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## Type 5 Diabetes

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Type 5 diabetes has just been recognised as a distinct form of diabetes by the International Diabetes Federation. Despite the name, there are more than a dozen different types of diabetes. The classification isn't quite as tidy as the numbering suggests.

Here's a clear guide to the different types, including some that you may not have heard of, along with information about what causes them and how they are treated [1].

### Type 1

Type 1 diabetes is caused by the body's immune system mistakenly attacking the insulin-producing cells in the pancreas. This autoimmune reaction can occur at any age, from infancy through to old age.

It is not linked to diet or lifestyle. Instead, it probably results from a combination of genetic predisposition and environmental triggers, such as viral infections.

Treatment involves lifelong insulin therapy, delivered through injections or pumps.

A small number of people who struggle with low blood sugars, called hypoglycaemia, can receive new cells in the pancreas that produce insulin from deceased donors. For many, this reduces the number of insulin injections needed. Some can stop taking their insulin altogether.

What's more, dozens of people have now received stem-cell-derived transplants to effectively "cure" their diabetes, although people still need to take strong immune-suppressing drugs. This treatment is not yet widely available [1].

### Type 2

Type 2 diabetes is the most common form of the condition and is often linked to having a high BMI (body mass index). However, it can also affect people of normal weight, particularly those with a strong genetic predisposition.

Certain ethnic groups, including south Asians and people of African and Caribbean descent, are at higher risk – even at lower body weights.

Boosting the body's production of insulin can help to control blood sugar levels. Some drugs boost insulin production from the pancreas, while others improve insulin sensitivity.

Metformin, for example, is taken by hundreds of millions of people worldwide. This drug improves insulin sensitivity and switches off sugar production by the liver.

There are dozens of different drugs to help control blood sugar in type 2 diabetes. Tailoring treatment to the individual has been shown to improve health outcomes significantly [2].

Lifestyle changes can also reverse diabetes. This can be done by keeping a low-calorie diet of 800 calories a day. In a research trial maintaining this diet for 12 months reversed diabetes in 46% of people.

#### Gestational diabetes

This type of diabetes develops during pregnancy, typically between weeks 24 and 28. It is triggered by hormonal changes that reduce the body's sensitivity to insulin.

Risk factors include being overweight or obese, a family history of diabetes, and giving birth to a large baby in a previous pregnancy.

Those from Middle Eastern, south Asian, black and African Caribbean backgrounds are also at higher risk of gestational diabetes. Age is also a factor, as insulin sensitivity declines with age. This can be treated with diet and exercise, tablets or insulin injections [3]

#### Rarer forms of diabetes

There are at least nine sub-types of diabetes that include rare genetic forms, sometimes caused by a single genetic change. Others can be caused by treatment, such as surgery or drugs, such as steroids [5].

- Neonatal diabetes appears early in life. Some of the genetic changes affect how insulin is released from the pancreas. Some people still make their own insulin, so can be treated with tablets that help pancreas cells to push out insulin.
- Maturity onset diabetes of the young, or Mody, occurs later in life and is linked to genetic changes. There are several gene changes, with some affecting how pancreas cells sense sugar and others affecting how the pancreas develops. MODY (Maturity-Onset Diabetes of the Young) is a rare genetic form of diabetes that usually develops before age 25 as a result of gene mutations
- Type 3c diabetes is different. It is caused by damage to the pancreas. People with pancreatic cancer, for example, can develop diabetes after parts of the pancreas are removed. It can also develop after pancreatitis (inflammation of the pancreas).

**Type 3c diabetes** describes a possible link between Alzheimer's disease and insulin resistance, suggesting that Alzheimer's could be a form of diabetes. However, this form of diabetes does not have official recognition.

- Those with cystic fibrosis are also at a higher risk of developing diabetes. This is called cystic fibrosis-related diabetes. The risk increases with age and is very common, with around a third of people with cystic fibrosis developing diabetes by the age of 40 [6].

#### Type 5

This newly recognized form of diabetes, known as Type 5 diabetes, is fundamentally linked to malnutrition during early life. Alarming, it is more prevalent in low-income countries, impacting an estimated 20 to 25 million individuals worldwide [1]. People with low body weight often struggle with insufficient insulin production; however, this deficiency is not rooted in immune dysfunction. Instead, it stems from inadequate nutrition during childhood, which can severely impair the normal development of the pancreas. Ground breaking research on rodents has consistently shown that a low-protein diet during pregnancy or adolescence can result in poor pancreatic development. This long-recognized phenomenon emphasizes that having a smaller pancreas significantly increases the risk of various forms of diabetes, as it translates to fewer insulin-producing cells. Diabetes is a broad umbrella term encompassing a range of conditions that cause elevated blood sugar levels, yet the underlying causes vary dramatically. Understanding the specific type of diabetes, a person has is essential for delivering effective treatment. As medical science continues to progress, so too should our classification of diabetes. Recognizing malnutrition-related diabetes as Type 5 is

more than just a designation; it is a call to action that fosters vital discussion and awareness. This transition is crucial for enhancing global understanding and improving care, especially in low-income countries where the need is greatest.

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- **Informed Consent**

Written Consent taken from Patients

- **Conflict of Interest Statement**

All the authors declared “No Conflict of Interest” with this publication.

- **Additional Information**

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