result of all those studies shows that, over 15 weeks, a supervised exercise program of 4-6 hours per week, results in an average fat loss of 2.9 kg (6.4 lbs). That is a loss of only 0.2kg (7 ounces) per week.[7] Not a lot, especially when you consider that these were the best of the exercise studies. They were more intense than your average gym program, and they had university research teams controlling them and mentoring and motivating each of the subjects.

If you add a reasonable nutrition program to the exercise program, however, results get much rosier. The same meta-analysis examined the best of the diet plus exercise studies over 25 years. In 15 weeks of a good diet plus a similar exercise program to those used in the exercise-only studies, subjects lost an average of 11.0 kg (24.2 lbs). That is an average fat loss of 0.73 kg (1.6 lbs) per week.[7] That's more like it. Except for the obese with more than 100 lbs to lose, that is the best you can expect while still remaining healthy.

The meta-analysis also compared results with studies of diet only, with no exercise. Weight loss was good but, one year later, the diet-only groups had ***regained*** much more of the weight than the diet-plus-exercise groups.[7] No one wants a fat loss program that promotes a rollercoaster of losing and regaining the same 25 lbs over and over every year, and gradually losing the battle as you age. Our conclusion from analysis of more than than100 controlled studies is; **if you want permanent fat loss, you have to combine diet with exercise.** The big question then becomes, what is the most effective exercise program for long-term weight management? Here are seven basic principles you have to follow.

Exercise Principle 1. Exercise in the mornings to raise your metabolic rate for the whole day.
When you wake in the morning, your metabolism is sluggish. Your metabolic rate for the day is then determined by what you do. If you have a lazy day off for example, your metabolic rate will remain low all day, and you will be on maximum calorie retention from anything you eat. If you exercise in the morning, however, even if only a brisk 30-minute walk, it raises your metabolic rate immediately, and it then remains high most of the day. Therefore, you use up a lot more calories.

Exercise Principle 2. Exercise on an empty stomach.
Your body takes the easiest route to energy. If you eat before exercise, your body will use the calories in your gut instead of using bodyfat for fuel. A single small "all fruit" smoothie or yoghurt will eliminate the weight loss effect of an hour of exercise after it. And, drinking "energy drinks" while working out is just plain stupid if you want to achieve fat loss.

Exercise Principle 3. Do 20-30 minutes of light aerobic exercise before your workout.
When you begin to exercise, your body uses mainly sugar for fuel, the sugar in your muscles, and sugar made in your liver by gluconeogenesis. To achieve your goal of using more body fat as fuel, you have to induce hormonal changes by doing light aerobic exercise for 15-30 minutes.

You cannot achieve this goal by racing on the treadmill, as I see some folk do, because, as soon as you begin to pant, signalling a shortage of oxygen, you keep the body stuck in sugar burning mode. A whole workout done with great effort, treadmilling wildly, then rushing from station to station for an hour, uses near zero bodyfat, and exhausts you into the bargain.

Exercise Principle 4. Do your workout in the "Fat Burning Zone".
The Fat Burning Zone is simply the range of exercise intensity where fat use (fat oxidation) settles into a high steady level near its maximum. It occurs when exercise is done at about 60-70% of your maximum heart rate.[8,9] If the maximum for you is 170 beats per minute, then your fat burning range is about 60-70% of that score, that is, about 100-120 beats per minute. First, do your 20-30 minute warm up to enter fat burning. Then keep your heart rate within the range of 100-120 beats per minute throughout the workout. Your body will pull approximately 50% of its energy from body fat. Above or below this range, your body's use of sugar increases, and it pulls less of its energy from body fat. Therefore, it makes sense to wear a heart rate monitor, and set your best fat burning range so that it beeps automatically to tell you when you are in it.

Exercise Principle 5. Build muscle to lose fat.
Muscle is active tissue, fat is not. Think of it this way. **Muscle is your engine that uses body fat for fuel.** Over 100 muscles are constantly active just to keep you standing up, and about 200 are merrily using energy just to maintain their tone. Fat hangs limp like Jello. Hence, muscle uses a lot of calories. Aerobics classes do not build muscle, and they use calories mainly while you are doing them. Increasing your muscle, however, increases your metabolic furnace for fat 24 hours a day. Therefore, put weight training at the top of your list.

Exercise Principle 6. Do weight training that makes you taller and more flexible.
We have seen it many times, especially with women. They embrace weight training in order to lose fat, then do all the wrong exercises. Often they follow bodybuilding routines. Although these exercises do build muscle and reduce body fat, they also turn your posture into a muscle-bound crouch. So, although you may have less body fat, you actually ***look*** shorter and fatter. **Optimum weight training for fat loss is exercise that lengthens your spine while contracting your muscles.** Overhead cables like those we use in the Colgan Power Program are the best. They train long, lean, flexible muscles, and lengthen the spine. That should be your aim, a tall, elegant, flexible body that emphasizes the low body fat you have worked hard to achieve.

Exercise Principle 7. Get a mentor.
You *can* go it alone, but success increases greatly with a mentor. To achieve a great body, you need someone who is an example, someone who walks their talk, someone who can answer your concerns and unerringly guide you in your quest. In my article *The Making of Genius* (2005), now reprinted worldwide, I analysed the components that produce genius in athletic performance, science, music, and arts. One vital component is the mentors that most geniuses have to guide them throughout their lives. Your goal of lean for life is a

difficult one. Most people who try, fail repeatedly. What the Colgan Institute offers is to become your fat loss mentor. Join our group now and prepare for the journey.

The Weight Management Exercise Program, Level One is now available on our website. This exercise program follows all the principles above. It is designed for first time exercisers and is a three day a week program for your first three months.

The Right Supplements to be Lean for Life

There are four things we look for in a supplement that can help you jump-start a fat loss program. It should:

Stimulate neural release of "get-up-and-go" neurotransmitters (dopamine, acetylcholine , adrenalin).
Stimulate thermogenesis (increase body temperature).
Bulk up in the stomach to 100-200 times its size or inhibit gastric receptors, to reduce appetite. Most of these are common foods, such as dried apple slices, but psyllium is sometimes used as a supplement.
Suppress appetite signals to and from the brain.

Our DNA used numerous components of our food before agriculture to design systems that do all the four things above, in order to increase human chances of survival. Those of our ancestors who developed these systems best, were the ones who survived to become us. We can use the same substances today to change our bodies permanently to leaner, faster, and healthier. From a great deal of evidence about our pre-agricultural diet[5] a good supplement to jump-start fat loss should contain:

Stimulants, e.g. caffeine, guarana, yohimbine , acetyl-L-carnitine, tyramine, kola nut.

Thermogenic agents, e.g. capsaicin, green tea.

Appetite suppressants, e.g. cayenne, piperine.

Metabolic cycle components, e.g. chromium, CLA.

I can cover only a few of these supplements in this short account, so we will look at some of the best, one or two from each category. These supplements detailed below are all found in our Weight Management Daily Packs or Between Meals Pack.

Caffeine & Green Tea Stimulate Thermogenesis & Fat Loss

Thermogenesis is the creation of heat in the body. It occurs mainly through the activity of a type of fat called Brown Adipose Tissue (BAT). In the 1980s, research showed that BAT creates body heat by using white body fat as fuel.[10] A hibernating bear for example, can lose 300 lbs of fat while it sleeps, as its body uses BAT to create the heat required to prevent it from freezing over the winter. The bear does not have to move a muscle.

We are not as efficient as bears at producing heat, and our levels of BAT also decline with age, one reason we tend to gain body fat over the years. Nevertheless, the amount of BAT in the body of a 40-year-old man or woman is still sufficient to use 10% -15% of their total energy, and get it all from body fat. But you have to get the BAT moving.[11] Anything that steadily stimulates BAT, will reduce your body fat even while you sleep.

Recent molecular science shows that BAT works by DNA expression of specific proteins. These proteins are termed **uncoupling proteins (UCPs)**, because they permit the production of energy to uncouple from the Krebs cycle and go directly to heat, without first becoming the energy molecule, adenosine triphosphate (ATP). This molecular mechanism of energy use is an important discovery in the fight against obesity.[11] Many pharmaceutical teams are now focussed on developing patentable drugs that will stimulate DNA expression of uncoupling proteins, in order to keep BAT activity high indefinitely. They remain yet undiscovered.

Popular approaches to weight loss do not activate BAT at all. Quite the opposite. Going on a sudden restrictive diet for example is the most common way to attempt to lose body fat. Anyone who has done it will tell you that there is little other than water loss for weeks. That is largely because your body, responding to an evolutionary signal of deprivation, automatically reduces its energy production and reduces its heat production as a defence mechanism to conserve its fat. In the 1990s, studies showed definitively that dieting, by reducing food intake to the level of hunger, ***reduces*** the activity of uncoupling proteins and ***reduces*** BAT activity.[12-14]

The second most popular way to attempt to lose weight is long aerobic exercise. Despite all the sweating you may do while exercising, for the rest of the day, aerobic exercise ***reduces*** the activity of uncoupling proteins, and ***reduces*** bodily heat production.[15,16] And, if you fail at the exercise program, and gain more weight while still doing it, uncoupling protein activity dive-bombs.[17,18] Incorrect dieting and incorrect exercise are two big reasons that we see so many people continually going on one or other diet, or bent on aerobics, yet remaining overweight. They also feel the cold more, and are more subject to chills and opportunistic infections, because they have inhibited the BAT heat production system. Nevertheless, as we teach in the **Colgan Weight Management Program**, correct nutrition and exercise, work like a charm to keep you lean.

Stimulating BAT

Fortunately, there are several substances in natural foods that stimulate BAT activity very well when correctly used. Best known is the stimulant caffeine, which also increases the activity of brain neurotransmitters, dopamine, acetylcholine, and adrenalin. Studies indicate that a cup of ground arabica coffee on an empty stomach (50-100mg caffeine), not only signals DNA to up-regulate the expression of uncoupling proteins,[19] but also increases oxygen consumption in BAT mitochondria, and increases resting metabolic rate.[20] Caffeine is a cert for stimulation and thermogenesis.

Combined with green tea, caffeine is even better. Scientists do not yet understand why green tea (which does contain a little caffeine) synergistically increases the BAT effects of caffeine. But we do know that it works. Green tea has a thermogenic effect itself, which was thought to be because of its caffeine content. Recent studies, however, show that green tea extract increases BAT thermogenesis to a much greater extent than could be caused by its small amount of caffeine. The latest evidence suggests that the abundant catechins in green tea may be responsible.[21] Over the last five years, research has shown that the principle catechin, epigallocatechin gallate (EGCG) induces thermogenesis by itself.[22,23]

We are impressed by a recent study in the American Journal of Clinical Nutrition, a journal that is very conservative about publishing dramatic effects of foods on weight control. In a placebo-controlled study, 38 healthy, middle-aged men used a moderately reduced calorie diet, including oolong tea. The tea was made to contain either high levels of catechins from green tea or low levels (placebo). Over 12 weeks, the group consuming tea with the green tea extract lost an average of 5.4 lbs (2.45kg). The control group lost only 2.9 lbs (1.3kg). The researchers concluded that: *Body weight, BMI, waist circumference, body fat mass, and subcutaneous fat area were significantly lower in the green tea extract group than in the control group.*[24]

In a larger study with a similar design, 240 obese individuals were given tea containing either high or low levels of catechins. Over 12 weeks, the high catechin group had significant declines in body weight, body mass index (BMI), body fat ratio, body fat mass, waist circumference, hip circumference, and area of visceral fat.[25] A dieter's dream come true.

Green tea catechins have also been combined with other thermogenic foods, including the capsaicin from hot peppers that we recommend below. In a recent placebo-controlled, double-blind trial, 80 overweight subjects were randomized to receive a placebo or a supplement of capsaicin plus EGCG. After eight weeks, subjects taking the supplement had a significantly greater loss in body fat mass, plus increased levels of thermogenesis.[26]

We have covered only a few of the recent studies. From these and similar research, we recommend the use of caffeine and especially green tea, either in foods or as supplements. From our summary of the amounts found effective in controlled studies, you should aim at a total intake of 1000mg per day of green tea catechins and 100-200 mg caffeine. Add these foods to your synergistic combination of natural, non-toxic chemicals that will assist you to remain **Lean for Life**.

Cayenne Promotes Thermogenesis

Cayenne, from the Greek "to bite", comes from capsicums, the hot, red peppers used for flavoring foods. The most important ingredient of cayenne is a group of chemicals collectively called **capsaicin.** Pure capsaicin is extremely toxic and would burn a hole right through you. Even one drop in 100,000 dilution can raise blisters on the skin. These powerful natural chemicals are new darlings of the pharmaceutical companies because capsaicinoid drugs are now being developed for a whole range of health problems.

Capsaicin content of peppers is measured in parts per million which is then converted into what are called Scoville units, which is the number of dilutions you have to make until the liquid is no longer hot to taste. The hotter the pepper the more capsaicin it contains. The hottest are **habaneras** with a score of 100,000–400,000 Scoville Units. Far too hot for most people! Then come **Scotch bonnets** and **Jamaican peppers** at 60,000–250,000 Scoville units. To understand how hot that is, powdered **cayenne pepper** scores only 30,000–50,000 Scoville Units. The usual bell peppers you see in the supermarket come from cultivars that are so in-bred they no longer contain capsaicin. Only hot peppers are of any use.

Capsaicin has a unique anti-inflammatory effect that is of great interest to medical scientists because of its value in numerous diseases of obesity. Obesity-induced inflammation contributes to the development of the metabolic syndrome, which precipitates insulin resistance, type 2 diabetes, fatty liver disease, and cardiovascular disease as we age. In a representative study, overweight mice were fed a high-fat diet and supplemented with capsaicin for ten weeks, and were compared with a control group of normal mice. Opposite to what is usually found when overweight mice (and men) are fed a high-fat diet, capsaicin lowered fasting glucose, lowered fasting insulin, and markedly reduced the impairment of glucose tolerance in the mice. It is likely that dietary capsaicin reduces obesity-induced glucose intolerance not only by suppressing inflammatory responses, but also by enhancing fatty acid oxidation in adipose tissue and liver, both of which are important for fat loss.[27,28]

Capsaicin Promotes Fat Loss

Capsaicin also has direct effects on fat loss. By the 1990s, controlled studies were showing that red pepper in meals dramatically increases thermogenesis, and energy use from body fat.[29] In animal studies, red pepper increases the use of body fat as fuel to produce the extra heat that you feel after eating it.[30] In the brain, it causes stimulation of catecholamines, and increased activity of the sympathetic nervous system

that regulates heart rate, blood pressure, and breathing.[31] That is, capsaicin energizes the body, but not in the same way as a stimulant, such as caffeine.

Red pepper also reduces appetite. Human studies show that people eating meals containing red pepper, eat less at subsequent meals. They also feel more satisfied with their meals, both in sensory gratification and in satiety.[32,33] A 2009 review of most of the controlled studies, concluded that capsaicinoids have been shown to reduce food intake, increase thermogenesis, and increase lipolysis (fat-use for fuel). The only adverse outcome is gastric discomfort, associated with taking too much capsaicin too soon.[34]

Some recent human studies of capsaicin also show fat loss, consistent with the animal research. In one 2-week study, participants were fed capsaicin together with green tea and chicken stock. Compared with placebo, they showed a significant reduction in body fat. In a long-term follow-up, without continuing the capsaicin, , the capsaicin group sustained greater fat oxidation than the placebo group.[33]

Another important effect of capsaicin is that it activates an enzyme with a complicated name, 5' adenosine-monophosphate-activated-protein-kinase, (AMPK for short). It is a critical enzyme in energy homeostasis. AMPK is expressed mainly in your liver, muscles, and brain. Its function is to stimulate fatty acid oxidation, and ketogenesis (production of ketone bodies to make energy available from fatty acids). In simple terms, it releases fat for use as muscle fuel, and then excretion from the body.[35]

At the same time, AMPK inhibits lipogenesis (formation of new body fat) and inhibits formation of new adipocytes (fat cells). As a bonus, it also inhibits formation of cholesterol and triglycerides. Further, it regulates insulin secretion from the pancreas. First explained in 1999, **AMPK is now considered the metabolic master-switch** of the human body.[35,36] Any simple way to activate it is a boon for fat loss and for general health.

As we age, AMPK activity starts to decline, thereby increasing the risk of insulin resistance, rising blood sugar, body fat accumulation, and the whole metabolic syndrome of diabetes and cardiovascular disease that is now overtaking America. Capsaicin offers a natural, readily available, non-toxic, means of combating all of these problems, while also enjoying deliciously flavored foods.

Use Capsaicin for Life

Using capsaicin is simple. Eat hot peppers in cooking and in meals out whenever you can. Change your diet to include hot salsas, curries and hot sauces. Make them a regular part of your food. In addition, use cayenne pepper, 6-10 grams, in appropriate recipes. You can also take cayenne supplements of 500mg-1000mg with meals.

Start easy, both in eating capsaicin and cayenne and in handling them. Remember, capsaicin is the main ingredient in pepper spray. If you are not used to hot peppers, be sure to use gloves when preparing them for cooking, and do not touch your face. Start with the milder types such as serranos: (*Capsicum annuum)*. They have a heat factor of 5,000 to 15,000 Scoville Units. With its clean, biting flavor and high acidity, the serrano is a popular addition to salsas and sauces.

Don't consider yourself a pepper expert just because you have had a few curries at home or the local family restaurant. My wife Lesley made that mistake when she took her grandmother to a good Indian restaurant and they both eagerly ordered the "hot" curry. It left them sweating for the next three days, a source of great amusement since.

Take your time before moving up to hotter peppers such as Scotch bonnets or habaneras. With Scoville scores of 60,000 -250,000 and 100.000-400,000 respectively, their very hot, fruity flavors make perfect

curries and Caribbean sauces, but you have to be used to the fire. In a very few years, when you look at friends who have not incorporated capsaicin into their nutrition, you will be ecstatic that you use this **Lean for Life** supplement.

Magnolia for Weight Management

Overeating because of being irritated or upset is often dismissed as purely emotional, rather than physical. Most of us have experienced unfocussed anxiety for example, that feeling of unease without any definite cause. Probably 90% of my readers, including me, have sometimes resorted to comfort foods to try and relieve it, such as that bargain jumbo bag of "low-fat" cheese doodles, or the monster tub of air-popped corn that my hairdresser insists has zero calories.

Anxiety, however is more than a feeling. It is a complex chemical response of the body and brain. Recent research shows that anxiety, insomnia, and stress are all strongly connected to the daily circadian rhythm of the stress hormone cortisol.[37] Although it is essential for numerous body functions, from the fight/ flight response to memory, we know now that the stresses of modern Western culture frequently raise cortisol into the danger zone, and keep it there all day. When that happens, physiological control starts to disintegrate. Your body no longer uses insulin properly to regulate blood sugar, so you feel weak and tired, your brain goes into overdrive, so you feel anxious and stressed. No wonder you sleep fitfully, and wake in the morning with eyes like holes burned in a blanket. Worse, because elevated cortisol inhibits insulin metabolism, any comfort food you eat to fight these problems goes straight to your hips.

How can we get cortisol back into the safety zone, and thereby lose the fat again? One age-old remedy is the traditional Chinese medicine, *houpu,* which is made from the bark of the magnolia tree. For at least the last 2000 years, it has been used to treat "stagnation of chi" (low energy), as well as a variety of syndromes caused by emotional turmoil. In Japan also, two of the most popular herbal medicines today, *Saiboku-to* and *Hange-kobuku-to*, contain magnolia bark, and are used to treat depression and anxiety. Until recently, no one knew how it worked.

Now we know that magnolia bark is rich in two biphenol compounds, (magnolol and honokiol), which are strong anti-stress and cortisol-lowering compounds. The magnolol content of dried magnolia bark is in the range of 2-10%. The honokiol content is in the range of 1-5%. Numerous animal studies show that even moderate doses of honokiol act as a non-sedating anti-anxiety and anti-stress agent.[37,38] Honokiol appears to be as effective in its anti-anxiety activity as Valium (diazepam). These studies suggest that a small daily dose of magnolia bark extract, standardized for honokiol content, can lower cortisol, help to "de-stress" you, and relieve anxiety, thereby allowing the body to more effectively use its systems for body fat control.

A placebo-controlled study used 28 overweight subjects, who habitually overate and gained weight in response to stress. They gave subjects 250 mg of magnolia extract three times daily for six weeks. The magnolia group showed no significant weight gain. The placebo control group, however, gained an average of 1.5 kg. There was also some evidence that the magnolia group showed lower evening cortisol levels.[39]

There are no adverse effects with traditional use of magnolia. Typical Japanese dosage for a magnolia bark decoction (hot-water extract as a tea) uses 3-9 grams of dried bark. Western usage is most often in pill form. Daily doses ranges from 250-750 mg, of an extract standardized for 1-2% each of honokiol and magnolol. If your weight gain is related to stress, magnolia may prove an effective supplement against it.

DHA for Fat Loss

Master of the human genome, Craig Venter explains so eloquently how the environmental chemicals we now call nutrients, first acted as hormonal signals to regulate cell synthesis in primitive creatures over 500 million years ago.[40] One of the earliest signals was the essential omega-3 fat, docosahexaenoic acid (DHA), found preformed only in marine life. By the time of the first cephalopods, DHA was already one of the major environmental signals. It regulated the expression of genes encoding for proteins that determined cell growth, cell differentiation, and energy metabolism of myriad creatures.

Conserved by evolution across cephalopods, fish, amphibians, mammals, primates, and humans, signals from DHA still regulate gene expression for hundreds of the proteins and lipids that compose us today. DHA is also the major fat that composes our brain. Most important for control of bodyfat, DHA is a major regulator of our energy metabolism.[41]

The Savannah Theory of human evolution, popularized by Louis Leakey findings, is now untenable. Recent evidence supports Sir Alex Hardy's 1972 hypothesis of "the aquatic ape," explaining how humans evolved, not on the inland plains of Africa but on the seashore. More recently, Michael Crawford at London University has presented compelling evidence of the coastal origin of Homo sapiens.[42.43] Here are just a couple of the points. During mammal evolution, despite abundant alpha linoleic acid (ALA), the form of omega-3 in plants, all savannah mammals, including primates, lost brain size. Chimps for example, lost about 40% of, brain weight relative to body weight. We know that the conversion of ALA to DHA is very poor, and was likely insufficient even for apes to develop their brains.[43]

The only exception is man. Over the last 200-250 thousand years, we evolved a massive cerebral cortex, composed mainly of DHA. To do so required access to abundant preformed DHA. The only source on Earth is marine life. Thus, it is likely we evolved on the coast. We know from the Klasies middens, and the Pinnacle Point, Blomberg, and other cave sites, that humans ate seafood and used tools at least 160,000 years ago. Anthropologists now believe that it would have taken 150-200 thousand years for the modern brain to evolve by using ancient DHA signals received from constant exposure to seafood. Otherwise, there is no known way our brain could have evolved. For a lot longer than 200,000 years, DHA has been abundant in the coastal marine environment of southern Africa, and still is today.[43]

Our bodies still cannot make DHA. We must obtain it from food in order to remain healthy. Conversion of its plant substrate ALA to DHA in humans is limited because of low levels of the rate-limiting enzymes, δ-5 and δ-4 desaturase, which convert eicosatetraenoic acid to EPA, then to DHA. Also, DHA of marine origin is absorbed into human system more than ten times more efficiently than omega-3 oil from ALA.[42,44]

The African savannah also lacked sufficient of the essential minerals iodine and selenium, which act with DHA to produce brain growth and maintenance, and also to produce energy metabolism. In Africa, iodine and selenium were, and still are, abundant only in coastal marine environments.[42,44]

We know now that dietary DHA is essential for normal development of the human brain and retina in utero and in infants. It is likely that this signal to our genetic code came from our ancient marine ancestors hundreds of millions of years ago, and has been conserved in our design ever since. Some scientists, including me, now suggest that only those hominids who occupied coastal environments, and ate marine foods, including fish, shellfish, and seaweed, for many thousands of years, received the necessary nutrients to develop into humans.[42-45]

We know that dietary DHA supplementation increases DHA levels in neonates and is essential for normal brain growth. Recent controlled studies show that infants supplemented with DHA in utero or at birth grow smarter than others, even before they are nine months old.[46] We know DHA is essential throughout life for

healthy organs, skin, joints, and brain. These are just a few of the reasons that you should use DHA as a daily part of your diet. I could cover 100 pages with others. Suffice to say here, if you don't eat DHA, you will grow fatter, and dumber, and die sooner.

If you are already trying to lose fat, DHA will help. There are numerous animal studies showing fat loss with DHA, but I will ignore them because, as scientists seem reluctant to learn, humans are not rats. Use of DHA by the human body is different from its use by all other animals except marine mammals. So we need studies on us or on dolphins. All the relevant studies to date are on humans because we are a lot cheaper to use than dolphins.

One representative recent study was published in the International Journal of Obesity. Researchers in Reykjavik, Iceland tested the effects of fish, or fish oil equivalent to 1.5 grams of combined EPA/DHA on body weight and body composition as part of a calorie restricted diet. Subjects were 324 young, overweight men and women who followed one of four experimental protocols for 4 weeks. They were supplemented with sunflower oil (placebo), lean fish, fatty fish(salmon), or fish oil capsules. All three marine supplements resulted in weight loss of 1.0 kg (2.2 lbs) more than the placebo. The study concluded that fish or fish oil increases weight loss on a restricted diet.[47]

Another recent study published in the American Journal of Clinical Nutrition included exercise in the mix. Seventy-five overweight subjects (BMI 25+) were randomly divided into four groups: sunflower oil (6 grams per day), fish oil (6 grams per day), sunflower oil plus three, 45 minute, walking sessions per week, and fish oil plus the walking. The fish oil contained 1.9 grams of omega-3 fats. The study lasted 12 weeks, and during that time there was no difference in the amounts of food eaten by the four groups.

Results showed that both the fish oil and the fish oil plus walking groups lost significantly more body fat than the sunflower oil groups. The fish oil plus walking group came out best, with a loss of 2.0 kg (4.4 lbs) of fat in 12 weeks, plus a significant improvement in cardiovascular risk factors.[48] Adding exercise, even walking, makes a big difference.[49]

Good fish oil capsules come in a 1,250 mg size. The best contain about 250mg of DHA. If you take four capsules a day and eat about 100 grams (3.5 ounces) of wild ocean fish or shellfish, you will get around 2.0 grams of omega-3s. That is more than sufficient, because DHA is not a fat burner that works by bigger is better. It is an essential part of your structure. Increasing your intake to 2.0 grams per day helps you lose fat primarily because it helps to optimise the structures, including your brain, that are involved in energy metabolism. As a bonus , it will also optimize the structure of your cardiovascular system.[50,51] To achieve optimal use of body fat for fuel lifelong, and also maintain a healthy heart and brain, make wild ocean fish and DHA supplements a permanent part of your nutrition.

Brown Seaweed Extract for Fat Loss

Edible brown seaweeds, such as wakame, (Undaria pinnatifida) and hijiki, (Hijicia fusiformis) are flavor components used in many Asian soups and salads. They have extraordinary chemistry. They contain dozens of unique carotenoids in the chloroplast of the cell, which enable the structure to use sunlight to produce energy and nourishment in the plant by the chemical miracle of photosynthesis. In 2005, chemists at Hokkaido University in Japan isolated one carotenoid pigment called fucoxanthin, and used it as a food supplement with experimental animals. Fucoxanthin produced a 5% to 10% loss of body fat.[52]

More important, the bulk of the loss was from visceral fat, the white glop that fills in spare space in your abdominal cavity, and surrounds and cushions your organs. Excess visceral fat is closely linked to adult-onset diabetes, liver disease, and heart disease. The researchers speculated that fucoxanthin might not only reduce body fat, but also be useful for management of diverse disorders.

Fucoxanthin is not new. Scientists have known for many years that there are more than 2,000 different species of brown and olive green seaweeds rich in fucoxanthin and a dozen similar compounds. They thrive in widely varied ocean environments, from the tropics to the colder waters off the coasts of Japan, Canada, and Northern Ireland. Most of them evolved hundreds of millions of years ago, and have been growing ever since. It is likely that fucoxanthin was a component of the early human design as they evolved on the shoreline of Africa, and that DNA incorporated it into our linked mechanisms of insulin and fat metabolism.

As soon as the 2005 research appeared in an accepted scientific journal,[52] fucoxanthin was seized upon by the diet industry. It was ideal to sell as a fat-loss supplement. Unlike most new diet chemicals, it was part of a popular food, therefore already accepted as non-toxic. There were no regulatory problems in selling it. The raw materials were cheap and plentiful, and fucoxanthin was easy to extract. It has now become the major product of several new multi-million dollar businesses. Does fucoxanthin really reduce body fat, or is it simply another of the endless procession of diet scams preying on the rich and gullible overweight that comprise more than 70% of the American and Canadian populations?

There are two mechanisms through which fucoxanthin could work. First, genomic studies in mice have shown that fucoxanthin stimulates production of a protein called uncoupling protein 1 (UCP1)1 I have examined UCP1 in a previous article in this series[53] and will not repeat it all here. To explain briefly, the energy stored in food is converted into molecules of the energy molecule, adenosine triphosphate (ATP), which are then used to power the body. When we eat the excessive modern way, three square meals a day, the excess energy in ATP is stored for future use by formation of new fat. When the body's caloric needs increase, the fat is broken down again, and the stored energy is put to use in new ATP. This process is called "coupling," which transforms chemical energy to physical energy and back again. Uncoupling proteins allow fat to bypass this process and go directly into energy, but humans usually produce very little of them

We tend to store more body fat more easily with age for two main reasons. First, food intake remains relatively constant with age but there is a progressive fall in energy expenditure (exercise and activity). Second, our resting metabolic rate declines dramatically with age.[54,55] By promoting UCP1, fucoxanthin may increase resting metabolic rate, to provide that holy grail of dieting, increased energy expenditure 24 hours a day, even while you sleep.

The second mechanism by which fucoxanthin could work is improved insulin metabolism. In animal research, fucoxanthin has reduced insulin and blood glucose levels.[52] Researchers hypothesize that this anti-diabetic effect may occur because fucoxanthin appears to promote the absorption and use of docosahexaenoic acid (DHA), the most important of the omega-3 fatty acids, found in fish oil and in seaweed.

DHA itself has strong anti-diabetic effects. It increases insulin sensitivity, reduces triglyceride levels, and reduces low-density lipoprotein (LDL) cholesterol, the "bad" cholesterol.[56] Following this lead in 2007, researchers showed that a combination of fucoxanthin and fish oil had a stronger effect than the seaweed extract alone, in reducing weight, blood glucose, and insulin levels of obese mice.[57,58]

Human trials began in 2008. Since then, several reports of these trials have appeared on the internet, and in publicity of companies that sell fucoxanthin. These reports not only disagree with each other but also misrepresent the science. Not surprising. We find that almost all undocumented nutrition information on the internet is so inaccurate as to be useless for anything. We have been waiting for publication of the human fucoxanthin research research in an accepted peer-reviewed journal. It appeared this month, January 2010. Now we have something worth discussing.

Researchers at the National Academy of Natural Sciences in Moscow examined the effects of fucoxanthin plus pomegranate seed oil on obese but non-diabetic premenopausal women. They used 151 women, 113 with fatty liver disease, and 38 with normal livers, in a 16-week, double-blind, randomized, placebo-

controlled trial. Daily supplements contained 300mg of brown seaweed extract (2.4mg of fucoxanthin), mixed with 300mg of pomegranate seed oil. They measured food intake, bodyweight, body fat, liver lipids, serum triglycerides (blood fats), and resting energy expenditure.

Results showed significant losses of weight. Compared with controls, the fatty liver group lost 5,5kg (12.1 lbs), and the normal liver group 4.9 kg (10.8 lbs). The fatty liver group lost 3.5 kg (7.7 lbs) of body fat, and the normal liver group lost 3.6 kg (7.9 lbs). Most of this loss was visceral fat. The supplement also caused a significant decline in serum triglycerides and in liver lipids in both groups, but increased resting energy expenditure occurred only in the fatty liver group.[59]

If replicated, these findings are valuable for overweight people and for people with diabetes, heart disease, and liver disease. It seems likely that fucoxanthin does reduce the formation of new fat in humans, and may even increase the use of existing body fat for fuel. It is certainly useful as a supplement to assist weight loss.

The studies did not use DHA as in the previous animal work, but pomegranate seed oil instead. The seed oil was used in these studies because of previous evidence that it contains abundant conjugated linoleic acid (CLA), and may reduce fat accumulation in the liver.[60] I have written previously about CLA as an adjunctive aid to weight loss.[61] Despite some claims on the internet, pomegranate juice does not contain pomegranate oil or CLA, and does not help to reduce weight. No one has yet done human research on fucoxanthin plus DHA, but I venture to predict that results will be similar. Adding pomegranate oil as well may improve the effect.

When buying a fat loss supplement, look for those that state the amount of fucoxanthin. Jumping on the bandwagon, various companies are selling simply ground up, dried brown seaweed, which may or may not contain much of anything. Look for companies with a reputation to lose, and stated amounts of fucoxanthin per capsule in the 3.0 mg to 10.0 mg range. Products that also contain DHA or pomegranate seed oil, are more in line with the science. Although the human data are still sparse, the chemistry suggests that fucoxanthin has a good fat-loss effect, when used in combination with these oils over at least 16 weeks.

Summary: Weight Management Lifelong

I have covered a little of the research behind lifelong weight management, enough I hope to convince you that it is extremely difficult to do without precise knowledge of the physiological systems that control body fat. These systems were built into our DNA before there was any agriculture or industry, in a dangerous and physically very active world, where food resources were scarce, and competition for them fierce. There were no obese people because no one who was overweight could survive for long. They would be caught and eaten. The DNA systems that kept us at our best when lean, are still our design today.

Meanwhile, however, we have developed farming, animal husbandry, and food processing which have distorted every part of our food chain, and which have made most physical activity unnecessary for survival. The old DNA systems remain our design, but we have changed the environment so drastically that it is very difficult to use the design in a healthy way. Most of our food now comes in a packet, and those that eat it have little or no idea of its origin, its real nutrition content, or its effects on their health.

That is why all the simplistic diets for fat loss work only temporarily. Worse than that, the very act of fat loss by dieting alone, puts your body in a physiological state that makes fat regain inevitable. As soon as you stop the diet, the empty fat cells signal the body urgently to extract as much new fat as possible from the now more abundant food. The fat storage enzyme, lipoprotein lipase, for example, is multiplied by the

diet as much as a hundred-fold. Afterwards, it complies generously to help ferry the fat back to your hips. A host of other hormonal and chemical systems triggered by the diet move the body into fat storage mode. You haven't much hope of defeating them.

The disappearance of physical activity in modern life also heavily promotes weight gain. Exercise is no longer seen as essential to obtain food or shelter. It is now considered recreation, done artificially, at special times, in special buildings called gyms, with weird and woeful machines. Every part of our man-made exercise environment is orchestrated not for human health, but for profit. That is why most exercise programs hardly work at all for fat loss.

Worst are the 2-3 month "boot-camp" types of silliness, usually also involving food restriction. They contain so much exhausting exercise that the devastated participants believe it just has to work. So they hang on grimly till the end. They may well lose a few pounds of fat. But what they have mainly accomplished is very effective training of the body to do more work with less. In three months of a typical boot-camp program (one complete turnover of blood cells), you can teach the physiology of your body to become very efficient at extracting energy and nutrients from less food and doing a lot more exercise with it. As soon as you stop the exercise, it uses its new efficiency to regain fat faster than ever.

Diets alone, exercise programs alone, diet supplements, fat loss drugs, packaged food programs, never work for long, no matter how miraculous they claim to be. You have to find your way through the maze of commercial hyperbole and mendacity to a combination of the right nutrition, the right exercise, and the right supplements to suit our ancient design. You have to apply all three simultaneously. You also should apply them in a way that you can enjoy lifelong. Being lean is a lifestyle not a temporary program. You only go round once, so you better do it in a way that lets you enjoy the ride. You will be delighted with the results.

The **Colgan Weight Management Program** aims for delight. We have developed it continuously over the last 35 years, and it has been successful with many people, including us, for as long as 32 years. Until recently, we kept it exclusive to our Assessment clients. Now, because of the health crisis of overweight in the US and Canada, and all the latest commercial nonsense that claims to be able to fix it, we have decided to offer the program to everyone.

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