

# Diabetes

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The aim of this article is to briefly define the 2 types of diabetes, their potential risk factors and how you can help manage the disease through diet and exercise.

The 2 main types of diabetes are simply classed as type 1 & type 2.

Type 1 is due to destruction of cells in the islets of Langerhans which results in absolute insulin deficiency. People with this version usually have to inject themselves with insulin.

Type 2 diabetics have an insulin deficiency, either caused by diminished insulin secretion due to a defect in the islets of Langerhans, or insulin resistance in the peripheral body resulting in decreased glucose uptake or increased glucose output by the liver.

The risk factors for developing type 2 diabetes are

Asian or Afrocaribbean ethnicity

Overweight

Family history of diabetes

History of large baby (birth weight over 4 kg).

As you can see from these risk factors, being overweight is the only one you can modify, and this can be achieved through diet & exercise. Studies have shown development of diabetes can be halved if weight loss, exercise and other healthy lifestyle changes are maintained for a period of 4 years.

The remainder of this article will focus on type 2 diabetes because this can be modified with exercise and diet.

The complications associated with both types of diabetes are loss of vision, resulting in blindness. Damage to blood vessels resulting in increased risk of heart disease, stroke or limb amputation. Damage to nerves and the kidneys.

Exercise is important for maintaining weight and therefore can reduce the risk of developing diabetes and additionally minimise the development of associated

complications. Exercise stimulates glucose uptake into the muscles without relying on insulin. In addition the effects of insulin and exercise are synergistic which means in combination they stimulate glucose uptake more than each one does independently.

Both aerobic exercise and resistance training are beneficial for diabetes. This is because muscle contraction is activated by Calcium which also activates the enzymes CaMK and AMPK whose role is to regulate glucose uptake into the muscle.

Weight loss also reduces the risk of developing diabetes.

It is hypothesised that one reason for insulin resistance is that fatty acids and fat related metabolites compete with glucose for uptake and oxidation. Therefore if muscle and liver fat concentrations are high then glucose oxidation is low.

Another theory is some free fatty acids are broken down into diacylglycerol, fatty acyl-CoA and ceramides. These products inhibit insulin and therefore reduce insulin stimulated glucose uptake.

A further theory in the development of diabetes is fat tissue communicates with other tissues in the body by releasing hormones called adipokines. Some of these can affect insulin sensitivity.

As you can see from the above theories fat tissue plays a pivotal role in the aetiology of diabetes and therefore if you can lose fat through weight loss you can reduce the risk of developing diabetes.

To summarise type II diabetes is a disease associated with increased risk of blindness, heart disease, Stroke, nerve damage and limb amputation.

The prevalence of diabetes has increased dramatically in recent years and it is believed this is mainly due to increasing obesity levels. This risk factor is modifiable and can be reduced through exercise and weight loss.

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