



Blood Sugar Regulating Program

By Geoff D'Arcy, Lic. Ac., D.O.M.

Diabetes is a Silent Killer

According to the American Diabetes Association, there are 15.7 million people, or 5.9% of the population in the United States who have diabetes. While an estimated 10.3 million have been diagnosed, unfortunately, 5.4 million people are not aware that they have the disease. Each day approximately 2,200 people are diagnosed with diabetes. About 798,000 people will be diagnosed this year.

Diabetes is the seventh leading cause of death (sixth-leading cause of death by disease) in the United States. Based on death certificate data, diabetes contributed to 198,140 deaths in 1996. Diabetes is a chronic disease that has no cure. Many people first become aware that they have diabetes when they develop one of its life-threatening complications.

- **Blindness** - Diabetes is the leading cause of new cases of blindness in people ages 20-74. Each year, from 12,000 to 24,000 people lose their sight because of diabetes.
- **Kidney Disease** - Diabetes is the leading cause of end-stage renal disease (kidney failure), accounting for about 40% of new cases. In 1995, approximately 27,900 people initiated treatment for end-stage renal disease because of diabetes.
- **Nerve Disease and Amputations** - About 60-70 percent of people with diabetes have mild to severe forms of diabetic nerve damage, which, in severe forms, can lead to lower limb amputations. In fact, diabetes is the most frequent cause of non-traumatic lower limb amputations. The risk of a leg amputation is 15-40 times greater for a person with diabetes. Each year, more than 56,000 amputations are performed among people with diabetes.
- **Heart Disease and Stroke** - People with diabetes are 2 to 4 times more likely to have heart disease which is present in 75 percent of diabetes-related deaths (more than 77,000 deaths due to heart disease annually). And, they are 2 to 4 times more likely to suffer a stroke.

Other signs of Diabetes

- **Extreme hunger**
- **Weakness**
- **Weight loss, not always seen in Type II diabetes**
- **Tiredness**
- **Frequent infection , poor wound healing, partially due to high sugar levels providing an environment that supports bacteria growth**
- **Long-term complications, blurry vision, numbness, and pain in the extremities**

What is diabetes?



wellness article

Diabetes mellitus is a condition that interferes with the body's ability to convert digested food into energy and growth. When we eat, the body converts food into glucose, a simple sugar that is our main source of energy. When glucose becomes available in the bloodstream, it must enter the cells to provide this energy. The hormone insulin is required to allow glucose to get into the cells. For a healthy person, the pancreas produces exactly the amount of insulin we need to match the amount of food ingested. Blood sugar regulation is a finely controlled system. Blood sugar should remain in a very small range of approximately 70 to 120 mg/dl (milligrams per deciliter) even after a heavy meal.

There are two types of diabetes mellitus:

Type I (also known as insulin-dependent diabetes mellitus, IDDM)

This form of diabetes was once called "juvenile diabetes" because it commonly occurs in younger patients. It is considered an autoimmune disease and results when the immune system attacks the insulin-producing beta cells of the pancreas, thus destroying them. The result is a pancreas that produces little or no insulin. The exact cause of the attack on the beta cells is not known, but both genetic and viral factors are believed to be involved.

A person with Type I diabetes requires exogenous insulin (insulin from an outside source) to sustain life. This insulin must be injected daily, and often several times a day. Originally, insulin was obtained from pigs and cows, though today's purified forms are of recombinant DNA origin. Type I patients constitute only about 10% of all diabetics, but they often find the condition to be devastating in its impact, in both short-and long-term damage.

Type II (also known as non-insulin-dependent diabetes mellitus, NIDDM)

This is the most common form of diabetes. It has been called adult-onset diabetes because it commonly occurs after age 40, most often in the middle 50's and later. In the great majority of cases, the Type II diabetic is overweight, putting additional demands on an aging organ system.

Type II patients usually produce insulin, but for some reason (either insufficient production or insulin resistance by the cells) their bodies are unable to process the glucose efficiently. The resulting condition is similar to that of Type I: an excess of glucose in the blood and the lack of fuel for the cells. Type II may have varying effects in different people.

In both cases, glucose builds up in the bloodstream and the cells are starved. Once blood sugar levels pass a certain point, unutilized sugar spills over into the urine, as the body attempts to get rid of the excess.

Diabetes was known in ancient China as the "thirsting-wasting" disease (it was once diagnosed by urinating on the steps of the clinic, and if in a few minutes ants swarmed around the urine, then it was confirmed. The ants were after the high sugar content in this diseased urine). This disorder causes frequent urination and unquenchable thirst because of the continual dumping of fluids to transport the extra sugar into the bladder. The body is forced to turn to other sources of energy. Its solution is to break down stored fats (hence the wasting) for their small glucose contents. A by-product of this breakdown, ketone bodies, builds up in the blood and may be extremely dangerous. Ketoacidosis accounts for 10% of deaths due to diabetes.



Six million Americans are under treatment for diabetes mellitus. There are five million people with undetected NIDDM and another 20 million people with impaired glucose tolerance that could progress into diabetes.

Diet.

As has been mentioned, even with well-designed medication regimes, diet is critical in many ways. On the most basic of levels, many diabetics must perform a delicate balancing effect with caloric/carbohydrate intake and medicine. This becomes even more important when the medications used have peaks of effectiveness (see below). “Sugar shock develops when we give ourselves that sugar “buzz.” It occurs after the consumption of too many simple sugars, which go directly into the bloodstream and wreak havoc with blood-sugar levels. After the inevitable crash, the body again craves sugar to boost energy, resulting in an unhealthy spiral. Complex carbohydrates, such as those found in beans, fruits and vegetables, are digested more slowly, thus providing a more sustained sugar supply”, writes Monika Klein, C.N., “Sweet Alternatives for Blood Sugar Balance.”

An overconsumption of highly refined foods, especially sugar and white flour, can affect the pancreas’ ability to regulate blood-sugar levels through insulin secretion, possibly leading to potential disease states, chief among them Type II diabetes.¹

¹ *Stevia (Stevia rebaudiana), for example, is a South American herb that, in its extracted form, is more than 200 times sweeter than sugar Other natural sweeteners include honey, molasses, brown rice syrup and barley malt syrup. Of course, fresh fruit is also a healthy form of natural sugar.*

Eat a cardiac patient’s diet:

Because degradation of the cardiovascular system is the root problem in diabetes, and so much of the resulting pathology is either in the heart and blood vessels or in organs with inadequate vascular supply, the basic rules of the cardiac diet should be followed. Diabetics typically have elevated cholesterol and high blood pressure. Therefore, fat intake should be kept low, and saturated fats should be avoided. Meals high in fiber and emphasizing complex carbohydrates are suggested. If blood pressure is not normal (120 over 80) or lower, salt intake should be reduced. Raw vegetables (as in salads) are absorbed slowly and are low in calories.

- Eat smaller meals - Even when properly medicated, it is difficult for the body of a diabetic to process large amounts of food at one time. Excessive food intake can cause blood sugar elevations. Smaller meals reduce the demand on an inadequate insulin supply system.
- Eat only small to moderate amounts of protein - Kidney Disease is a common complication of diabetes. Protein is difficult for the kidneys to process. The logical response is to restrict protein intake. Since proteins and fats are paired in red meats, it is recommended that sources of red meat be avoided as much as possible. Unfortunately, for many years diabetics were prescribed a diet in which carbohydrates were replaced with large amounts of proteins and fats. The long-term data concerning typical diabetes complications (with high incidences of vascular and renal disease) undoubtedly reflect that diet’s errors.
- Meals should be timed to match the dosage curves of diabetes medications - All insulin and some oral drugs have periods of onset and peak activity. Diet plans should adjust to these



wellness article

pre-set times. If a patient cannot arrange to eat the appropriate amount of food at the correct times, then some accommodation must be made, for example, by altering medication times or adding a small meal to delay hypoglycemic reactions.

- No processed carbohydrates and avoid meat in the beginning stages of the therapy—the reason is that every time you eat processed carbohydrate (i.e., sugar, honey, alcohol, mashed potatoes, etc.) you will lose 300% more chromium in your urine than when you consume complex carbohydrates.

Things to Watch Out For:

Alcohol.

Know the facts about alcohol. The most important fact is that being out of control makes it difficult to manage diabetes, even masking the acute danger brought on by hypoglycemic reactions. If a person is capable of the moderate use of alcohol, other facts are important. Pure alcohol itself (scotch, vodka, rum, gin, etc.) contains no carbohydrates, despite what it is made from. Liqueurs, such as Amaretto and Kahlua, on the other hand, are high in carbohydrates. Another danger comes from the mixers used in cocktails, many of which have high sugar contents (colas, juices, tonic, margarita mix, etc.).

One odd fact is that, under certain circumstances, alcohol can actually cause a low blood sugar reaction. If blood sugar is low and food is not eaten, plain alcohol alone may prevent the body's natural, protective response to hypoglycemia. In other words, when the body wants to release stored glycogen (sugar) to combat low blood sugar levels, alcohol prevents it from doing so.

Smoking.

Diabetes damage is increased tremendously by smoking. Tobacco usage causes severe damage to the vascular system, adding to a diabetic's already embattled health.

Stress.

The problems of diabetes are compounded by stress. On a direct level, stress raises the blood sugar. This happens because of the primitive "fight or flight" response in which perceived dangers are met by the body's protective chemical reactions, including a release of adrenaline from the adrenal glands and dumping of glycogen (sugar) stores from the liver. In a healthy person, the reaction may be useful for the energy and alertness needed to deal with difficult situations. In a diabetic, the additional glycogen input cannot be utilized and results in elevation of the blood sugar. Such elevations can be extreme and may result from everything from bumping into an ex-spouse, to getting called by a doctor with the results of a blood test, to having to testify in court. Frequent and timely self-testing may help to mitigate this problem.

Stress also robs the body of necessary nutrient levels. All of the basic requirements of an individual are increased by stress.

Everybody benefits from the following:

Relaxation Therapies/Meditation.

Available at True-wellness.com

Whether they are called relaxation, biofeedback, self-hypnosis, autogenic training, meditation, or any related name, these treatments all attempt to lower a person's stress levels (critically important in diabetes). Usually, this involves the focusing of attention on a stimulus, sound, or visualization. Once a subject is in this altered state, blood pressure and pulse rates are reduced and peripheral blood vessels are dilated, causing increased blood and oxygen delivery to deprived tissues.

These therapies may be done under the guidance of a professional such as a trained psychotherapist, in a group setting, or at home with books and tapes. However they occur, they are beneficial.

Diabetes is considered a lifelong condition. Most advances have occurred in the areas of home blood-glucose testing, insulin delivery, medications with fewer side effects, and the treatment of specific symptoms. Therefore, diabetics should take a long-term approach to health care, understanding that lifestyles and dietary cautions for the general public apply to them with greater urgency.

When a diabetic's sugar levels become elevated, the body attempts to transport the excess sugar out through the kidneys by increasing urination. In the process of excreting fluids, water-soluble nutrients are lost, and must be replaced by regular supplementation.

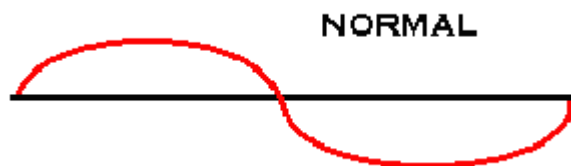
Exercise.

Exercise plays a direct role in the control of diabetes by increasing the efficiency of available insulin. Combined with diet, exercise may return some Type II diabetics to normal metabolic levels. An additional benefit accrues from the blood-pressure-lowering effect of exercise. As mentioned previously, diabetics typically suffer from hypertension, a major factor in some of the deadly and disabling complications discussed in this protocol.

Blood Sugar Regulation, The Key to Health

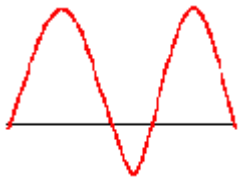
What is "Blood Sugar"?

From the Article on Blood Sugar regulation by Dr. Brett Saks, B.S., D.C.:
 Everything that we eat or drink (except water) is digested. The digestion process simply breaks down food and drink into component parts so that they may be absorbed as vitamins, minerals, fats, proteins and carbohydrates. Whether you eat fruit, vegetables, bread, pasta or meat, they are ALL changed into glucose by the body. Glucose is used by the cells in our body for energy to perform all daily functions. Glucose is "blood sugar". If our blood sugar levels are normal, then the levels gently rise and fall as food is digested. The gentle rise and fall usually involves help from two hormones: insulin from the pancreas and cortisol from the adrenals. The red line below shows a normal pattern of blood glucose ("blood sugar").

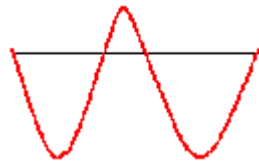


What's Wrong?

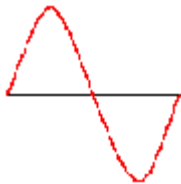
Unfortunately, there are many ways in which the blood sugar system can become imbalanced: emotional stress, poor diet, lack of exercise and lack of rest to name a few. The symptoms are varied, but usually someone who suffers from blood sugar imbalance experiences increased appetite, food cravings, fatigue and drowsiness shortly after eating a meal. Most of these symptoms are produced due to an excess of insulin or cortisol in the blood. This being the case, a person can be hyperglycemic, hypoglycemic or both (oppositic). The pictures below show the blood glucose levels in these cases. No single type is worse than another, and all of them can be corrected within a few short weeks.



Hyperglycemia, blood sugar (glucose) is too high.



Hypoglycemia, blood sugar (glucose) is too low.



Oppositic Syndrome, blood sugar (glucose) runs too high and low throughout the day.

Correcting Blood Sugar Regulation

A specific nutritional regimen is the cornerstone for correcting blood sugar. It may take two to six weeks to achieve complete balance of the blood sugar system. During the first few days of the "blood sugar diet" you may experience irritability, excessive hunger, and even processed sugar cravings. After the third or fourth day, these symptoms will cease and you will feel a sense of clarity, energy and well-being that you may not have ever felt before! Take note: this is what it feels like to feel healthy! Many foods will be avoided during this period. However, once the body's blood sugar system has been restored to full function, occasional "fattening" foods can be eaten without consequence to health or to your waistline!

Some conditions helped by Regulating Blood Sugar:

<ul style="list-style-type: none"> • Food, Contact and Inhaled Allergies • Blood Sugar Imbalances • Arthritis 	<ul style="list-style-type: none"> • Learning Disabilities/ Hyperactivity/Attention Deficit • Chronic Digestive Disorders • Sinusitis
---	---



<ul style="list-style-type: none">• High Blood Pressure• Asthma• Headaches• Chronic Pain and Inflammation	<ul style="list-style-type: none">• Obesity• Hypo/Hyperthyroidism• Menstrual Difficulties & Infertility
--	--

The maintenance of precise levels of blood sugar provides fuel to each of our cells on a second-to-second basis and the effects of blood sugar dysregulation are profound. Excursions into both low blood sugar (hypoglycemia) and high blood sugar (diabetes) stress all cells and immediately threaten full functioning. With low blood sugar one feels weak, irritable and craves sweets and often salt, as the cells run out of fuel. In high blood sugar, excessive blood sugar leaves the diabetic feeling sluggish, tired, and worse yet, high blood sugar actually damages cells and can lead to life-threatening infections and blindness. Both low and high blood sugar are caused largely by dietary factors and both can be corrected, or better yet, prevented by proper dietary management. In short, problems of blood sugar dysregulation are often unnecessary.

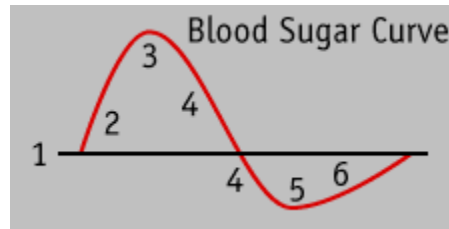
The Six Step Program

Most often blood sugar problems originate from the excessive consumption of food and drinks that are easily converted into sugar, (like sweets, sugar, bread, sodas, chocolate, candy, and processed carbohydrates) or from the intake of stimulants that trigger hormonal signals which increase blood sugar (as caffeine and nicotine). With such intakes, blood sugar quickly rises and either stays high (in diabetes) or is lowered too quickly (in hypoglycemia). Stable blood sugar, not too high or too low, is one of the most important keys to physical and emotional well being.

A Program That Can Help Stabilize Blood Sugar

1. Eat regular meals (and snacks, if necessary) of fresh, whole foods. Eat at least 3-4 cups of low carbohydrate vegetables per day with adequate protein, as needed. Do not skip meals!
2. Substitute fruit and/or crackers or pretzels for baked goods, candy and sweets.
3. Drink plenty of pure water, herb tea and a bit of fresh juice while avoiding sodas and caffeine
4. Take time to consume a protein snack in the afternoon. A little tuna, humus, almond butter or egg salad on crackers works well. Avoid using coffee, sodas, or sugary foods as a pick-me-up from the “3 p.m. slump”. Rest a bit in the afternoon, if possible. (More realistic word is “possible”!!
5. Use a broad spectrum vitamin/mineral on a daily basis, which includes 200 mcg of chromium, and a full range of all other essential nutrients.
6. Reduce your production of stress hormones by practicing relaxation, stress reduction and playful physical exercises. Meditating 20 minutes twice a day is helpful.

The Blood Sugar Curve



This graphic shows a common fluctuation in blood sugar or glucose to demonstrate why blood sugar stabilization is a key to better health.

1. Normal blood sugar level
2. Sudden rise in blood sugar
3. Pancreas overreaction produces excessive insulin
4. **Stimulants** are used by habit and by choice to restore glucose levels
5. Apparent shift of cognitive brain function results in loss of rational control
6. Behavioral symptoms similar to depression or burnout result

Stimulants

A variety of addictive stimulants can alter your blood sugar level.

- sugar / sweets
- caffeine
- nicotine
- alcohol
- chocolate
- cola
- simple processed carbohydrate

The following is a simple questionnaire that tests our risk of Diabetes:

1 I am overweight according to the BMI-test*

Obesity (BMI 30+) – 5 pts:
Over Weight (29) - 4 pts,
27+ - 3pts,
26 - 2 pts,
25 - 1pt
(BMI – 25 – 29.9)*

2 I am under 65 years old and I exercise infrequently.

No exercise - 5 pts
Now &then - 4 pts
1x week - 3 pts
2x week - 2 pts
3x week - 1 pt

3 I am female, and have given birth to a child weighing more than 4.5 kg.

Yes – 5 pts, No – 0 pts

4 I have a sister or a brother with diabetes.

Yes - 1pt, No – 0 pts

5 I have a parent with diabetes.

Yes -1pt, No - 0pts

Score:

Between 0 - 9 points.

You have a small chance of developing Type 2 diabetes, but as you grow older, the risk of becoming diabetic increases.

Over 10 points.

You are in the risk group for developing Type 2 diabetes -and could even already have diabetes without knowing it. It is advisable for you to discuss the result of this test with your physician on an appropriate occasion.

(Based upon the test prepared by American Diabetic Association)

WARNING: Only a blood test and your doctor can provide an accurate diagnosis. This test is intended as a guide only.



Supplement Recommendations

	Month 1	Month 2	Month 3
<u>Supplement Dosage</u>	<u>Daily Intake</u>	<u>Daily Intake</u>	<u>Daily Intake</u>
Sugar Norm (HIGH) 500mg	x 4	x 4	x 4
Maqui Select (HIGH) 500mg	x 1	x 1	x 1
Five Ginsengs (LOW) 500mg	x 2	x 2	x 2
Chromium 200mcg	x 2	x 2	x 2
Power Mushrooms 500mg	x 1	x 1	x 1
Vitamin E 400mg			
<u>Foods to Avoid:</u> Avoid all processed foods, saturated fats and alcohol, sugar / sweets, caffeine, nicotine, chocolate, cola, simple processed carbohydrates	<u>Recommended Foods:</u> Increase fresh vegetables, garlic, onions & fruits, soy products, whole grains and beans. Increase fiber from more plant foods.		
<u>Exercise:</u> At least 30 minutes a day for 3-5 days a week of recommended exercises.			
<u>Other:</u> <ul style="list-style-type: none"> You should strictly monitor your blood sugar levels on a daily basis. Drink at least 6-8 glasses of pure water a day. 			

Supplements for Diabetes

Following the recommendations for diabetes presented above, the protocols for other related medical problems will be suggested as well.

Note that the recommendations are directed primarily at the symptoms of diabetes, not at the disorder itself. Until a cure for the disorder is discovered, controlling its damage is paramount.

There are several major avenues of treatment for diabetes. All presume that the patient is taking a high-potency, easily assimilated, multi-vitamin/mineral complex as a basis for other specific, symptom-targeted supplements. The global objective of this approach is to limit, prevent, or in some cases reverse the vascular and neural damage seen in diabetes. This involves:



- **Improving the oxygen delivery capacity of the circulatory system by stopping, eliminating, or circumventing vascular blockage, thus improving cellular and neural health.**
- **Preventing diabetes-induced metabolic breakdowns.**
- **Reducing oxidative stress.**
- **Inducing angiogenesis (regenerating capillaries).**
- **Changing the lipid characteristics of blood corpuscles to make them less brittle and more capable of entering the small capillaries.**
- **Preventing endoneural hypoxia (oxygen deficiency in the tissues).**

CAUTION: It is important that those with type I (IDDM) diabetes work closely with their Medical Doctor when starting a supplement program, as the herbs may make the body more sensitive to insulin injections.

The following are the most important supplements for the aggressive treatment of diabetes:

Antioxidants

Oxidative damage plays critical roles in the complications of diabetes, including being part of the glycosylation process. Here are the most important antioxidants used to combat this oxidative stress:

Vitamin E - This nutrient also protects prostacyclin, widens blood vessels, and thins the blood. Recommended dosage: 400 mg once daily initially, then gradually raised to 400 mg 2 or 3 times daily.

Vitamin C - Recommended dosage: 2500 mg daily, in divided doses.

Coenzyme Q10 - CoQ10 is also an immune boosting agent. Recommended dosage: 30 to 100 mg. daily.

Chromium picolinate - 200 mcg. twice daily

Because of chromium's ability to enhance cellular absorption (increasing the efficiency of insulin), Type II diabetics should be aware of the possibility that their medications may need lowering.

Chromium supplementation can have a profound effect on health and nutrition. It has become extremely popular in recent years due to its ability to lower body weight and increase lean body mass. Studies have shown that chromium picolinate can help those who suffer from high blood fat, high blood sugar, obesity, food cravings and osteoporosis.

The importance of chromium in human nutrition was discovered in 1957 when it was shown that chromium was essential to proper blood sugar control. Chromium plays a key role in increasing the body's sensitivity to insulin. Without chromium, insulin's action is blocked and blood sugar levels are elevated. Insulin allows the body to breakdown carbohydrates, fat and protein naturally. As a result, chromium supplements can be beneficial in promoting weight loss, as well as treating diabetes, hypoglycemia and high cholesterol. Chromium picolinate was introduced in 1988 when a scientist from a mid-western college reported that it increased lean body mass in male athletes. Chromium picolinate is chromium bound to amino acid. Because the body does



wellness article

not absorb chromium well, the amino acid (picolinate) is added to help aid absorption. Studies show that chromium levels are deficient in 90% of the adult population and chromium is not abundantly supplied in the typical American diet. The best source of chromium is true brewer's yeast. It is also found in many grains and cereals, but may be lacking if they are refined. Believe it or not, scrapings from stainless steel pots and pans provide much of the chromium in many people's diet. Many doctors recommend a daily chromium supplement of 200 mcg; however, daily intake can range from 50 – 200 mcg, depending on individual needs. Strenuous physical activity increases the need for chromium.

Do not take more than 300 mcg per day without a doctor's supervision. Certain medications interact in a positive and/or negative way with chromium. Check with your doctor if you are currently taking any medications.

Chromium picolinate is an important mineral that helps regulate blood-sugar levels. In a recent study, 180 men and women with Type II diabetes were divided into three groups. Each supplemented twice daily with 100 mcg chromium picolinate, 500 mcg chromium picolinate or placebo. They maintained their existing eating and lifestyle habits. After four months, fasting and two-hour glucose levels were significantly reduced in the 500 mcg group, while fasting and two-hour insulin values were significantly reduced in both chromium groups.⁽¹⁾

Preliminary research in animals⁽³⁾ and humans^(4,5) suggested that chromium picolinate increases fat loss and lean muscle tissue gain. Though some follow-up research in people has not confirmed chromium picolinate to have a significant effect in altering body composition,⁽⁶⁾ double blind research has reported reduction in body fat (7) and body weight⁽⁸⁾ in people given 400 mcg of chromium picolinate per day for three months.

Herbs

MAQUI SELECT 1 x 2 x day

Helps maintain healthy blood sugar levels Maqui Select® extract stabilizes blood glucose levels, helping to control metabolic balance. As mentioned previously, the delphinidins of Maqui Select® have powerful anti-inflammatory effects, due to their activation of the PPAR receptor. This activation mechanism is strongly correlated with the control of Type 2 diabetes as it enhances insulin sensitivity. Also, since hyperglycemic episodes in diabetic patients are closely linked to nitro-oxidative or oxidative stress --the most important factor in the onset and progress of vascular and kidney complications from Type 1 and Type 2 diabetes-- the potent effect of Maqui Select® may help prevent the pro-oxidant effects of hyperglycemia.

In conclusion, studies show that the delphinidins of Maqui Select® significantly increase the expression of adipocytokine genes, PPAR and specific adipocyte genes in humans and can be an excellent complement in regulating the adipocyte function, reducing body weight and controlling metabolic problems related to overweight and obesity.



Sugar Norm Formula 2 x 3 x day,

Gymnema sylvestre is an Indian Ayurvedic herb commonly used by diabetics. Animal tests and in vitro assays suggest that gymnema extracts suppress intestinal absorption of saccharides, which prevents blood-sugar elevations. A 1997 Japanese animal study of gymnemic acids from *Gymnema sylvestre* leaves looked at the effects of nine fractionated extracts on blood glucose in guinea pigs and rats. Two fractions suppressed the elevation of blood glucose by inhibiting glucose uptake in the intestine.⁽²⁾ This study shows promise for *Gymnema sylvestre* as an herb that can block sugar absorption

Fenugreek Seeds are low in dietary fiber, which may be the main reason they can lower blood sugar levels in diabetes. One human study found that fenugreek can help lower cholesterol and blood sugar levels in persons with moderate atherosclerosis and non-insulin-dependent diabetes.¹

Bilberry has the ability to reduce blood sugar levels, confirming its similar traditional/folk use. It has a multi-purpose use for this condition because studies show it to be beneficial on disorders of vessels in the conjunctiva of diabetic and pre-diabetic patients with tendencies toward glaucoma and stimulation of peripheral circulation. The anthocyanoside myrtillin, found in Bilberry fruit, has been indicated to improve collagen integrity, capillary fragility and reduce serum cholesterol triglyceride levels.

Ginseng. Research indicates that it regulates blood sugar levels and improves circulation. It can be used as a general tonic and for specific purposes. The ginsenosides contained in this herb are usually credited for many of its actions but they are devoid of hypoglycemic action which places importance on using extracts made of the whole root and not just laboratory concocted isolated ginsenoside type products. What baffles the scientific world is that Ginseng balances blood sugar only in individuals who need such an action. Because it also has an ability to decrease atherosclerosis, makes Ginseng even more suitable support for the treatment of diabetes.

Ginseng is one of the most widely used herbs, is believed to play a role in carbohydrate metabolism and diabetes mellitus.

American ginseng reduced postprandial glycemia (stabilizing blood sugar levels after a meal) in both study groups. For nondiabetic subjects, to prevent unintended hypoglycemia it may be important that the American ginseng be taken with the meal.

References

Chromium picolinate

1. Anderson RA, et al. Elevated intakes of supplemental chromium improve glucose and insulin variables in individuals with type 2 diabetes. *Diabetes* 1997 Nov;46(11):1786-91.
2. Shimizu K, et al. Suppression of glucose absorption by some fractions extracted from *Gymnema sylvestre* leaves. *J Vet Med Sci* 1997 Apr;59(4):245-51.

3. Page TG, Ward TL, and Southern LL. Effect of chromium picolinate on growth and carcass characteristics of growing-finishing pigs. *J Animal Sci* 1991;69:356.
4. Lefavi R, Anderson R, Keith R, et al. Efficacy of chromium supplementation in athletes: Emphasis on anabolism. *Int J Sport Nutr* 1992;2:111–22.
5. McCarty MF. The case for supplemental chromium and a survey of clinical studies with chromium picolinate. *J Appl Nutr* 1991;43:59–66.
6. Hallmark MA, Reynolds TH, DeSouza CA, et al. Effects of chromium and resistive training on muscle strength and body composition. *Med Sci Spt Ex* 1996;28:139–44.
7. Kaats GR, Blum K, Fisher JA, Adelman JA. Effects of chromium picolinate supplementation on body composition: a randomized, double-masked, placebo-controlled study. *Curr Ther Res* 1996;57:747–56.
8. Kaats GR, Blum K, Pullin D, Keither SC, Wood R. A randomized, double-masked, placebo-controlled study of the effects of chromium picolinate supplementation on body composition: a replication and extension of a previous study. *Curr Ther Res* 1998;59:379–88.

Sugar Lower Formula Ingredients

Gymnema

- Chattopadhyay RR. A comparative evaluation of some blood sugar lowering agents of plant origin. *J Ethnopharmacol.* 1999 Nov 30;67(3):367-72.
- Persaud SJ, Al-Majed H, Raman A, Jones PM. Gymnema sylvestre stimulates insulin release in vitro by increased membrane permeability. *J Endocrinol.* 1999 Nov;163(2):207-12. *Gymnema sylvestre.* *Altern Med Rev.* 1999 Feb;4(1):46-7.
- Baskaran K, Kizar Ahamath B, Radha Shanmugasundaram K, Shanmugasundaram ER. Antidiabetic effect of a leaf extract from *Gymnema sylvestre* in non-insulin-dependent diabetes mellitus patients. *J Ethnopharmacol.* 1990 Oct;30(3):295-300
- Shanmugasundaram ER, Rajeswari G, Baskaran K, Rajesh Kumar BR, Radha Shanmugasundaram K, Kizar Ahmath B. Use of *Gymnema sylvestre* leaf extract in the control of blood glucose in insulin-dependent diabetes mellitus. *J Ethnopharmacol.* 1990 Oct;30(3):281-94.
- Shanmugasundaram ER, Gopinath KL, Radha Shanmugasundaram K, Rajendran VM. Possible regeneration of the islets of Langerhans in streptozotocin-diabetic rats given *Gymnema sylvestre* leaf extracts. *J Ethnopharmacol.* 1990 Oct;30(3):265-79.
- Okabayashi Y, Tani S, Fujisawa T, Koide M, Hasegawa H, Nakamura T, Fujii M, Otsuki M. Effect of *Gymnema sylvestre*, R.Br. on glucose homeostasis in rats. *Diabetes Res Clin Pract.* 1990 May-Jun;9(2):143-8.
- Dogar IA, Ali M, Yaqub M. Effect of *Grewia asiatica*, *Gossypium herbacium* and *Gymnema sylvestre* on blood glucose, cholesterol and triglyceride levels in normoglycaemic and alloxan diabetic rabbits. *J Pak Med Assoc.* 1988 Nov;38(11):289-95.
- Srivastava Y, Nigam SK, Bhatt HV, Verma Y, Prem AS. Hypoglycemic and life-prolonging properties of *Gymnema sylvestre* leaf extract in diabetic rats. *Isr J Med Sci.* 1985 Jun;21(6):540-2.
- Khare AK, Tondon RN, Tewari JP. Hypoglycemic activity of an indigenous drug (*Gymnema sylvestre*, 'Gurmar') in normal and diabetic persons. *Indian J Physiol Pharmacol.* 1983 Jul-Sep;27(3):257-8.
- Shanmugasundaram KR, Panneerselvam C, Samudram P, Shanmugasundaram ER. Enzyme changes and glucose utilization in diabetic rabbits: the effect of *Gymnema sylvestre*, R.Br. *J Ethnopharmacol.* 1983 Mar;7(2):205-34.
- Rathi AN, Visvanathan A, Shanmugasundaram KR. Studies on protein-bound polysaccharide components & glycosaminoglycans in experimental diabetes—effect of *Gymnema sylvestre*, R.Br. *Indian J Exp Biol.* 1981 Aug;19(8):715-21.

Shanmugasundaram KR, Panneerselvam C, Samudram P, Shanmugasundaram ER. The insulinotropic activity of *Gymnema sylvestre*, R. Br. An Indian medical herb used in controlling diabetes mellitus. *Pharmacol Res Commun*. 1981 May;13(5):475-86.

Fenugreek Seeds

Bordia A, Verma SK Effect of fenugreek on blood lipids, blood sugar, and platelet aggregation in patients with coronary artery disease. *Prostaglandin Leukotrienes Essential Fatty Acids* 1997; 56: 379-84

Genet S, Kale RK, Baquer NZ. Effects of vanadate, insulin and fenugreek (*Trigonella foenum graecum*) on creatine kinase levels in tissues of diabetic rat. *Indian J Exp Biol*. 1999 Feb;37(2):200-2.

Ravikumar P, Anuradha CV. Effect of fenugreek seeds on blood lipid peroxidation and antioxidants in diabetic rats. *Phytother Res*. 1999 May;13(3):197-201.

Khosla P, Gupta DD, Nagpal RK. Effect of *Trigonella foenum graecum* (Fenugreek) on blood glucose in normal and diabetic rats. *Indian J Physiol Pharmacol*. 1995 Apr;39(2):173-4.

Sharma RD, Raghuram TC, Rao NS. Effect of fenugreek seeds on blood glucose and serum lipids in type I diabetes. *Eur J Clin Nutr*. 1990 Apr;44(4):301-6.

Madar Z, Abel R, Samish S, Arad J. Glucose-lowering effect of fenugreek in non-insulin dependent diabetics. *Eur J Clin Nutr*. 1988 Jan;42(1):51-4.

Ribes G, Sauvaire Y, Da Costa C, Baccou JC, Loubatieres-Mariani MM. Antidiabetic effects of subfractions from fenugreek seeds in diabetic dogs. *Proc Soc Exp Biol Med*. 1986 Jun;182(2):159-66.

Ribes G, Sauvaire Y, Baccou JC, Valette G, Chenon D, Trimble ER, Loubatieres-Mariani MM. Effects of fenugreek seeds on endocrine pancreatic secretions in dogs. *Ann Nutr Metab*. 1984;28(1):37-43.

Eight Ingredient Pill with *Rehmannia* (Hachimi-jio-gan)

Shoji M, Sato H, Hirai Y, Oguni Y, Sugimoto C, Morishita S, Ito C. [Pharmacological effects of Gosha-jinki-gan-ryo extract: effects on experimental diabetes]. *Nippon Yakurigaku Zasshi*. 1992 Mar;99(3):143-52

Goto M, Hayashi M, Todoroki T, Seyama Y, Yamashita S. [Effects of traditional Chinese medicines (dai-saiko-to, sho-saiko-to and hachimi-zio-gan) on spontaneously diabetic rat (WBN/Kob) with experimentally induced lipid and mineral disorders]. *Nippon Yakurigaku Zasshi*. 1992 Oct;100(4):353-8.

Shoji M, Sato H, Hirai Y, Oguni Y, Sugimoto C, Morishita S, Ito C. [Pharmacological effects of Gosha-jinki-gan-ryo extract: effects on experimental diabetes]. *Nippon Yakurigaku Zasshi*. 1992 Mar;99(3):143-52.

Five Ginseng Formula Ingredients

Ginseng

American ginseng (*Panax quinquefolius* L) reduces postprandial glycemia in nondiabetic subjects and subjects with type 2 diabetes mellitus. Vuksan V, Sievenpiper JL, Koo VY, Francis T, Beljan-Zdravkovic U, Xu Z, Vidgen E., Department of Nutritional Sciences, Faculty of Medicine, University of Toronto, St. Michael's Hospital, Ontario, Canada

Davydov VV, Molokovskii DS, Limarenko AI. Efficacy of ginseng drugs in experimental insulin-dependent diabetes and toxic hepatitis. *Patol Fiziol Eksp Ter*. 1990 Sep-Oct;(5):49-52. Russian.

Sotaniemi EA, Haapakoski E, Rautio A. Ginseng therapy in non-insulin-dependent diabetic patients. *Diabetes Care*. 1995 Oct;18(10):1373-5.

Vuksan V, Stavro MP, Sievenpiper JL, Beljan-Zdravkovic U, Leiter LA, Josse RG, Xu Z. Similar postprandial glycemic reductions with escalation of dose and administration time of American ginseng in type 2 diabetes. *Diabetes Care*. 2000 Sep;23(9):1221-6.

Power Mushroom Ingredients

Kimura Y, Okuda H, Arichi S. Effects of the extracts of *Ganoderma lucidum* on blood glucose level in rats. *Planta Med.* 1988 Aug;54(4):290-4.

Kubo K, Aoki H, Nanba H. Anti-diabetic activity present in the fruit body of *Grifola frondosa* (Maitake). *I. Biol Pharm Bull.* 1994 Aug;17(8):1106-10.

Maqui Select

- Hidalgo M. A.; Ojeda J.; Jara E.; Molina L. ;Giori A.; Hancke J. L.; Burgos R. A. (2010) Effects of juice of the berry *Aristotelia chilensis* on COX-2 expression, NF-kB, ERK1/2, PI3K/Akt and apoptosis in colon cancer cells (in preparation)
- Hancke J.; Rojas F., Caballero E., Burgos R.A. (2009) Sub-chronic toxicological study of *Aristotelia chilensis* concentrate administered in rats for 60 days Biochemical & Hematological Analysis. Institute of Pharmacology and Morphophysiology, Universidad Austral de Chile. (IN House report)
- Jara, E.; Burgos, R.A.; Hidalgo, M.A.; Hancke, J. (2010) Delphinidin induces calcium mobilization and the production of IL-2 through of the store-operated calcium entry in T cells. Joint meeting of the The Society of Leukocyte Biology and the International Endotoxin and Innate Immunity Society in Vancouver, British Columbia, Canada on October 7-9, 2010. The Three Rs of Immunity: Recognition, Response and Resolution". (abstract)
- Cao, G. & Prior, L. (1996) Plant pigments paint a rainbow of antioxidants, *Agricultural Research*, nov., p. 4 - 8.
- Gaziano, J.M.; Manson, J.E.; Buring, J.E.; Hennekens, C.H. (1992) Dietary antioxidants and cardiovascular disease. *Ann. N. Y. Acad. Sci.*, 669, 249-258.
- Montecino, S. & Conejeros, A. (1985) Mapuche women: traditional wisdom in curing common illnesses. *Serie Mujer y Salud*, Centro de Estudios de la Mujer.
- Muñoz, O.; Montes, M.; Wilkomirsky, T. (2001). *Medicinal plants in Chile: chemistry and pharmacognosis*. Editorial Universitaria. University of Chile. 330 pp.
- Miranda-Rottmann, S., et al. (2002). Polyphenol rich fractions of the berry *Aristotelia chilensis* inhibit LDL oxidation in-vitro and protect human endotelial cells against oxidative stress. *Free Radical Biology & Medicine* (Oxygen Society), XI Meeting of the Society for Free Radical Research International, July 16-20, René Descartes University, Paris, France.
- Miranda-Rottmann, S., et al. (2002). Juice and phenolic practions of the berry *Aristotelia chilensis* inhibit LDL oxidation in vitro and protect human endotelial cells against oxidative stress. *Journal of Agricultural and Food Chemistry*. 50, 7542-7547.
- Seeram N.P. (2008) Berry fruits compositional elements, biochemical activities, and the impact of their intake on human health, performance, and disease. *Journal of Agricultural Food Chem.* 2008 Feb 13;56(3):627-9.
- Escribano-Bailón M.T.; Alcalde-Eon C.; Muñoz O.; Rivas-Gonzalo J.C.; Santos-Buelga C.; (2006) Anthocyanins in berries of Maqui (*Aristotelia chilensis*). *Phytochem Anal.* Jan-Feb;17(1):8-14.