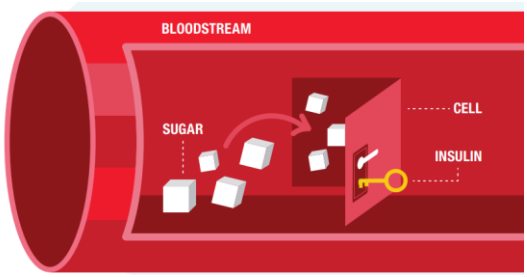
How Diabetes Works: The Lock and Key Model of Blood Sugar Control

What Happens When We Eat?

When we eat, our body breaks down most foods into sugar (glucose), which enters the bloodstream. As blood sugar levels rise, the pancreas releases insulin, a hormone that helps move glucose from the bloodstream into our cells to be used for energy.

The Lock and Key Analogy



Think of insulin as a key and our cells as locked doors. Glucose (sugar) needs insulin to unlock the door and enter the cell. In people without diabetes, insulin fits the lock perfectly, allowing glucose to move into the cells smoothly.

But what happens when the key no longer works?

Diabetes is a chronic condition when the body cannot effectively manage blood sugar levels. This happens when the insulin "key" and the cell "lock" stop working properly.

There are several types of diabetes, each with different causes and treatments:

Type 1 Diabetes:

- Prevalence: Around 10% of people with diabetes in Canada have Type 1.
- Cause: The body's immune system mistakenly attacks and destroys insulin-producing cells in the pancreas, so the body does not produce insulin.
- Lock and Key: There is no key available.
- Treatment: Requires daily insulin injections or the use of an insulin pump.

Pre-diabetes

- Definition: A warning sign that the body is starting to struggle with blood sugar control.
- Cause: The body begins to resist insulin or does not make enough. Blood sugar levels are high but not yet high enough to be diagnosed as Type 2 diabetes.
- Lock and Key: The key starts to struggle, and the lock becomes harder to open.
- Treatment: Lifestyle changes such as healthy eating, regular physical activity, and weight management can help prevent or delay the development of Type 2 diabetes.

Type 2 Diabetes

- Prevalence: Approximately 90% of people with diabetes in Canada have Type 2.
- Cause: The body does not use insulin properly (insulin resistance) and may not produce enough insulin.
- Lock and Key: The key is worn down, or the lock is rusty.

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- Treatment: Managed through lifestyle changes, oral medications, and in some cases, insulin.

Gestational Diabetes

- Definition: A form of diabetes that develops during pregnancy.
- Cause: Hormonal changes during pregnancy can lead to high blood sugar levels. This type usually resolves after childbirth but increases the risk of developing Type 2 diabetes in the future.
- Treatment: Depends on the severity and may include dietary changes, exercise, and in some cases, medication or insulin.

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