Diabetes:

Type 1 (diabetes mellitus)

Your own immune system attacks the insulin producing cells of the pancreas.

Before this form of diabetes was referred to as type one diabetes it was called juvenile diabetes or juvenile onset diabetes. The change was made due in part to the fact that type 1 diabetes also occurs in young adults. So to be politically correct the change was made.

With type 1 diabetes the pancreas completely shuts down production of insulin. The diabetic then becomes insulin dependent for treatment. A diabetic who has type 1 diabetes can not be treated alone with oral medications.

Type 2 (diabetes insipidus)....(adult / delayed onset)

90% of diabetic cases

Differing causes..

* Genetics, it’s in your family history
* Over-weight / Obesity
* Little or no exercise
* Immune response

Most can minimize their chances of type 2 diabetes by a good diet and exercise plan.
A Canadian Influence... Fred Banting and Charles Best

Global Heroes: Banting and Best Discover Insulin

Frederick Banting, right, and Charles Best, left, discovered a life-saving treatment for diabetes: insulin.

A diagnosis of diabetes meant almost certain death until 1922, when the discovery of its cause and treatment thrust two young Canadian researchers into the international spotlight. Frederick Banting and Charles Best seemed unlikely heroes, and neither had any special research qualifications. Though a diabetic’s blood contains high levels of glucose, very little of it enters the cells. This means that an untreated patient can literally starve to death while eating what should be adequate meals.

Unexpected Insight

Banting had obtained a medical degree at the University of Toronto and trained in orthopedic surgery. On October 30, 1920, he read a medical journal article about an apparent link between the pancreas and diabetes. He learned that (1) depancreatized dogs developed symptoms of diabetes; (2) a healthy pancreas contains background cells and a small scattering of distinctive cell clusters called the islets of Langerhans; (3) if the main duct of the pancreas is deliberately blocked, the background tissue usually shrivels up but the islets often persist; (4) if the islet cells remain healthy, diabetes does not develop. Apparently, the islets held the key that allowed glucose to enter the body’s cells.

At about two the next morning, Banting suddenly awoke with an exciting research idea that would eventually save the lives of millions of diabetics around the world and dramatically change his own.

Banting’s Bold Idea

Banting’s idea was this: block the pancreatic duct to isolate islet cells from the pancreas of a dog, chemically extract the islet secretions, and administer the purified extract to another dog made diabetic by removing its pancreas. He hypothesized that the islets extract would normalize the second dog’s blood sugar levels.

Banting presented his hypothesis to Dr. J.J.R. Macleod, a diabetes expert at the University of Toronto. Intrigued, Macleod offered Banting a small lab, a supply of dogs, and a 21-year-old assistant, Charles Best. Best was in medical school, and his excellent laboratory skills in biochemistry complemented Banting’s surgical experience.

The first exhilarating results supporting their hypothesis came on July 30, 1921, when a diabetic dog’s blood sugar did normalize as expected. By November, they had duplicated this result many times over.

Breakthrough

Banting and Best’s extract was given to a human diabetic patient for the first time on January 11, 1922, but with disappointing results. Fortunately, J.B. Collip, a biochemist from the University of Alberta, had joined the team late in December. After much “bathtub chemistry,” as he later described it, Collip discovered that alcohol in a 90% concentration precipitated the active ingredient out of the raw extract. On January 23, Collip’s purer extract was given to the same patient with much greater success.

The membrane-bound secretory granules (vesicles) in this islets cell contain insulin (red dots).

Macleod named the extract insulin, after the Latin word for “island.” The University of Toronto’s Connaught Laboratories immediately began developing large-scale production methods. The outcome was dramatic: within months, insulin was saving lives all around the world.

The media spotlight shone with its brightest intensity in 1923 when Banting and Macleod were awarded the Nobel Prize for medicine. Shocked that Macleod was named and not Best, Banting immediately split his award with his young assistant. Macleod followed suit by sharing his award with Collip. Surely, in this great moment, there was glory enough for all.