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The Development of Synthetic Insulin

What Is Diabetes?

Diabetes is a disease where the body cannot properly control the level of sugar (glucose) in the blood. This happens when the system that manages blood sugar doesn't work the way it should. If glucose builds up in the blood instead of going into cells, it can lead to serious health problems like heart disease, nerve damage, or vision loss.

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There are two main types of diabetes: Type 1 and Type 2. In Type 1, the body makes no insulin at all. In Type 2, the body still makes insulin but doesn't use it correctly. Both types cause high blood sugar and need careful treatment.



Life Before Synthetic Insulin

Before insulin was discovered, Type 1 diabetes was usually fatal. Without insulin, the body couldn't use sugar for energy, and patients would become weak, lose weight quickly, and eventually die. There was no effective way to control blood sugar, so a diagnosis of Type 1 diabetes often meant only months to live.



Early treatments for diabetes used extremely strict diets. Patients were given

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In 1921, insulin was discovered by Sir Frederick G Banting, Charles H Best, and J.R. Macleod at the University of Toronto and began using it to treat diabetes. A team led by Frederick Banting and Charles Best was able to extract insulin from animals and use it to lower blood sugar. This breakthrough turned Type 1 diabetes from a deadly disease into a manageable condition.

Animal-Based Insulin

The first insulin treatments used insulin taken from animals, usually pigs or

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Animal insulin worked, but it wasn't perfect. One problem was that it was difficult and costly to produce large amounts. It required collecting and processing insulin from the pancreases of many animals, which made the supply limited and inconsistent, especially as more people needed treatment.

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The Breakthrough: Synthetic Human Insulin

In 1978, scientists created the first synthetic human insulin using a method called genetic engineering. This was a major breakthrough in diabetes treatment. Instead of relying on animal insulin, researchers found a way to make insulin that was exactly the same as the kind made by the human body.

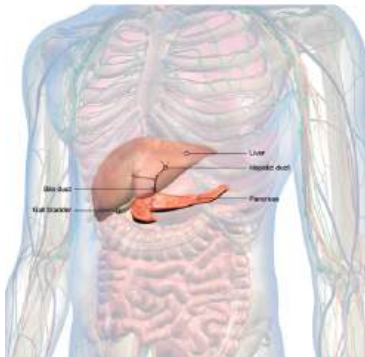
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This method is known as recombinant DNA technology. It allows scientists to combine genetic material from different organisms. In this case, they used human DNA and bacteria to create a new way to make medicine. Recombinant DNA is now used to produce many important drugs, not just insulin.



Why Synthetic Insulin Was a Game Changer

Synthetic insulin made production faster, more reliable, and less expensive. Using bacteria to produce insulin meant scientists no longer had to rely on animals. Insulin could now be made in labs in large amounts, with consistent quality, making it more accessible and affordable for people with diabetes around the world. It also created insulin that was identical to the kind made by the human body. This human-like insulin worked better than animal insulin and matched what the body needed. Because of this, it controlled blood sugar more accurately and helped patients manage their diabetes more effectively.



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Scientists could also design insulin to act faster or slower. This allowed for different types of insulin, such as fast-acting for meals or long-acting for all-day control. With more options, doctors could create treatment plans that fit each person's lifestyle and needs more closely.

Modern Diabetes Treatment

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Insulin pens and pumps make taking insulin easier and more accurate. Pens are simple to use and portable, while insulin pumps deliver steady doses through a small tube under the skin. These tools help people give the right amount of insulin at the right time with less guesswork.



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Thanks to synthetic insulin and new technology, people with diabetes can live long, healthy lives. With proper care and access to treatment, diabetes is no longer the deadly disease it once was.

Future Developments and Ongoing Challenges

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One major challenge is making insulin affordable and available to everyone who needs it. In some countries, insulin is still too expensive or hard to get. Even though synthetic insulin is easier to produce, many people with diabetes struggle to afford regular treatment.

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Conclusion: A Life-Saving Discovery

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This breakthrough shows how science and genetic engineering can solve real-world health problems. By using bacteria to produce human insulin, scientists found a way to save lives and improve treatment. It's a powerful example of how research and innovation can turn ideas into life-changing solutions.

Students should understand the impact of medical science on people's lives. Discoveries like synthetic insulin remind us why science matters. With curiosity, learning, and teamwork, today's students could become the scientists and doctors who solve tomorrow's health challenges.

Reading Comprehension Questions:

1. What is the
2. What
3. What was life
4. Where was the first insulin used for treatment taken from?
5. What
6. How was the first synthetic human insulin made in 1978?
7. What is
8. Why was
9. What are two
10. What are scientists working on for future diabetes treatments?

Extension Questions:

1. How much does insulin cost in different parts of the world and why is access a major issue in some countries?
2. What are the
3. How does an
4. What is the role of E. coli
5. How has the discovery of synthetic insulin impacted global health outcomes for people with Type 1 diabetes?

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