



Metabolic Syndrome Support

Useful Standard Process and MediHerb Products

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A Division of Advanced Holistic Centers of America®

Leesburg, VA

Loudounholistichealthpartners.com

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Products with Benefits

- Fen-Gre®
- Gymnema 4g
- Vitanox®
- Cataplex® GTF
- Whey Pro Complete
- Pancreatrophin PMG®

...and so many more!!

Fenugreek

Annual clover-like herb

- Native to southern Europe/Asia
- India is world's largest producer
- Common names: Trigonella, Methi, Bird's foot
- Key ingredient in curry recipes

Active ingredients

- **Saponins** – Graecunins, fenugrin B, fenugreekine, etc.
- **Steroid saponogens** – Diosgenin, yamogenin, etc.
- **Fiber** – Galactomannin, gum
- **AA's** – 4-Hydroxyisoleucine, arginine, lysine, histidine
- **Flavanoids** – Quercetin, luteolin, etc.
- **Other** – Coumarin

Fenugreek

Benefits for Metabolic Syndrome

- **Hyperglycemia**

- Stimulates insulin synthesis by β -cells
 - 4-hydroxyisoleucine
- Stimulates insulin signaling pathways
 - Increased GLUT4 translocation in adipocytes/hepatocytes
 - Increased insulin receptor activation (via phosphorylation)
 - 4-hydroxyisoleucine
- Decreased hepatic gluconeogenesis
- Increased glycogen formation
- Decreased GI CHO digestion/absorption

Fenugreek

Benefits for Metabolic Syndrome

- **Cardiovascular**

- Endothelial relaxation via eNOS → NO
- Triglyceride/cholesterol reductions in hepatocytes and serum
 - Disogenin inhibits lipid accumulation by hepatocytes
 - 4-hydroxyisoleucine reduces serum TG/TC levels
 - Upregulation of LDL receptors
- Reduced lipid peroxidation in hepatocyte, kidney, brain
- Increased SOD in hepatocyte, brain, kidney, heart

Fenugreek

Human Trials

- 25 newly diagnosed T2DM patients
 - J Assoc Physicians India. 2001 Nov;49:1057-61
- 2 treatment groups
 - Treatment: 1 gm/d fenugreek seed extract
 - Usual care: diet/exercise
 - Both groups had similar traits pre-study:
 - Body parameters
 - GTT, lipids, C-peptide, HgbA1c
 - HOMA-model insulin resistance

Fenugreek

Human Trials

Parameter	Difference between the groups
FBS	- 20%
2hr post-glucose BS	-14%
AUC glucose (total glucose exposure)	-92%**
UC Insulin (total insulin exposure)	-56%**
HOMA-model IR	Improved**
Triglycerides	Decreased**
Total HDL	Increased**
(** = statistically significant difference when fenugreek and usual care group compared)	

Fenugreek

Human Trials

- 69 T2DM patients Chin J Integr Med. 2008 Mar;14(1):56-60.
 - Not controlled by oral sulfonylurea drug (SFU)
- Randomized to 2 groups
 - Treated (n=46) – received fenugreek tid (DOSE NOT SPECIFIED)
 - Control (n=23) – received placebo tid
 - Both groups continued SFU
- Statistically significant ($p < 0.05$ or $p < 0.01$) :
 - FBS, 2h PPBS, HgbA1c, clinical symptom scores
- No significant difference:
 - BMI, renal function, hepatic function

Fen-Gre®

810mg fenugreek seed powder per serving (3 capsules)

- Also in Fen-Cho and Emphaplex
- Confirmed
4-hydroxyisoleucine content



Fen-Gre®

How I utilize in my practice

- 3 capsules 2 to 3 times daily
- **Capsules**
 - Fenugreek bread is available *J Med Food. 2009 Oct;12(5):1046-9.*
 - No statistically significant difference in texture, firmness, color, flavor compared to whole wheat
 - Statistically significant decrease in insulin AUC
 - Be careful if patient is on prescription diabetes meds
 - May need to reduce dose of Rx
 - Vanadium enhances effect of Fenugreek *J Biosci. 2011 Jun;36(2):383-96.*
 - Take away from other medications
 - Fiber can slow absorption

Fenugreek references

- Kochhar A, et al. Effect of supplementation of traditional medicinal plants on blood glucose in non-insulin-dependent diabetics: a pilot study. *J Med Food*. 2005 Winter;8(4):545-9.
- Shekelle PC, et al. Are Ayurvedic herbs for diabetes effective? *J Fam Pract*. 2005 Oct;54(10):876-86.
- Vijayakumar MV, et al. The hypoglycaemic activity of fenugreek seed extract is mediated through the stimulation of an insulin signalling pathway. *Br J Pharmacol*. 2005 Sep;146(1):41-8.
- Cicero AF, et al. What do herbalists suggest to diabetic patients in order to improve glycemic control? Evaluation of scientific evidence and potential risks. *Acta Diabetol*. 2004 Sep;41(3):91-8.
- Puri D, et al. Mechanism of action of a hypoglycemic principle isolated from fenugreek seeds. *Indian J Physiol Pharmacol*. 2002 Oct;46(4):457-62.
- Basch E, et al. Therapeutic applications of fenugreek. *Altern Med Rev*. 2003 Feb;8(1):20-7.
- Gupta A, et al. Effect of *Trigonella foenum-graecum* (fenugreek) seeds on glycaemic control and insulin resistance in type 2 diabetes mellitus: a double blind placebo controlled study. *J Assoc Physicians India*. 2001 Nov;49:1057-61.
- Losso JN, et al. Fenugreek bread: a treatment for diabetes mellitus. *J Med Food*. 2009 Oct;12(5):1046-9.
- Baquer NZ, et al. Metabolic and molecular action of *Trigonella foenum-graecum* (fenugreek) and trace metals in experimental diabetic tissues. *J Biosci*. 2011 Jun;36(2):383-96.
- Middha SK, et al. Protective role of *Trigonella foenum-graecum* extract against oxidative stress in hyperglycemic rats. *Eur Rev Med Pharmacol Sci*. 2011 Apr;15(4):427-35.
- Xie W, et al. Traditional chinese medicines in treatment of patients with type 2 diabetes mellitus. *Evid Based Complement Alternat Med*. 2011;2011:726723. Epub 2011 Mar 17.
- Ramadan G, et al. Anti-metabolic syndrome and immunostimulant activities of Egyptian fenugreek seeds in diabetic/obese and immunosuppressive rat models. *Br J Nutr*. 2011 Apr;105(7):995-1004. Epub 2010 Dec 23.

Fenugreek references

- Moorthy R, et al. Mechanism of anti-diabetic action, efficacy and safety profile of GII purified from fenugreek (*Trigonella foenum-graceum* Linn.) seeds in diabetic animals. *Indian J Exp Biol.* 2010 Nov;48(11):1119-22.
- Moorthy R, et al. Anti-hyperglycemic compound (GII) from fenugreek (*Trigonella foenum-graecum* Linn.) seeds, its purification and effect in diabetes mellitus. *Indian J Exp Biol.* 2010 Nov;48(11):1111-8.
- Uemura T, et al. Diosgenin, the main aglycon of fenugreek, inhibits LXR α activity in HepG2 cells and decreases plasma and hepatic triglycerides in obese diabetic mice. *J Nutr.* 2011 Jan;141(1):17-23. Epub 2010 Nov 24.
- Tripathi UN, et al. The plant extracts of *Momordica charantia* and *Trigonella foenum-graecum* have anti-oxidant and anti-hyperglycemic properties for cardiac tissue during diabetes mellitus. *Oxid Med Cell Longev.* 2009 Nov-Dec;2(5):290-6.
- Sirtori CA, et al. Functional foods for dyslipidaemia and cardiovascular risk prevention. *Nutr Res Rev.* 2009 Dec;22(2):244-61.
- Yadav M, et al. Complementary and comparative study on hypoglycemic and antihyperglycemic activity of various extracts of *Eugenia jambolana* seed, *Momordica charantia* fruits, *Gymnema sylvestre*, and *Trigonella foenum graecum* seeds in rats. *Appl Biochem Biotechnol.* 2010 Apr;160(8):2388-400. Epub 2009 Nov 11.
- Kassaian N, et al. Effect of fenugreek seeds on blood glucose and lipid profiles in type 2 diabetic patients. *Int J Vitam Nutr Res.* 2009 Jan;79(1):34-9.
- Nahas R, et al. Complementary and alternative medicine for the treatment of type 2 diabetes. *Can Fam Physician.* 2009 Jun;55(6):591-6.
- Modak M, et al. Indian herbs and herbal drugs used for the treatment of diabetes. *J Clin Biochem Nutr.* 2007 May;40(3):163-73.

Fenugreek references

- Lu FR, et al. Clinical observation on trigonella foenum-graecum L. total saponins in combination with sulfonylureas in the treatment of type 2 diabetes mellitus. *Chin J Integr Med.* 2008 Mar;14(1):56-60.
- Hannan JM, et al. Soluble dietary fibre fraction of *Trigonella foenum-graecum* (fenugreek) seed improves glucose homeostasis in animal models of type 1 and type 2 diabetes by delaying carbohydrate digestion and absorption, and enhancing insulin action. *Br J Nutr.* 2007 Mar;97(3):514-21.
- Srichamroen A, et al. In vitro intestinal glucose uptake is inhibited by galactomannan from Canadian fenugreek seed (*Trigonella foenum graecum* L) in genetically lean and obese rats. *Nutr Res.* 2009 Jan;29(1):49-54.
- Vijayakumar MV, et al. Hypolipidemic effect of fenugreek seeds is mediated through inhibition of fat accumulation and upregulation of LDL receptor. *Obesity (Silver Spring).* 2010 Apr;18(4):667-74. Epub 2009 Oct 22.
- Broca C, et al. 4-Hydroxyisoleucine: experimental evidence of its insulinotropic and antidiabetic properties. *Am J Physiol.* 1999 Oct;277(4 Pt 1):E617-23.
- Narender T, et al. 4-hydroxyisoleucine an unusual amino acid as antidyslipidemic and antihyperglycemic agent. *Bioorg Med Chem Lett.* 2006 Jan 15;16(2):293-6. Epub 2005 Oct 21.
- Jette L, et al. 4-Hydroxyisoleucine: a plant-derived treatment for metabolic syndrome. *Curr Opin Investig Drugs.* 2009 Apr;10(4):353-8.
- Broca C, et al. Insulinotropic agent ID-1101 (4-hydroxyisoleucine) activates insulin signaling in rat. *Am J Physiol Endocrinol Metab.* 2004 Sep;287(3):E463-71. Epub 2004 Apr 13.

Gymnema sylvestre

Climbing herb native to tropical India

Also known as Gurmar (Hindi)

- For healthy sugar metabolism

Active ingredients

- Gymnemic acids, triterpenoid saponins
- Betaine and choline
- Phytosterols

Common uses

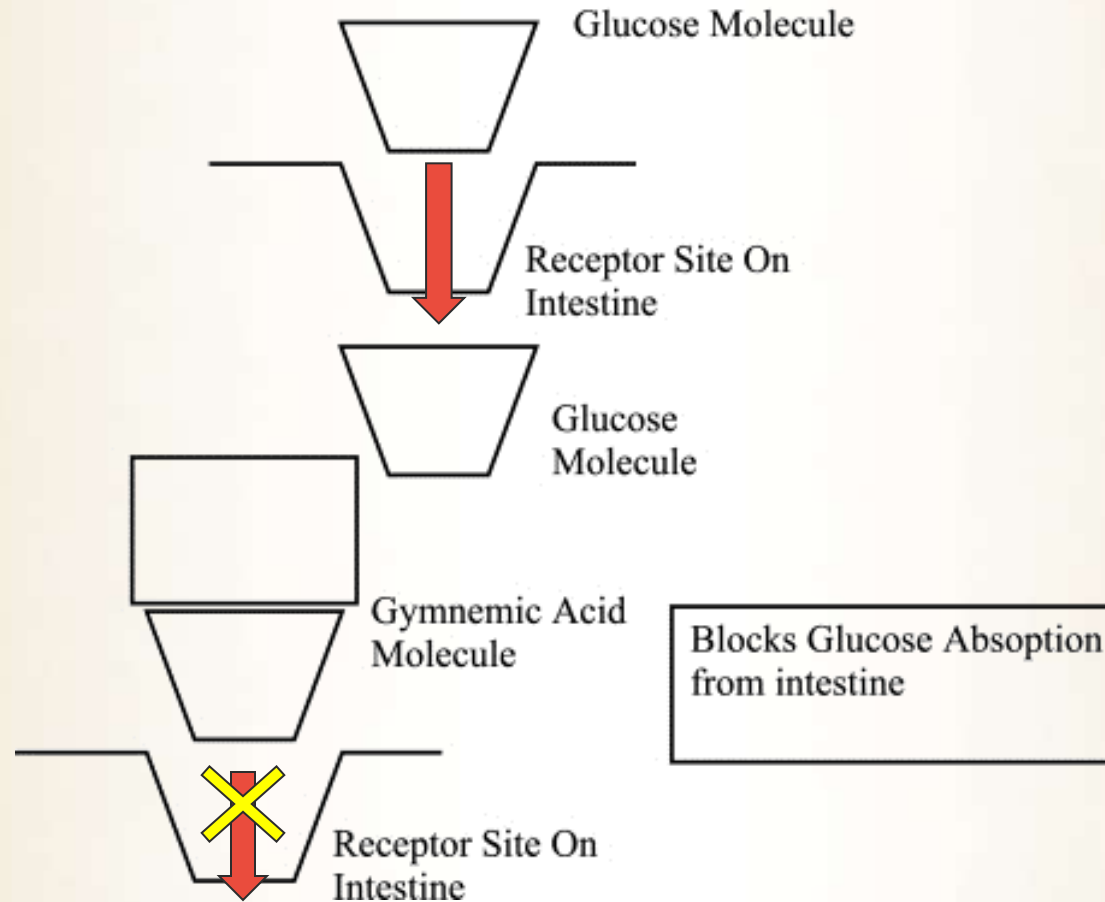
- Maintain healthy weight
- Support cholesterol/lipid in a healthy range

Gymnema sylvestre

Benefits for Metabolic Syndrome

- Beta-cell regeneration
- Increased insulin secretion
- Decreased intestinal absorption of sugar
- Increased glucose utilization
- Decreased gluconeogenesis
- Decreased blood and liver triglycerides

Gymnema sylvestre



Kanetkar P.V, et al. Mysore, India: 2004

MediHerb | Gymnema 4g

How I utilize in my practice

- 1 to 2 tablets 3 times per day
- Tablets
 - Recommend taking with meals
 - Reduces glucose absorption
 - Supports beta cell function
 - Can suck on 1/2 tablet before sugar ingestion (60 sec is enough)
 - Effect lasts 1-2 hrs
 - Leaf extracts are most useful
 - Be careful with those taking prescription diabetes meds – recommend they speak with their treating physician before taking



Gymnema sylvestre references

- Ahmed AB, et al. In vitro callus and in vivo leaf extract of *Gymnema sylvestre* stimulate β -cells regeneration and anti-diabetic activity in Wistar rats. *Phytomedicine*. 2010 Nov;17(13):1033-9. Epub 2010 Jul 27.
- Liu B, et al. Characterisation of the insulinotropic activity of an aqueous extract of *Gymnema sylvestre* in mouse beta-cells and human islets of Langerhans. *Cell Physiol Biochem*. 2009;23(1-3):125-32. Epub 2009 Feb 18.
- Sahu N., Mahato S.B., Sarkar S.K., Poddar G. Triterpenoid Saponins from *Gymnema sylvestre*. *Phytochem*. 1996;41:1181–1185.
- Persaud SJ, et al. *Gymnema sylvestre* stimulates insulin release in vitro by increased membrane permeability. *J Endocrinol*. 1999 Nov;163(2):207-12.
- Shigematsu N, et al. Effect of long term-administration with *Gymnema sylvestre* R. BR on plasma and liver lipid in rats. *Biol Pharm Bull*. 2001 Jun;24(6):643-9.
- Shanmugasundaram ER, Rajeswari G, Baskaran K, et al. Use of *Gymnema sylvestre* leaf in the control of blood glucose in insulin-dependent diabetes mellitus. *J Ethnopharmacol* 1990;30:281-294.
- Kanetkar P.V., Laddha K.S., Kamat M.Y. Poster presented at the 16th ICFOST meet organized by CFTRI and DFRL, Mysore, India: 2004. Gymnemic acids: A molecular perspective of its action on carbohydrate metabolism.

Chromium

Different forms available

- **Trivalent (3+)** – chromium piccolinate (and others)
 - Effective in some studies, but **cancer concerns** raised
 - Prone to oxidative damage
- **GTF – glucose tolerance factor**
 - Chromium + nicotinic acid+ amino acids (glutamate, cysteine, or glycine)
 - Biologically active form
 - Can be acquired from food (esp. meat/nutritional yeast) or synthesized in vivo
 - Most absorbable trivalent form of chromium

GTF Chromium

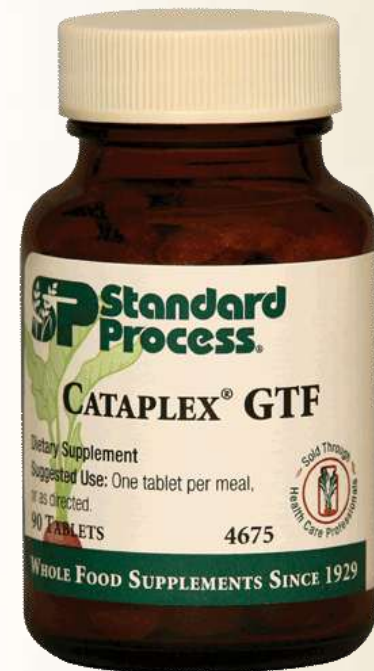
Benefits for Metabolic Syndrome

- **Enhanced insulin effect at skeletal muscle**
 - Those taking insulin should consult prescribing physician
- **Increased insulin receptor number**
 - Nuclear DNA binding and manipulation
- **Activation of insulin receptor and IGF-1**
- **Activates Low Molecular Weight Chromium binding substance (LMWCr)**
 - activates insulin receptor tyrosine kinase
- **Lower triglycerides**
- **Helps support healthy cholesterol already in a normal range**
- **Reduced carb/sugar cravings**

Cataplex® GTF

An effective combination of nutrients
acting synergistically to
improve insulin resistance

- Nutritional yeast, cysteine,
pancreas Cytosol, niacinamide



Cataplex[®] GTF

How I utilize it in my practice

- 1 to 3 tabs per meal
- **Tablets**
 - Useful for healthy sugar metabolism
 - Chromium competes with iron for transferrin binding
 - Safe up to 2g/day
 - Also find GTF in Diaplex (plus digestive support)

GTF Chromium references

- Kaats GR, et al. A combination of l-arabinose and chromium lowers circulating glucose and insulin levels after an acute oral sucrose challenge. *Nutr J*. 2011 May 6;10(1):42. [Epub ahead of print]
- Wiernsperger N, et al. Trace elements in glucometabolic disorders: an update. *Diabetol Metab Syndr*. 2010 Dec 19;2:70.
- Chen WY, et al. Chromium supplementation enhances insulin signalling in skeletal muscle of obese KK/HlJ diabetic mice. *Diabetes Obes Metab*. 2009 Apr;11(4):293-303. Epub 2008 Aug 20.
- Tuman RW, et al. Metabolic effects of the glucose tolerance factor (GTF) in normal and genetically diabetic mice. *Diabetes*. 1977 Sep;26(9):820-6.
- Sharma S, et al. Beneficial effect of chromium supplementation on glucose, HbA(1)C and lipid variables in individuals with newly onset type-2 diabetes. *J Trace Elem Med Biol*. 2011 May 11. [Epub ahead of print]
- Vincent JB. Relationship between glucose tolerance factor and low-molecular-weight chromium-binding substance. *J Nutr*. 1994 Jan;124(1):117-9.
- McCarty MF. The therapeutic potential of glucose tolerance factor. *Med Hypotheses*. 1980 Nov;6(11):1177-89.
- Grant AP, et al. The effect of brewers yeast containing glucose tolerance factor on the response to treatment in Type 2 diabetics. A short controlled study. *Ulster Med J*. 1982;51(2):110-4.
- Hummel M, et al. Chromium in metabolic and cardiovascular disease. *Horm Metab Res*. 2007 Oct;39(10):743-51.
- Simonoff M. Chromium deficiency and cardiovascular risk. *Cardiovasc Res*. 1984 Oct;18(10):591-6.
- Roeback JR Jr, et al. Effects of chromium supplementation on serum high-density lipoprotein cholesterol levels in men taking beta-blockers. A randomized, controlled trial. *Ann Intern Med*. 1991 Dec 15;115(12):917-24.
- Mertz W. Chromium in human nutrition: a review. *J Nutr*. 1993 Apr;123(4):626-33.

Vitanox

A synergistic blend of herbs which provide

- Strong antioxidant protection
- Effective support for insulin resistance
- **Green tea leaf**
 - Catechins
- **Turmeric**
 - Curcuminoids
- **Grape seed extract**
 - Procyanidins
- **Rosemary leaf**
 - Rosmarinic acid

Green Tea Extract (catechins)

- **Four major epicatechin derivatives**
 - epicatechin (EC)
 - epigallocatechin (EGC)
 - epicatechin gallate (ECG)
 - epigallocatechin gallate (EGCG)
- **Support for Metabolic Syndrome**
 - Increased GLUT-4 translocation – increased glucose uptake
 - Non-gallated catechins: EC, EGC
 - Decreased gut absorption of glucose
 - Gallated catechins: ECG, EGCG
 - Beta cell protection from cytokine destruction
 - Increased PPAR activity
 - Increased adiponectin
 - Improved lipids/BP
 - Decreased lipogenesis, gluconeogenesis

Turmeric (curcuminoids)

- Tropical, member of ginger family
- Multiple uses
 - Latest data – 61 clinical trials completed/underway (NIH)
- **Benefits for Metabolic Syndrome**
 - TZD-like effect (healthy inflammatory response)
 - PPAR activation, NF- κ B suppression, AMPK Activation
 - Lowers TNF-alpha, leptin, resistin
 - Upregulates adiponectin
 - Stimulates insulin release, inhibits gluconeogenesis

Grape Seed Extract (Procyanidins)

- **Proanthocyanidins, oligomeric proanthocyanidins (OPC), procyanidins**
- **Potent antioxidant activity**
 - Essentially oligomeric chains of antioxidants
- **Benefits for Metabolic Syndrome**
 - Enhanced insulin signaling effect
 - Increased GLUT-4 and Akt activity
 - Increased adiponectin
 - Increased glycogen synthesis



Rosemary Leaf Extract (Rosmarinic acid)

Mediterranean native, woody, perennial evergreen

Common uses

- Antioxidant activity

Benefits for Metabolic Syndrome

- Helps support normal cholesterol already in a normal range
- Reduced AGE formation (carnosol/carnosic acid)

MediHerb | Vitanox[®]

How I use it in my practice:

- 1 to 2 tabs twice daily
- **Tablets:**
 - Can be stimulating (green tea extract)
 - More OPC in apples than grapes – FYI
 - Also find OPC and Green Tea extracts in **OPC Synergy[®]**



Vitanox References

Green Tea Extract references

- Ueda M, et al. Tea catechins modulate the glucose transport system in 3T3-L1 adipocytes. *Food Funct.* 2010 Nov 2;1(2):167-73. Epub 2010 Oct 21.
- Park JH, et al. Ambivalent role of gallated catechins in glucose tolerance in humans: a novel insight into non-absorbable gallated catechin-derived inhibitors of glucose absorption. *J Physiol Pharmacol.* 2009 Dec;60(4):101-9.
- Hininger-Favier I, et al. Green tea extract decreases oxidative stress and improves insulin sensitivity in an animal model of insulin resistance, the fructose-fed rat. *J Am Coll Nutr.* 2009 Aug;28(4):355-61.
- Fukino Y, et al. Randomized controlled trial for an effect of green tea-extract powder supplementation on glucose abnormalities. *Eur J Clin Nutr.* 2008 Aug;62(8):953-60. Epub 2007 Jun 6.
- Serisier S, et al. Effects of green tea on insulin sensitivity, lipid profile and expression of PPARalpha and PPARgamma and their target genes in obese dogs. *Br J Nutr.* 2008 Jun;99(6):1208-16. Epub 2007 Dec 6.
- Venables MC, et al. Green tea extract ingestion, fat oxidation, and glucose tolerance in healthy humans. *Am J Clin Nutr.* 2008 Mar;87(3):778-84.
- Cao H, et al. Green tea polyphenol extract regulates the expression of genes involved in glucose uptake and insulin signaling in rats fed a high fructose diet. *J Agric Food Chem.* 2007 Jul 25;55(15):6372-8. Epub 2007 Jul 6.
- Li RW, et al. Green tea leaf extract improves lipid and glucose homeostasis in a fructose-fed insulin-resistant hamster model. *J Ethnopharmacol.* 2006 Mar 8;104(1-2):24-31. Epub 2005 Oct 3.

Vitanox References

Tumeric references

- El-Moselhy MA, et al. The antihyperglycemic effect of curcumin in high fat diet fed rats. Role of TNF- α and free fatty acids. *Food Chem Toxicol*. 2011 May;49(5):1129-40. Epub 2011 Feb 15.
- Shehzad A, et al. New mechanisms and the anti-inflammatory role of curcumin in obesity and obesity-related metabolic diseases. *Eur J Nutr*. 2011 Apr;50(3):151-61. Epub 2011 Mar 27.
- Mohankumar S, et al. An aqueous extract of *Curcuma longa* (turmeric) rhizomes stimulates insulin release and mimics insulin action on tissues involved in glucose homeostasis in vitro. *Phytother Res*. 2011 Mar;25(3):396-401. doi: 10.1002/ptr.3275. Epub 2010 Aug 23.
- Wickenberg J, et al. Effects of *Curcuma longa* (turmeric) on postprandial plasma glucose and insulin in healthy subjects. *Nutr J*. 2010 Oct 12;9:43.
- Fujiwara H. Curcumin inhibits glucose production in isolated mice hepatocytes. *Diabetes Res Clin Pract*. 2008 May;80(2):185-91. Epub 2008 Jan 24.

Vitanox References

Grape Seed Extract references

- Montagut G, et al. Effects of a grapeseed procyanidin extract (GSPE) on insulin resistance. *J Nutr Biochem.* 2010 Oct;21(10):961-7. Epub 2009 Dec 4.
- Meeprom A, et al. Grape seed extract supplementation prevents high-fructose diet-induced insulin resistance in rats by improving insulin and adiponectin signalling pathways. *Br J Nutr.* 2011 May 31:1-9. [Epub ahead of print]
- Kar P, et al. Effects of grape seed extract in Type 2 diabetic subjects at high cardiovascular risk: a double blind randomized placebo controlled trial examining metabolic markers, vascular tone, inflammation, oxidative stress and insulin sensitivity. *Diabet Med.* 2009 May;26(5):526-31.
- Montagut G, et al. Oligomers of grape-seed procyanidin extract activate the insulin receptor and key targets of the insulin signaling pathway differently from insulin. *J Nutr Biochem.* 2010 Jun;21(6):476-81. Epub 2009 May 14.

Rosemary Leaf Extract references

- Bakirel T, et al. In vivo assessment of antidiabetic and antioxidant activities of rosemary (*Rosmarinus officinalis*) in alloxan-diabetic rabbits. *J Ethnopharmacol.* 2008 Feb 28;116(1):64-73. Epub 2007 Nov 4.
- Ibarra A, et al. Carnosic acid-rich rosemary (*Rosmarinus officinalis* L.) leaf extract limits weight gain and improves cholesterol levels and glycaemia in mice on a high-fat diet. *Br J Nutr.* 2011 May 17:1-8. [Epub ahead of print]
- Hsieh CL, et al. Low-density lipoprotein, collagen, and thrombin models reveal that *Rosmarinus officinalis* L. exhibits potent antiglycative effects. *J Agric Food Chem.* 2007 Apr 18;55(8):2884-91. Epub 2007 Mar 27.

Whey Protein

Whey – A 5% solution of lactose in H₂O with minerals and lactalbumin

- Removed after cheese is processed
- Can be denatured by heat - **undesirable**
- 3 forms on the supplement market
 - Isolate – processed to remove fat/lactose, 90% protein
 - Lower in bioactivated compounds
 - Concentrate – x amounts fat/cholesterol, contains lactose
 - Protein content varies
 - Higher in bioactivated compounds
 - Hydrolysates – predigested, partially hydrolyzed
 - More easily absorbed, less allergenic
 - **May not have benefits of Isolate and Concentrate for Metabolic Syndrome**

Whey Protein

- **Abundant source of BCAA' s**
 - Excellent for protein synthesis
- **Abundant source of cysteine**
 - Regenerates glutathione
- **Benefits for Metabolic Syndrome**
 - Increased insulin production/sensitivity
 - Incretin hormone stimulation (glucagon-like peptide (GLP))
 - Lower fasting/post-prandial triglycerides and CRP
 - Appetite suppressing

Especially
if you load
pre-meal!

Whey Pro Complete

A whey protein powder formulated with other nutrient factors to enhance the antioxidant and immune support qualities.



Whey Pro Complete

- **Contains both whey concentrate AND isolate** in “nondenatured” form
 - Gives the highest AA content/highest bioactive compounds
- **Contains bovine colostrum**
 - Potent immune system support and GI mucosal support
 - Contains GTF/LMWCr! (Yamamoto A, et al. Purification and properties of biologically active chromium complex from bovine colostrum. J Nutr. 1988 Jan;118(1):39-45.)
- **Contains Inulin from chicory**
 - Pre-biotic support for the gut biome
- **Contains Soy lecithin**
 - Lowers TG/TC, raises HDL

Whey Pro Complete

How I use it in my practice

- **In blender carafe:**

- 1/2 coconut water
- 1/4 hemp or almond milk
- 1/4 coconut milk
- **2 to 5 scoops Whey Pro Complete**
- 1 tbsp nut butter
- 1/2 to 1 banana
- 1 tbsp cinnamon
- 2 tbsp flax oil
- Personalization options: maca, wheatgrass juice, acai, greens powder, raw egg yolk(s)
- MAKES 2-3 servings

Pearls:

- Pre-meal load with shake
- Post-exercise for recovery

Whey Protein references

- Shertzer HG, et al. Dietary whey protein lowers the risk for metabolic disease in mice fed a high-fat diet. *J Nutr.* 2011 Apr 1;141(4):582-7. Epub 2011 Feb 10.
- Perrone F, et al. Effects of preoperative feeding with a whey protein plus carbohydrate drink on the acute phase response and insulin resistance. A randomized trial. *Nutr J.* 2011 Jun 13;10:66.
- Morifuji M, et al. Comparison of different sources and degrees of hydrolysis of dietary protein: effect on plasma amino acids, dipeptides, and insulin responses in human subjects. *J Agric Food Chem.* 2010 Aug 11;58(15):8788-97.
- Pal S, et al. Acute effects of whey protein isolate on cardiovascular risk factors in overweight, post-menopausal women. *Atherosclerosis.* 2010 Sep;212(1):339-44. Epub 2010 May 31.
- Pal S, et al. The acute effects of four protein meals on insulin, glucose, appetite and energy intake in lean men. *Br J Nutr.* 2010 Oct;104(8):1241-8. Epub 2010 May 11.
- Kawase M, Hashimoto H, Hosoda M, et al. Effect of administration of fermented milk containing whey protein concentrate to rats and healthy men on serum lipids and blood pressure. *J Dairy Sci* 2000; 83:255-263.
- Pal S, et al. Effects of whey protein isolate on body composition, lipids, insulin and glucose in overweight and obese individuals. *Br J Nutr.* 2010 Sep;104(5):716-23. Epub 2010 Apr 9.
- Akhavan T, et al. Effect of premeal consumption of whey protein and its hydrolysate on food intake and postmeal glycemia and insulin responses in young adults. *Am J Clin Nutr.* 2010 Apr;91(4):966-75. Epub 2010 Feb 17.
- Nilsson M, Stenberg M, Frid AH, Holst JJ, Bjorck IM: Glycemia and insulinemia in healthy subjects after lactose-equivalent meals of milk and other food proteins: the role of plasma amino acids and incretins. *Am J Clin Nutr* 2004, 80(5):1246-1253
- Petersen BL, et al. A whey protein supplement decreases post-prandial glycemia. *Nutr J.* 2009 Oct 16;8:47.
- Nilsson M, et al. Glycemia and insulinemia in healthy subjects after lactose-equivalent meals of milk and other food proteins: the role of plasma amino acids and incretins. *Am J Clin Nutr.* 2004 Nov;80(5):1246-53.
- Ma J, et al. Effects of a protein preload on gastric emptying, glycemia, and gut hormones after a carbohydrate meal in diet-controlled type 2 diabetes. *Diabetes Care.* 2009 Sep;32(9):1600-2. Epub 2009 Jun 18.

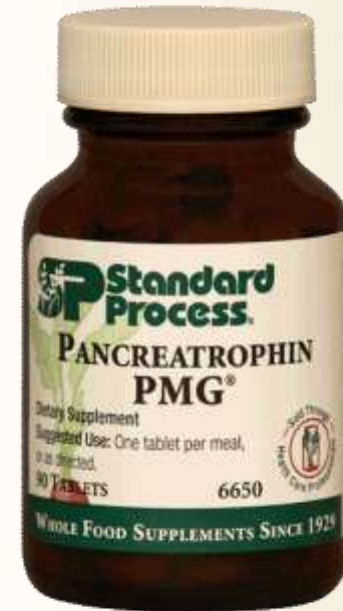
Protomorphogens

- Protomorphogen (PMG) extract is the brand name of Standard Process' extracts derived from nucleoprotein-mineral molecules.
- The foundation for the function of these uniquely formulated nucleoprotein-mineral extracts comes from the antigen-antibody reaction that takes place during normal cell maintenance.
- The antigenic properties promote healthy cellular division, function, and growth.

Pancreatrophin PMG®

A combination of nutrients and PMG extracts that support both exocrine and endocrine pancreas activities

- Glandular extracts that provide tissue specific nutrients
- Alfalfa contributes chlorophyll for detox
- Nutritional yeast – GTF, B Complex, minerals



Pancreatrophin PMG[®]

How I use it in my practice:

- 1 to 2 tablets per meal
- **Tablet**
 - Especially useful for pancreas support
 - Insulin deficiency and islet cell/insulin antibodies

Putting It Into Practice

- **Evaluate** – gather the data and assess the situation
 - No stone unturned!
- **Lifestyle adjustments**
 - Diet, stress management, toxin avoidance
 - Standard Process Purification Program
- **Apply the proper treatments**
 - Fen-Gre 3 capsules 2 to 3 times daily
 - Gymnema 4g 1-2 tablets twice daily
 - Cataplex GTF 1-3 tablets with meals
 - Vitanox 1-2 tablets twice daily
 - Whey Pro Complete – daily shakes (see recipe)
 - Pancreatrophin PMG 1-2 tablets with meals
 - Don't forget the staples:
 - Tuna Omega-3 Oil, Catalyn, ProSynbiotic, vitamin D