

Metabolic Syndrome

This is a biochemical change not a disease. But it can be regarded as a warning sign: one that indicates a higher risk from diabetes, heart disease, raised blood pressure and even cancer, osteoarthritis and a subgroup of Alzheimer's disease.

Some believe it is the biggest health problem of our age and the reason for the epidemic of obesity and diabetes around the world. Recently it has been found to increase the risk of dying from Covid 19 three-fold. It also reduces life expectancy by 2.5 to 15 years, depending on which stage it is at. Fortunately, it is reversible.

It is closely related to **insulin resistance**.

Diagnosis

One feature can be obesity, particularly abdominal obesity (waist greater than 40 inches in males and 36 in females). Another feature is raised blood pressure.

Another finding is abnormal biochemistry. If you have a combination of **high triglycerides** and **low high-density lipoprotein or HDL** (often described as good cholesterol) you probably have this syndrome. High fasting blood sugar is another feature. Anyone who has three of the above five features has metabolic syndrome.

It is also associated with high insulin levels though these are not normally measured on NHS labs. Metabolic syndrome is very common, affecting at least 1 in 5 of the population.

Normally triglycerides (these are fats that carry sugar round in the bloodstream) should be below 1.7 and HDL should be above 1.0 in men and 1.3 in women.

Note: lipid tests are not normally done fasting but a meal before the test can cause a moderate rise in triglycerides but has little effect on cholesterol and HDL levels. A fasting test gives a better measure of triglycerides.

How it Happens

Metabolic syndrome occurs when the body loses control of blood sugar and insulin becomes consistently raised.

The first stage is too much insulin, too often. The most important cause is eating sugary foods. Eating sugar or refined carbohydrates (white bread, white rice, chips, cereals, alcohol) floods the blood stream with sugar. The body responds by releasing insulin.

This takes the sugar out of the bloodstream and into the cells bringing the sugar level down again. The danger comes when this keeps happening and the insulin stays high.

As time goes by the cells become less and less sensitive to the insulin. It's like shouting at a child all day: they listen to begin with and then the shouting has less and less effect. This is insulin resistance. It is a two-edged sword; insulin levels compensate by going even higher.

High insulin levels prevent fat being broken down into energy so typically metabolic syndrome makes us fat, tired and hungry. The reason for gaining weight and feeling tired is the raised insulin.

Normally we shouldn't feel hungry for 4 -5 hours after a meal. Early hunger after a meal is a clue to metabolic syndrome. **In the same way, lack of hunger or lack of carbohydrate craving after a meal is a sign of improvement.**

Metabolic syndrome also causes levels of triglycerides and, often cholesterol, to rise. **Insulin is the main cause of obesity. It is the fat storage hormone causing us to store fat and fluid. It can also lead to fluid and salt retention.** This all makes the pancreas work harder to produce more insulin and this can **lead eventually to diabetes.**

To deal with this syndrome you need to reduce both insulin and insulin resistance. These are not quite the same.

Reducing Insulin

By far the most important step in reducing insulin is reducing sugar and refined carbohydrates (see below). Another crucial step is reducing ultraprocessed foods (UPFs) which are invariably high in sugar and carbohydrates.

It is true that all foods cause insulin to be released including foods which have no sugar in them but some are far worse than others. Artificial sweeteners and Diet products cause big rises in insulin even if they contain no sugar. Meat can increase insulin a little but fat has minimal effect.

Reducing sugar, refined carbohydrates, UPFs and artificial sweeteners in the diet is an important step forward.

Reducing Insulin Resistance

Normally insulin goes up after we eat but then goes down again reaching its lowest point after sleeping. **These periods of low insulin are vital and protect us from insulin resistance.** If we

don't have periods without food, insulin resistance is permanently switched on and we're in trouble.

A key step in combating insulin resistance is to have extended periods without food. **Most fat burning starts about 6 hours after the last food we eat in the day (food includes alcohol). The longer we can leave it after this the better the effect with an optimum result at 16 hours.** Twelve hours is more realistic for most people but longer is better. **Another important step is to avoid snacking between meals.**

But there is one other important factor. **It is fructose.** When we eat sugar, it breaks down into glucose and fructose. After sugar our blood glucose rises but not fructose. But fructose is silently doing more harm than the glucose. How does this happen?

Fructose can only be broken down by the liver and it has a limited capacity to do so. If the liver is overloaded with fructose, it can't cope with surges in blood glucose and insulin goes even higher. If there is persistent overload, fatty liver develops, and insulin control gets worse.

In one experiment healthy subject took 25% of their calories from either glucose or fructose. Those taking fructose developed a pre-diabetic state in just 8 weeks (but not those taking glucose). It is interesting that increase in obesity has mirrored the increase in fructose consumption.

The main sources of fructose are sugar (50% fructose) and high-fructose corn syrup (55%) which is **found in most processed foods**. There is also some sugar in fruit but this is not a problem due to its slow absorption. Fruit juice is different and can create insulin resistance.

So the key to reducing insulin resistance is to reduce fructose and have breaks without food, the longer the better. This is also the key to managing fatty liver.

Sources of Sugar

Many people think if they stop adding sugar to tea or cereals that they will be okay. Nothing could be further from the truth. The typical British diet is a health hazard. This is because of all the added sugar; 73% of foods have added sugar. Our diet contains, on average, 23 teaspoonfuls of sugar per day. Most of this comes within processed foods. Almost every processed food, in other words everything that comes in a packet or tin, has added sugar. The food companies do it because they know we easily become addicted to sugar.

The worst offenders are sugary drinks and fruit juices. A single cola drink can contain 10 teaspoonfuls of sugar, an energy drink 15

to 19 teaspoonfuls and commercial fruit juices 14 teaspoonfuls of sugar.

A portion of pizza can have 8 teaspoonfuls sugar, most ready meals 5 to 10 teaspoonfuls of sugar, a packet of couscous 6 -10 teaspoonfuls of sugar, a can of baked beans 6 teaspoonfuls, a yoghurt 5 teaspoonfuls a portion of bran flakes 3 teaspoonfuls. Sauces have between 1 to 3 teaspoonfuls per portion, even one sausage can have 1 teaspoonful of sugar. Nearly all low-fat products, cereals, soups, sauces, ready meals and processed foods contain lots of sugar.

A teaspoonful of sugar is 4 grams. Packets and cartons of food are labelled in sugar per 100 grams. If it above 4 grams it is high in sugar.

A Dangerous Combination

There is another thing to know about sugar. The most addictive food is not sugar itself but when sugar is combined with fat as happens in doughnuts, pizzas, burgers, crisps, biscuits and cakes.

Labelling

Some foods use the **traffic light system**. Green is low – less than 5 grams per 100 grams but beware: if you eat a 400 grams packet of soup labelled as green you might still be eating 4 teaspoonfuls of sugar. Amber is between 5 and 22.5 grams of sugar per 100 grams. This is labelled as medium but I would regard it as high. Why? Because the maximum fructose the liver can metabolise in one day is 12 grams (found in 24 grams sugar) and 4 grams for a child. Red is above 22.5 grams per 100 grams and labelled as high – I would regard that as a health hazard.

Other Foods

Refined carbohydrates such as white flour, white rice, chips, mashed potatoes, alcohol and most cereal act in much the same way as sugar and push up insulin but contribute less to insulin resistance as they lack fructose.

It might be thought diet drinks should be a good substitute for sugar. Nothing could be further from the truth. **A number of studies have shown diet drinks (and artificial sweeteners) have a positive association with metabolic syndrome** and also with obesity, diabetes, heart attacks and stroke.

Unrefined (wholemeal or wholegrain) carbohydrates are okay (but often have added sugar). Bizarrely they only need to be 51% unrefined to be called wholemeal. Ordinary brown bread is a refined carbohydrate.

Soluble fibre (such as oats) has been found to be helpful for reducing insulin levels.

Fruit, although it contains fructose, is safe because it contains both soluble and insoluble fibre. The fructose breaks down slowly at a level the body can deal with (and has many healthy phytonutrients). An exception is fruit juices which release sugar rapidly and often have added sugar.

Metabo Law

Japan is one of the few high income countries that doesn't have an obesity crisis. This is not an accident. They have a system known as Metabo Law (named after metabolic syndrome) where everyone between the ages of 40 and 70 has to have their waistline measured each year. If their waist is getting too big, they get referred to a doctor for treatment.

Illness linked to Metabolic Syndrome

Male pattern baldness is aggravated by the metabolic syndrome.

Depression is twice as likely in those with metabolic syndrome after seven years.

Protect the Cell Membrane

Cell membranes are vital for good health. As they are made from fat, the quality of the fat you eat is crucial. **By far the most dangerous fats are hydrogenated fats, sometimes called trans fats.** These are found whenever fats are heated such as in fried food, cooking oils (except olive oil) and margarines. They are found in nearly all processed foods such as biscuits and cakes. Look for vegetable fat, vegetable oil, shortenings, hydrogenated fat on the label – these all mean hydrogenated fats. Any food that can sit on a supermarket shelf and has a long expiry date is likely to contain trans fats. Dr Willett of Harvard has estimated that removing hydrogenated fats from food would cut heart disease by half. These synthetic fats stop your cell walls functioning properly, acting as a spanner in the works. It is the combination of high sugar and high trans fats in the British diet that makes it so disease promoting.

In addition, you need essential fats and most people have low levels of these, especially the Omega 3s. The Omega 3 fats are found in oily fish, linseeds (flaxseeds) and their oils. They are found to a lesser extent in other seeds and nuts. Omega 6 fats are also important but they are less likely to be low in the diet. You need even more essential fats if you are taking hydrogenated fats in the diet.

Apart from eating good quality fats. **another factor known to reduce insulin resistance is exercise.** Both fasting and weight loss have also been shown to reduce insulin resistance.

Take Vitamin D

A 2017 study of postmenopausal women found a strong correlation between low Vitamin D and metabolic syndrome. To be specific those with a vitamin D level of below 75nmol/l (this is extremely common) raised their risk of metabolic syndrome by 40%, raised the risk of high triglycerides by 55% and raised the odds of a low HDL by 60%. Take at least 2000 iu of Vitamin D3 daily and ideally take 5000 iu daily for 2 months to build up levels when you start. (Note that both metabolic syndrome and low Vitamin D levels have been found independently to be factors increasing the risk of death from Covid 19).

Take Magnesium

Magnesium reduces triglycerides and LDL and increases HDL. Nearly everyone is low in magnesium (see magnesium leaflet for reasons). However, insulin can't work properly without magnesium (it needs it to open up the cell membranes and let glucose in). Magnesium also decreases fasting insulin. Deficiency of magnesium causes insulin resistance.

In addition, high insulin levels (as in metabolic syndrome) deplete the body of magnesium as does sugar. Researchers have found there is a high calcium-to-magnesium ratio in metabolic syndrome. Many drugs also deplete magnesium (see magnesium leaflet). Take 200-300mg of magnesium twice daily.

Summary

- 1) Reduce sugar and refined carbohydrates**
- 2) Stop snacking and increase the time between dinner and breakfast.**
- 3) Avoid diet drinks and artificial sweeteners.**

- 4) Cut out hydrogenated fats
- 5) Add good fats: olive oil, nuts, seeds, oily fish, flaxseed, avocado.
- 6) Increase fruit and vegetables
- 7) Increase exercise
- 8) Lose weight
- 9) Take Vitamin D and magnesium