Defeating Diabetes

Dr Rachel Coelho B.Sc, B.Med, FRACGP, DBM

Diabetes is a chronic condition in which blood sugar (glucose) levels remain too high because the body either does not produce enough insulin or cannot use it effectively. Insulin is a hormone produced by the pancreas. It enables glucose o move from the bloodstream into the body's cells, where it is used to produce energy.

There are two main types of diabetes. Type 1 and Type 2.
Type 1 diabetes is an autoimmune disease in which the body's immune system destroys the insulin-producing beta cells of the pancreas. Key features:

- Little or no insulin is produced.
- Symptoms usually develop rapidly over weeks to months.
- Most commonly begins in childhood or adolescence but can occur at any age.
- It is irreversible.
- Lifelong insulin therapy is essential for survival.
- Type 2 Diabetes

Type 2 diabetes is the most common form of diabetes and is the focus of this editorial. In type 2 diabetes, the body still produces insulin, but the cells become resistant to its effects. Over time, the pancreas may no longer produce enough insulin to maintain normal blood glucose levels.

- The condition develops gradually, often over several years.
- Although it most commonly affects adults over 45, it is increasingly seen in younger adults, adolescents, and children.
- Type 2 diabetes is strongly associated with lifestyle factors, including obesity, poor diet, and physical inactivity.
- In its early stages, lifestyle changes can often prevent, control, or even reverse the condition.

Risk Factors for Type 2 Diabetes

- Poor diet
- Physical inactivity
- Overweight or obesity
- Family history and genetics
- Certain ethnic backgrounds
- Increasing age
- Previous gestational diabetes
- Polycystic ovary syndrome (PCOS)
- High blood pressure
- Sleep disorders

Type 2 diabetes often develops silently, with few or no symptoms initially. As blood sugar levels rise, symptoms may include:

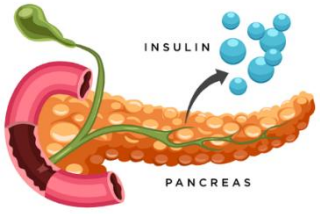
- Increased thirst (polydipsia)
- Frequent urination (polyuria)
- Increased hunger (polyphagia)
- Fatigue and weakness
- Blurred vision
- Tingling or numbness in the hands and feet
- Slow wound healing
- Recurrent infections
- Potential Complications

Without treatment, type 2 diabetes can damage many organs and significantly reduce quality of life. Complications include:

- Heart and blood vessels: heart attack, stroke, and poor circulation to the limbs
- Nerves: pain, burning, tingling, or numbness (neuropathy)
- Kidneys: chronic kidney disease and kidney failure
- Eyes: diabetic retinopathy and blindness
- Feet: ulcers, infection, and amputation
- Digestive system: bloating, constipation, diarrhoea, and abdominal pain
- Skin: dryness, itching, infections, and poor wound healing
- Premature death

Biochemistry of Sugar Metabolism

When food is eaten, carbohydrates are broken down into glucose, the body's primary source of energy. As glucose enters the bloodstream, the pancreas releases insulin from specialised beta cells. Insulin acts like a key, unlocking receptors on the surface of cells so glucose can enter and be used for energy. Any excess glucose is stored as glycogen, primarily in the liver and muscles, for later use. In type 1 diabetes, the immune system destroys the insulin-producing beta cells. Without insulin, glucose cannot enter the cells and instead builds up in the bloodstream. Without lifelong insulin treatment, cells are unable to obtain the energy they need, leading to life-threatening complications. The hallmark of type 2 diabetes is insulin resistance. The body still produces insulin, but the cells no longer respond normally. As a result, glucose cannot enter cells efficiently, causing blood sugar levels to rise. Insulin resistance is influenced by several factors, including poor diet, physical inactivity, obesity, and ageing. Initially, the pancreas compensates by producing larger amounts of insulin. Over time, however, the beta cells become exhausted and lose their ability to produce sufficient insulin. Without early intervention, many people with type 2



diabetes eventually require insulin therapy to maintain healthy blood glucose levels.

Diet is central to the prevention, management, and, in many cases, reversal of type 2 diabetes. Contrary to popular belief, type 2 diabetes is not simply caused by eating carbohydrates. Large population studies have shown that diabetes has historically been uncommon in many Asian and African populations despite diets rich in carbohydrate foods such as rice, beans, whole grains, noodles, and starchy vegetables. The difference is that these diets are based on whole, high-fibre plant foods rather than highly processed foods. A major driver of insulin resistance is excess saturated fat, particularly from animal foods. Saturated fats found in meat, dairy, and eggs promote inflammation and oxidative stress, reducing the ability of insulin to move glucose into cells. In contrast, unsaturated fats from plant foods such as nuts, olives, avocados, and seeds improve insulin sensitivity.

The strongest evidence supports a whole-food plant-based (WFPB) diet for preventing and treating type 2 diabetes. This dietary pattern emphasises fruits, vegetables, whole grains, legumes, nuts, and seeds while minimising processed foods, added oils, and animal products. Research has shown that:

- A lacto-ovo vegetarian diet can reduce the risk of developing type 2 diabetes by approximately 60%.
- A fully plant-based diet can reduce diabetes risk by as much as 80%.
- A WFPB diet can improve blood sugar control, lowering HbA1c by around 1.2%—an effect comparable to many diabetes medications.

The whole-food plant-based diet not only prevents diabetes, but has also been shown to reverse diabetes, independent of an individual's weight. This diet is three time more effective than the standard diabetic diet, and as effective as medication. Studies have also demonstrated that many people are able to reduce or discontinue diabetes medications under medical supervision while following this dietary approach. Importantly, these improvements have been achieved without calorie counting, carbohydrate restriction, or strict portion control.

Benefits of a Whole-Food Plant-Based Diet

- Improves insulin sensitivity
- Stabilises blood glucose levels
- Supports pancreatic beta-cell function
- Promotes healthy weight loss
- Reduces inflammation
- Improves gut health
- Helps prevent and treat heart and kidney disease
- Can be as effective as leading diabetes medications in improving blood sugar control

Water is the ideal beverage for people with type 2 diabetes. Staying well hydrated helps:

- Regulate blood glucose
- Improve insulin sensitivity
- Support kidney function
- Assist with weight management

Alcohol can worsen diabetes, particularly when consumed regularly. It:

- Adds excess calories with no nutritional value
- Interferes with normal glucose metabolism
- Promotes fatty liver disease
- Increases insulin resistance

Avoiding alcohol is recommended for optimal metabolic health.

Regular exercise is one of the most effective ways to prevent and manage type 2 diabetes. It helps:

- Improve insulin sensitivity
- Lower blood glucose
- Increase muscle function
- Reduce abdominal (visceral) fat
- Support healthy weight management

Aim to include all three forms of exercise:

- Aerobic exercise: Brisk walking, cycling, swimming, hiking, or similar activities for at least 150 minutes per week.
- High-intensity interval training (HIIT): Short bursts of vigorous activity incorporated into aerobic exercise.
- Resistance training: Weights, resistance bands, or bodyweight exercises 2–3 times per week.

Good-quality sleep is essential for healthy glucose metabolism. Sleeping 7–9 hours each night helps:

- Stabilise blood glucose
- Improve insulin sensitivity
- Regulate hormones involved in metabolism
- Reduce inflammation and oxidative stress

Smoking is an independent risk factor for developing type 2 diabetes. Nicotine increases insulin resistance and makes blood glucose more difficult to control. Smoking also substantially increases the risk of diabetes-related complications, including heart attack, stroke, kidney disease, nerve damage, and vision loss, by accelerating damage to blood vessels throughout the body.

Chronic stress contributes to both the development and progression of type 2 diabetes. Elevated stress hormones can raise blood glucose levels, reduce insulin sensitivity, promote unhealthy eating habits, and disrupt sleep. Managing stress through healthy lifestyle practices is an important part of diabetes care.

Regular, safe sunlight exposure helps the body produce vitamin D, which plays an important role in glucose metabolism. Adequate vitamin D levels:

- Improve insulin sensitivity
- Support healthy pancreatic beta-cell function
- Help slow the progression of type 2 diabetes

Some herbal medicines have shown potential benefits in supporting blood glucose management, although they should complement—not replace—healthy lifestyle changes. Examples include:

- Bitter melon: 0.5–2 g daily
- Fenugreek seed: 5 g daily
- Ceylon cinnamon: 1–3 g daily
- Goat's rue: 3 g daily
- Garlic (dried powder): 2–4 g daily