

How a medical student helped discover lifesaving insulin

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For people with diabetes, the inability to produce enough or any insulin leads to a myriad of problems. Thankfully, the discovery of the pancreatic hormone paved the way to lifesaving treatments for people around the world. On this day in 1899, one of the people responsible for that breakthrough, Charles H. Best, was born.

The story begins nearly 100 years ago, in 1921, when Ontario surgeon Frederick Banting convinced University of Toronto biochemistry professor J.J.R. Macleod to let him use his laboratory, which came with research animals, while the senior scientist was away on summer vacation in Scotland. Banting also got to choose one of two potential student assistants: Charles Best or **Clark Noble**. Best, 21 years old at the time, won a coin flip, soon becoming the epitome of the curious medical student, and winning a role in medical history.

Banting had no formal training in physiology, but had the great idea of ligating, or tying off, the pancreatic duct in order to isolate and collect the gland's "internal secretion," a yet-to-be-identified biological substance so essential to the body's metabolism. The entire, hot, sticky summer of 1921, Banting and Best toiled in a tiny, smelly laboratory, gathering their data.

By fall, Banting and Best were still struggling to purify the hormone secreted by the cells of the pancreas — known as "islets of Langerhans" — when Macleod returned to Toronto. Macleod saw the value of Banting and Best's research and assigned the biochemist James Collip to purify (and increase the potency of) what we now know as insulin. (For those intrigued by this rollicking adventure of curiosity and conflict, I recommend the superbly written book "The Discovery of Insulin" by the late historian Michael Bliss.)

In early 1922, **Leonard Thompson** was a 14-year-old boy with end-stage type I (or juvenile) diabetes. On Jan. 11 of that year, Thompson became the first human to be treated with insulin — within a few weeks and better purification, the injections pulled Leonard off of his death bed.

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The next month, Banting and Best published their findings in the *Journal of Laboratory and Clinical Medicine*, eventually leading to insulin becoming one of the most successful drugs of the 20th century. The hormone, and its many improved iterations over the past century, continues to be the mainstay of treatment for both type I and, increasingly, type II diabetes.

When the 1923 Nobel Prize for physiology or medicine was announced, it went only to Banting and Macleod, the man who served as Banting's supervisor (in the technical sense) by lending him his laboratory. Both Best and Collip were excluded by the Stockholm jurors. In the interest of honoring Best's critical role in the experiments that led to insulin's discovery, Banting shared his prize money with him; Macleod subsequently shared his winnings with Collip.

So what happened to Charles H. Best, the lucky medical student who co-discovered insulin? He received his medical degree in 1925 from the University of Toronto and, by 1929, succeeded Macleod as Canada's most eminent physiologist and medical researcher. Much of his subsequent research focused on the blood's clotting system and the use of anticoagulants, diabetes and co-authoring textbooks, such as "The Physiological Basis of Medical Practice," which was popular among North American medical students during the 1960s and 1970s. He was the winner of 18 honorary doctorates and many dozens of prestigious awards. And yet, Dr. Best made his most important discovery before he turned 23.

By — **Dr. Howard Markel**

Dr. Howard Markel writes a monthly column for the PBS NewsHour, highlighting the anniversary of a momentous event that continues to shape modern medicine. He is the director of the Center for the History of Medicine and the George E. Wantz Distinguished Professor of the History of Medicine at the University of Michigan.

