

## Metabolic Syndrome

**Metabolic Syndrome** (also, referred to as MetS, Syndrome X or Insulin Resistance) is a constellation of medical conditions that has negative impacts on the heart, blood vessels, liver and the ability to normally metabolize sugar and fat (diabetes). In the United States it is estimated that the prevalence of Metabolic Syndrome in adults is as high as 35%.

Metabolic Syndrome is defined by the *American Heart Association* & the *International Diabetes Association* as the presence of **three or more** of the following conditions:

- ❖ **Increased Waist Circumference** (*40 inches or greater in men; 34 inches or greater in women*). This is the measurement of the waistline at the level of the hipbones. Any increase above these levels reflects excessive visceral fat -(referred to as abdominal or belly fat).
- ❖ **Elevated Blood Pressure** (*130/85 or greater or on blood pressure medication*)
- ❖ **Elevated Fasting Blood Sugar or Glucose** (*100 mg or higher*)
- ❖ **Elevated Triglycerides** (*150 mg or higher*)
- ❖ **Low HDL** (high-density lipoprotein)-**Cholesterol** (*<40 mg in men & <50 mg in women*)

**Additionally**, patients diagnosed with Metabolic Syndrome frequently have one or more of the following abnormal *Blood Tests*:

- ◆ Elevated Total LDL (low-density lipoprotein)-Cholesterol
- ◆ Elevated Total Cholesterol
- ◆ Elevated small dense particles of LDL-Cholesterol (sdLDL-C)
- ◆ Elevated Inflammatory Markers (e.g. hs-CRP or C-Reactive Protein)
- ◆ Elevated Fibrinogen
- ◆ Elevated Homocysteine

### What are the Risks of Metabolic Syndrome?

- **3X** more likely of having a heart attack or stroke
- **2X** more likely of dying from a heart attack or stroke
- **5X** more likely of developing diabetes mellitus.

### What Causes Metabolic Syndrome?

- ❖ **Inflammation**
  - ◆ **Obesity** (primarily abdominal) is known to be associated with low-grade inflammation. The inflammation occurs first in the adipocytes (fat cells) of the abdomen (visceral) fat stores. This results in series of changes in the body, including an **increase** in *tumor necrosis factor-alpha (TNF-a)*, a decrease in *adiponectin* and an **increase** in *insulin resistance, arterial endothelial dysfunction, hypertension and atherosclerosis*.

- ❖ **Dietary Excesses**
  - ◆ **Sugar-Sweetened Sodas** – 48% of Americans drink an average of at least one soda drink daily. Blood triglycerides and waist size increase as the number of sugar-sweetened drinks increases.
  - ◆ **Diet Sodas** – There is a misconception that drinking diet soda is a healthier choice. False. When compared to individuals who consume NO diet beverages, those with a daily intake of diet soda have a 67% greater risk of developing type 2 diabetes.
  - ◆ **High-Fructose Corn Syrup (HFCS)** – Studies comparing HFCS-sweetened beverages to sugar-sweetened ones show that HFCS-sweetened drinks increase MetS at a higher rate by contributing to weight gain, insulin resistance, increased triglyceride and lipid production by the liver and type 2 diabetes.
  - ◆ **Western Diet Excesses** – especially in meat, fried foods and diet soda
- ❖ **Lack of Exercise** - associated with increased visceral fat and insulin resistance
- ❖ **Environmental Toxin Exposure** – chemicals can contribute to hormonal imbalances that disrupts healthy metabolism. Exposure to DDT, PCB's, PBDE's and BPA is associated with insulin resistance, obesity and liver abnormalities.
- ❖ **Chronic Stress**
  - ◆ Chronic stress causes a rise in blood cortisol (stress hormone produced in the adrenal glands).
  - ◆ Elevated blood cortisol causes :
    - Increase blood sugar levels
    - Increased food cravings
    - Increased insulin levels
    - Increased fat production
  - ◆ Over time chronic stress frequently results in increased body weight and obesity, which causes further increases in inflammation and propagation of this abnormal metabolic state.

#### **Co-Morbidities of Metabolic Syndrome:**

- ❖ **NAFLD (*Non-Alcoholic Fatty Liver Disease*):**
  - ◆ Affects 20-30% of adults in United States and is the primary cause of elevated liver enzymes.
- ❖ **Sleep Apnea:**
  - ◆ Commonly associated with obesity and with Metabolic Syndrome.
  - ◆ Increases blood cortisol levels and insulin resistance.
  - ◆ 70% of obese Type 2 diabetics experience sleep apnea.
  - ◆ Problem starts in adipocytes (fat cells) and causes an increase in tumor necrosis factor-alpha (TNF-a), which in turn stimulates a general state of inflammation throughout the body. This results in insulin resistance, endothelial dysfunction of the arteries and hypertension.

## Can Metabolic Syndrome Be Reversed?

- ❖ **Yes** – Following these *three life-style behaviors* the abnormal conditions can definitely reverse Metabolic Syndrome.
  - ◆ **Personalized Life-Plan Nutrition** (based on the Boston Heart Diagnostics evaluation)
  - ◆ **Regular Exercise** – Print my article: “**Exercise – How Much is Enough?**”
  - ◆ **Stress Management thru Meditation**: Print my article: “**Mindful Meditation – Exactly What Is It?**”
  
- ❖ **Importance?** – The quality of your years of life, as well as your longevity, will depend directly to the extent you embrace these *life-style behaviors* as a daily way of living.

### **‘Not Doing It – Not An Option’**

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