# KNOW YOUR INSULIN

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**Ever since its discovery and administration in humans in the early 1920s, insulin therapy has remained a hallmark of diabetes therapy.**

**It is by far the most potent glucose lowering therapy available and has been shown to improve clinical outcomes and avert the devastating complications of the illness.**

**If one looks at the journey of insulin since its discovery, things have certainly come a long way.**

**From its humble beginnings where insulin was literally extracted from animals including dogs and cows, today the production of insulin is synthetically made in large factories under highly controlled and sterile environments.**

The methods of insulin injections have changed significantly as well with the introduction of insulin pens and syringes as compared to the hulking delivery devices from days past. The latest insulin needle is a mere 4mm in length and the diameter of two human hairs.

Today, up to 30% of people who have type 2 diabetes may need insulin injections to control their blood sugars. Insulin comes in many different forms, strengths and modes of action.

## What are the different types of insulin?

### Rapid-acting
Usually taken before a meal to cover the blood glucose elevation from eating. This type of insulin is used with longer-acting insulin.

### Short-acting
Usually taken about 30 minutes before a meal to cover the blood glucose elevation from eating. This type of insulin is used with longer-acting insulin.

### Intermediate-acting
Covers the blood glucose elevations after the effects of the rapid or short acting insulins wear out. This type of insulin is often combined with rapid- or short-acting insulin and is usually taken twice a day.

### Long-acting
This type of insulin is often combined, when needed, with rapid- or short-acting insulin. It lowers blood glucose levels when rapid-acting insulins stop working. It is taken once or twice a day.

### Mixed/Biphasic insulin
This type of insulin is typically a fixed combination of either a rapid- or short-acting insulin with an intermediate-acting insulin so the action of the insulin has a dual effect, i.e. to cover for the immediate meal and also to provide insulin cover for glucose elevations for up to the next 12 hours.

**In Singapore, the number on the name of the mixed insulin represents the percentage of short-acting insulin ratio to the intermediate-acting. For example, Humalog mix 25 is (25% short-acting and 75% intermediate-acting)**

| | Common Brand Names | Onset (length of time before insulin starts to work) | Peak (time period when insulin reaches maximum efficacy) | Duration (Total time in which insulin works for) |
|---|---|---|---|---|
| Rapid-acting | Humalog<br>Novorapid<br>Apidra | 10 - 30 minutes | 30 minutes - 3 hours | 3 - 5 hours |
| Short-acting | Actrapid | 30 minutes - 1 hour | 2 - 5 hours | Up to 12 hours |
| Intermediate-acting | Insulatard | 1.5 - 4 hours | 4 - 12 hours | Up to 24 hours |
| Long-acting | Lantus<br>Levemir | 0.8 - 4 hours | Minimal peak | Up to 24 hours |
| Mixed/Biphasic | Novomix 30<br>Humalog Mix 25<br>Humalog Mix 50<br>Mixtard 30 | Variable onset | Variable onset | Up to 12 hours |

## I have been told I need to start on insulin treatment. Which insulin is the best option for me?

Many of my patients ask me if there is one single 'better' insulin and the answer is simply 'no'. Like all treatments in diabetes, therapy has to be tailored to meet the individual, and insulin is no different. Speak to your doctor regarding the insulin treatments available and discuss how to best match it to your blood sugars, lifestyle and expectations.

## I am on insulin treatment but my sugars are still high? Is the insulin working?

The term 'insulin resistance' which was coined to refer to people with diabetes can sometimes be misunderstood. Though it is true that many people with type 2 diabetes are insulin resistant, it simply means that insulin does work in their body but just not to such a degree and, hence, more insulin is needed to reduce their overall blood sugars. In other words, insulin does work in these individuals, just not so effectively. Hence, more insulin is needed.

There is no upper limit to insulin doses. There are people who require doses higher than 100 units a day. Generally, the amount of insulin required increases with the age of the person, duration of diabetes, reduced level of activity and larger body size. There are oral agents that can reduce the body's insulin resistance and this agents are commonly used in combination with insulin therapy.

## How do I adjust my insulin doses if needed?

Simply put, slowly and carefully. Though there is no upper limit to insulin doses, putting yourself on too high a dose without medical advice can result in serious complications such as hypoglycaemia and even death. However, that being said, there are many studies showing that with the proper advice, support and education, insulin doses can be safely and effectively adjusted by people with diabetes without always having to consult their healthcare provider first.

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