



## Metabolic Syndrome: Causes, Prevention & Treatment

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### **Introduction**

Metabolic Syndrome is a health care crisis of epidemic proportions facing Western industrialized societies. In the foreseeable future, one half or more persons over 60 years of age may be impacted by this condition. The following presentation is provided to help you learn how the many imbalances that contribute to the development of Metabolic Syndrome can often be prevented and managed with the right nutrition, exercise and dietary supplements.

### **What is Metabolic Syndrome?**

A “syndrome” is a pattern or collection of symptoms that together indicates a disease. You don’t actually “catch” a syndrome like you do a virus. Rather, the word “syndrome” is used to describe a concurrence of symptoms that act as hallmarks for a disease or health condition.

Metabolic Syndrome – also known as *Syndrome X*, *Metabolic Syndrome X*, or *Insulin Resistance Syndrome* – is therefore a collection of symptoms of overall poor health that are also risk factors that increase a person’s chance of developing heart disease, stroke, and diabetes. In fact, for the past 20 years some physicians have judged Metabolic Syndrome to be a powerful – if not *the* most powerful – indicator of an eventual heart attack.

According to a national health survey, more than one in five Americans has Metabolic Syndrome; Phyllis Balch, CNC, reports that a full quarter (25%, or 1 in 4) of all American adults are estimated to have this syndrome. And the likelihood of having Metabolic Syndrome rises with age, affecting more than 40% of people in their 60s and 70s.

The main symptoms of Metabolic Syndrome include:

- Insulin resistance
- Inability to fully metabolize carbohydrates
- Hypertension (high blood pressure)
- Cholesterol abnormalities
- An increased risk for clotting
- Overweight or obesity

You are clinically diagnosed with Metabolic Syndrome if you have 3 or more of these symptoms. (An interesting side note: Part of the Metabolic Syndrome profile includes an earlobe crease appearing at a 45-degree downward angle toward the shoulder and an elevated waist to hip circumference.)

In a society in which 66% of us are either overweight or obese, it's easy to understand how it's possible that up to 25% of the population has this syndrome. And if current diet and lifestyle trends do not improve, that number will only climb, increasingly affecting our children.



Insulin resistance is a particularly important part of the Metabolic Syndrome equation. Karlene Karst, RD suggests that high insulin levels are actually the root cause of the syndrome and states that while it is possible to have insulin resistance without having Metabolic Syndrome, those who have Metabolic Syndrome *always* have insulin resistance. (Insulin resistance refers to the diminished ability of cells to respond to the action of insulin in promoting the transport of blood sugar (glucose), from blood into muscles and other tissues.)

#### If I have Metabolic Syndrome, what health problems might develop?

Consistently high levels of insulin and glucose are linked to many harmful changes to the body, including:

1. Damage to the lining of coronary and other arteries, a key step toward the development of heart disease or stroke
2. Changes in the kidneys' ability to remove salt, leading to high blood pressure, heart disease and stroke
3. An increase in triglyceride levels, resulting in an increased risk of developing cardiovascular disease
4. An increased risk of blood clot formation, which can block arteries and cause heart attacks and strokes
5. A slowing of insulin production, which can signal the start of type 2 diabetes, a disease that can increase your risk for a heart attack or stroke and may damage your eyes, nerves or kidneys

There are other concerns that should be mentioned as well. Metabolic Syndrome is associated with fat accumulation in the liver (fatty liver), resulting in inflammation and the potential for cirrhosis. The kidneys can also be affected, as there is an association with *microalbuminuria* – the leaking of protein into the urine, a subtle but clear indication of kidney damage.

Other problems associated with Metabolic Syndrome include obstructive sleep apnea, polycystic ovary syndrome, increased risk of dementia with aging, and cognitive decline in the elderly.

## What Causes Metabolic Syndrome?

As is true with many medical conditions, genetics and the environment both play important roles in the development of Metabolic Syndrome. Genetic factors influence each individual component of the syndrome, and the syndrome itself.

For example, a family history that includes type 2 diabetes, hypertension, and early heart disease greatly increases the chance that an individual will develop Metabolic Syndrome. Environmental issues such as low activity level, sedentary lifestyle, and progressive weight gain also contribute significantly to the risk of developing the Metabolic Syndrome.

While obesity itself is a strong risk factor, others factors of concern include:

- Women who are post-menopausal
- Smoking
- Eating an excessively high carbohydrate diet
- Lack of activity (even without weight change)
- High intake of alcohol

Environmental factors play an important part, but Karst maintains that Metabolic Syndrome is caused by a poor diet and lifestyle and she places insulin resistance right at the center of the equation.

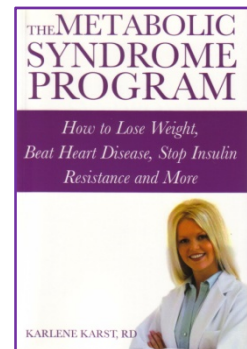
### Insulin Resistance

Insulin resistance means that the body does not use insulin efficiently to lower glucose and triglyceride levels. Insulin resistance is a combination of genetic and lifestyle factors. Lifestyle factors include diet, activity and perhaps interrupted sleep patterns (such as sleep apnea).

Typically, insulin resistance develops as a result to a diet high in sugar, refined carbohydrates, and processed foods, especially when combined with a sedentary lifestyle. It certainly doesn't help that over 70% of the calories consumed by people in the U.S. and Canada come from foods that never existed in our ancestor's diets: refined sugar, artificial sweeteners, white flour, high fructose corn syrup and trans fats. Our bodies are not equipped to handle these "foods" and the unnatural strain they put on our body's various systems.

Insulin's job is to "push" glucose (blood sugar) into insulin receptor "doors" on the surface of cells. When the body is continually blasted by foods containing high levels of simple sugars, the cells are bombarded with so much insulin that these "doors" begin to malfunction and shut down. With fewer doors open, the body needs to produce even more insulin to push glucose into the cells. The pancreas is stimulated by sugar's continued presence to produce more insulin, and a vicious cycle is in place, resulting in a condition called "insulin resistance."

Blood insulin levels are chronically high which inhibits fat cells from giving up their energy stores to help us lose weight. And the more overweight we are, the more resistant to insulin we



become, because extra fat causes a hormone reaction that closes the cells' doors to incoming glucose.

It's a grim picture! Fortunately, as we lose body fat, insulin resistance improves.

### **Metabolic Syndrome Prevention**

Since insulin resistance, physical inactivity and excess weight are the main underlying contributors to the development of Metabolic Syndrome, and *all* of these things are preventable, stopping Metabolic Syndrome before it starts is the best way to approach it. Obviously, getting more exercise and losing weight can help reduce or prevent the complications associated with this condition. Preventing insulin resistance is just as important, if not more so. It's also probably more difficult, as it may require changes in long-established patterns of eating and addiction.

#### Preventing Insulin Resistance

Naturally, the best way to prevent insulin resistance is to avoid the foods that promote it! This means staying away from refined sugar, white flour products, simple carbohydrates, etc. Maintaining a normal weight, eating a balanced diet, and keeping up a regular program of aerobic exercise are the best preventive measures. Increasing fiber consumption is also helpful, as fiber slows the movement of sugar from food into the blood stream.

#### Losing Weight

Moderate weight loss, in the range of 5 – 10% of body weight, can help restore the body's ability to recognize insulin and greatly reduce the chance that the syndrome will evolve into a more serious illness.

#### Exercise

Increased activity alone can improve insulin levels. Aerobic exercise such as a brisk 30-minute daily walk can result in weight loss, improved blood pressure, improved cholesterol levels and a reduced risk of developing diabetes. Most health care providers recommend 150 minutes of aerobic exercise each week. Exercise may reduce the risk for heart disease even if without accompanying weight loss.

#### Change the Diet

Metabolic Syndrome is largely a nutritional disease that is manageable with dietary corrections, reducing carbohydrates such as sweets, pastas and breads, and instating good fats (especially Essential Fatty Acids) in carbohydrates' place. An appropriate breakdown of the food groups should be about 45% of calories from carbs, 40% from fat and 15% from protein.

### Change the Fats

Finding the right balance of dietary fats is important as the wrong kinds of fats can contribute to insulin resistance by interfering with the burning of glucose and increasing insulin resistance. Eating cold-water fish (such as wild salmon, tuna, mackerel, sardines or anchovies) two times/week, including flax seeds and nuts (such as walnuts, Brazil nuts, etc.) in the diet, and eating as many dark green and leafy vegetables as possible will all help restore the omega-3 to -6 balance that is so important in preventing insulin resistance.

Omega-3 fatty acids help maintain flexible cell membranes, important because only healthy membranes contain large numbers of insulin receptors, increasing the surface areas available for insulin binding. Up to 4,000 mg (4 grams) of omega-3s a day can be helpful to prevent Metabolic Syndrome.

### Limit Alcohol Intake

While some recent studies suggest that drinking alcohol in moderation may actually help prevent Metabolic Syndrome, limiting alcohol consumption is a better choice. Drinking too much alcohol can raise blood pressure and triglyceride levels, and it can also harm the liver, brain and heart. Additionally, alcohol is a source of empty calories, which inhibit weight loss, an important component of prevention. If alcohol is consumed, it is recommended that it be no more than one drink a day for women or two drinks for men.

## **Metabolic Syndrome Treatment**

The major goals are to address both the underlying cause of the syndrome, and also the cardiovascular risk factors if they persist. The majority of people with Metabolic Syndrome are overweight and lead a sedentary lifestyle. Therefore, lifestyle modification is the preferred treatment. Weight reduction usually requires a specifically tailored multifaceted program that includes diet and exercise. Allopathic care typically uses medications to aid in treatment, but we will explore some suggestions for supplementation.

### Diet

In general, a well-balanced diet high in whole foods and low in sugars and saturated fats is a good start. A diet high in fiber helps to balance blood sugar, so vegetables, nuts, seeds and whole grains should be encouraged. Protein also helps balance blood sugar, so viable sources of vegetable protein (or lean animal protein) with each meal or as snacks is also a good suggestion. Several smaller meals throughout the day are better than 3 larger ones, as they will help keep the blood sugar and insulin levels steady.

Sugars, white flour products, alcohol, caffeine and sources of saturated fat should be strictly avoided. These spike insulin and blood sugar levels and (especially in the case of

saturated fats), increase the risk of diabetes and heart disease. Also avoid artificial sweeteners, trans-fats and high-glycemic load foods.

There is now a trend toward the use of a Mediterranean diet – one that is rich in “good” fats (olive oil) and contains a reasonable amount of carbohydrates and proteins (such as from fish and chicken). The Mediterranean diet is palatable and easily sustained. In addition, recent studies have shown that when compared to a low fat diet, people on the Mediterranean diet have a greater decrease in body weight, and also had greater improvements in blood pressure, cholesterol levels, and other markers of heart disease – all of which are important in evaluating and treating Metabolic Syndrome.

### Exercise

A *sustainable* exercise program is a key component in addressing Metabolic Syndrome (provided there is no medical contraindication). There is a beneficial effect of exercise on blood pressure, cholesterol levels, and insulin sensitivity, regardless of whether weight loss is achieved or not. Thus, exercise in and of itself is a helpful tool in treating Metabolic Syndrome. (Conversely, research shows that there is *no* benefit in cosmetic surgery to remove fat where insulin sensitivity, blood pressure and cholesterol are concerned. Diet and exercise remain the best courses of action!)

### Chromium

Improves glucose tolerance and balances blood-sugar levels. Take a daily total of up to 1,000 mcg.

### Magnesium

Plays an important role in both the prevention and treatment of Metabolic Syndrome and diabetes. It benefits these conditions by increasing the number and sensitivity of insulin receptors. A dosage suggestion is 500-1,500 mg daily of magnesium bound to succinate, citrate, or aspartate. (Magnesium oxide, in larger dosages, can cause loose stool.)

### Gymnema sylvestre

An herb native to the tropical forests of southern and central India, it lowers blood sugar levels. Take 400 mg of a 25% gymnemic acid extract daily.

### Alpha lipoic acid

Some researchers credit alpha-lipoic acid with being the principal supplement for preventing and reversing Metabolic Syndrome. The supplement earned this reputation by increasing the burning of glucose.

The body needs alpha-lipoic acid to produce energy; it plays a crucial role in the energy-producing structures in cells (mitochondria). The body actually makes enough alpha-lipoic acid for this basic function. Alpha-lipoic acid acts as an antioxidant, however, only when there is an excess of it and it is in the “free” state in the cells. There is little free

alpha-lipoic acid circulating in your body, unless you consume supplements or get it injected.

Alpha-lipoic acid is a versatile antioxidant—it helps deactivate an unusually wide array of cell-damaging free radicals in many bodily systems and also improves insulin sensitivity. Some researchers believe 50-250 mg/day (in concert with other antioxidants) may be sufficient to protect against Metabolic Syndrome. However, typical doses range from 300-1,800 mg daily.

#### Vanadyl sulfate

Vanadyl Sulfate is the most popular and common form of vanadium, an element in the body that is found in foods such as pepper, dill, radishes, eggs, vegetable oils, buckwheat, and oats. There has been some debate over whether or not it is an essential nutrient. Recently, a great deal of attention has been paid to vanadium because of its insulin-mimicking activities. It improves glucose tolerance in people with insulin resistance. Take 100-300 mg daily (high doses require the supervision of a physician).

#### Biotin

Biotin is involved with proper glucose metabolism. Take 9-16 mg daily.

#### High-potency multivitamin/mineral supplement

This will supply many of the nutrients involved with blood sugar metabolism. Take as directed.

#### Essential Fatty Acids

EFAs – especially omega-3s – are vital to health and proper insulin function. Flaxseed or fish oil, combined with evening primrose oil is a good idea. Take as directed and up to 9 grams (9,000 mg) daily in divided doses.

#### Bitter melon

Can help balance blood-sugar levels. Take 5 ml twice daily of the tincture or 200 mg three times daily.

#### Garlic

An important herb for stabilizing blood sugar, and for reducing the risk of heart disease and other circulatory disorders by improving blood flow, lowering elevated blood pressure, and reducing levels of “bad” cholesterol. Take 300-450 mg twice daily.

#### Fenugreek

Another herb that stabilizes blood sugar. Take a product with an equivalent dosage of 15-50 grams daily.

### Reflexology

Work the points that correspond to the pancreas, liver, thyroid, pituitary and adrenal glands. They should be massaged every day for several months.

### Energy work

Can help with lowering stress and improving blood circulation.

### **Conclusion**

The term “Metabolic Syndrome” is a way of identifying individuals at high risk for the development of heart disease and diabetes. We all know that obesity, high cholesterol, and hypertension are bad omens. We also know that insulin resistance precedes type 2 diabetes, and can itself be an important condition meriting treatment. Each of us knows someone who is overweight, hypertensive, or has cholesterol levels that are “a little high.” It may be a brother, sister, parent, neighbor, or even yourself.

While the actual definition of Metabolic Syndrome may vary, the known clustering that occurs means that adults with any major cardiovascular risk should be evaluated for the presence of other risk factors. Those at risk should receive education and counseling on lifestyle modification, and all risk factors for heart disease should be treated promptly and seriously.

For the client, the main point to understand is that it is important to treat the risk factors as “bad things,” before “worse things” happen. And while these changes can be addressed in your office, the other 99% of the time, they need to be addressed in the real world. That means we need to start having healthier food options readily available. We need to have time during the day to take a walk. We basically need to restructure some fundamentals in our society. Clients should be supported in making these (often difficult) lifestyle changes.

### **Questions & Answers**

The following questions-and-answers came from a live lecture-chat on the subject conducted during GCNM’s November 17, 2007 Online Open House.

**Q:** *What factors go into why someone would metabolize carbs better than others? I know people who eat sugar and refined carbs but never manifest these conditions.*

**A:** That's probably largely based on individual biochemistry. We're all very unique. I recently watched the film *Supersize Me!* again and was shocked (again) to see that man who eats something like 2-6 Big-Macs *each day*...and has for years and years...and yet is fairly slim with no visible health issues. I can only chalk it up to his unique physiology/biochemistry.

This is one of the things that make Nutritional Consulting such an individualized affair. Yes, there are some things that we can suggest are appropriate for the vast majority of people...but



every now and then you run across someone who just responds very differently to standard approaches.

**Q:** *Will clients come to us who have been diagnosed by doctors with this syndrome?*

**A:** They may, yes. When they do, you'll need to keep from agreeing or disagreeing with the diagnosis. Basically, you'll want to work with the symptoms.

**Q:** *You said energy work can be a benefit. Is there any knowledge that a positive attitude can improve metabolism?*

**A:** I don't know of any studies on the intersection of optimism and Metabolic Syndrome, but I'm certain a positive attitude couldn't hurt! Of course, it probably won't have as much effect in the short-term as, say, exercise.

It's important to remember that each of us have gross, subtle and causal bodies:

Your gross body ("body") needs exercise and good "fuel" (i.e., food and water, etc.)

Your subtle body ("mind") needs positive emotions and mental stability

Your causal body ("spirit") needs spiritual energy, centering/focus

When all three are pointed in the same direction, amazing changes can happen in healing circumstances. So, certainly, positivity is important. But if you rely on it solely, you're missing part of the Body-Mind-Spirit piece. That's why diet and exercise are so important...they're like the bottom of the pyramid.

**Q:** *It sounds like anyone overweight is a perfect candidate for Metabolic Syndrome, correct?*

**A:** Quite possibly, yes. Remember that up to 66% of us are overweight or obese and may have this collection of symptoms, making us possible Metabolic Syndrome sufferers. Insulin resistance is really where the root is, I believe. That, added to just about any other weight-related issue, is strong Metabolic Syndrome stuff...

**Q:** *What sources are available for working with Metabolic Syndrome in holistic health? Are there any specific reading materials that you've read that you would recommend?*

**A:** There's a lot out there on it. Try the [Online Student Forum](#), of course. Beyond that, I'd suggest the book that I reviewed specifically for this lecture. I put the book review in one of the latest newsletters (available online [here](#)). It's called *The Metabolic Syndrome Program: How to Lose Weight, Beat Heart Disease, Stop Insulin Resistance and More* by Karlene Karst, RD. It's a great book – and I think it actually has the answer for this particular health concern.

**Q:** *Is it safe to say that since water is the most vital nutrient that if you are not getting enough in your diet, that by increasing it and making other body functions run more optimally, then it is an asset to the "treatment" of Metabolic Syndrome?*

**A:** Absolutely. Drinking 8-10 glasses of pure water is often enough to help people lose weight, feel better and improve all sorts of health problems.

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