

DIABETES: A History for Laymen

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I'll just bet that if you don't have "diabetes," you know someone who does. It's probably a loved one. I put diabetes in quotation marks because that's what we call it, but diabetes is part of a much bigger problem: **metabolic failure**. According to 2014 reports, 29 Million Americans have diabetes, and that figure is *up* from the forecast 26 Million. Even worse, 1 in 4 don't even know they have the disease, and another 86 Million Americans are pre-diabetic.

Those numbers have steadily increased. They have *never* declined. Worldwide it's even worse. The numbers have never improved. The most that physicians even hope for is to keep their diabetic patients where they are, or that they don't get too much worse. I think that diabetics' doctors don't even hope for improvement.

There are, and apparently always have been, two kinds of diabetes: (1) Type 1, formerly called "juvenile diabetes," because it is a kind of birth defect wherein the person's pancreas produces no insulin or the person doesn't even have a pancreas; and (2) Type 2, formerly called "adult onset diabetes," because it develops later in life, and many think it is caused by getting fat.

I have spent hundreds of hours researching everything I could learn about diabetes (because I was diagnosed a diabetic at age 68) and want to share a few things I have learned about the history of this awful disease, in laymen's terms. The names I have included have recurred often in the many documents I studied about the history of the diabetes, and they are important. Most diabetics and those who love them should find something of interest here.

The Ancients

Diabetes has been around as long as humans, it seems, and the earliest record found (so far) was in Egypt, written on a Third Dynasty Egyptian papyrus in about 2650 B.C. Physician **Hesy-Ra**, royal physician to the Pharaoh Djoser, and thought to be the first authenticated doctor and dentist in recorded history, speculates that frequent urination is a symptom of "Sweet Urine Disease." This is the earliest known record of diabetes, and the papyrus was found during a tomb excavation.

About 2,000 years later, around 600 B.C., a Hindu physician in India named **Sushruta** was a legendary scholar of Indian medical science and is considered to be the "Founding Father

of Surgery.” He wrote medical textbooks in Sanskrit that are today called among the most important ancient medical treatises. His work was later translated to Arabic, Latin, and English and is foundational text of the medical tradition in India.

Sushruta described diabetes as a disease characterized by passage of large amounts of urine, sweet in taste. He says the disease primarily affects obese people who are sedentary and emphasized the role of physical activity in lessening the effects of the disease. That was 2,300 years ago! Think of that. This might be one of those few things that *never* change: the need for physical exercise.

Sushruta and his staff tested for the disease by observing whether ants were attracted to a person’s urine, and called it “sweet urine disease.” Two types (which we call Type 1 and Type 2 today) of diabetes were identified as separate conditions for the first time by Sushruta, with type 1 associated with youth and type 2 with being overweight. Pretty amazing, huh?

In 250 B.C., **Apollonius of Memphis** (former capital of Egypt, which today is Cairo) is credited with coining the term “diabetes,” from the Greek meaning *to go through, or siphon*, for a disease that drains patients of more fluid than they can consume.

In the 2nd Century A.D., **Aretaeus the Cappadocian**, a Greek physician who revived Hippocrates' teachings and who practiced in Rome and Alexandria, named the condition *diabeinein* for causing the patient to pass too much water. After his death he was entirely forgotten, until two of his manuscripts were discovered around 1550. More than any other physician of antiquity, his name has been linked with diabetes—even though he wrongly concluded that the disease was caused by a kidney malfunction. He was blessed with a gift for words, and he produced the first clear written description of the disease. In the Jan.-Mar. 2012 edition of *Hormones*, his description is called “outstandingly vivid and accurate.”

It is pertinent at this point to quote a passage of his text and to note his description, from some two thousand years ago:

“Diabetes is a remarkable affliction, not very frequent among men The course is the common one, namely, the kidneys and the bladder; for the patients never stop making water, but the flow is incessant, as if from the opening of aqueducts The nature of the disease, then, is chronic, and it takes a long period to form; but the patient is short-lived, if the constitution of the disease be completely established; for the melting is rapid, the death speedy. Moreover, life is disgusting and painful; thirst, unquenchable; excessive drinking, which, however, is disproportionate to the large quantity of urine, for more urine is passed;

and one cannot stop them either from drinking or making water. Or if for a time they abstain from drinking, their mouth becomes parched and their body dry; the viscera seems as if scorched up; they are affected with nausea, restlessness, and a burning thirst; and at no distant term they expire. They thirst, as if scorched up with fire But if it increases still more, the heat is small indeed, but pungent, and seated in the intestines; the abdomen is shriveled, the veins protuberant, and there is general emaciation, when the quantity of urine and the thirst have already increased; and when, at the same time, the sensation appears at the extremity of the member, the patients immediately make water. Hence, the disease appears to me to have got the name *diabetes* as if from the Greek word [signifying a siphon], because the fluid does not remain in the body, but uses the man's body as a ladder, whereby to leave it. They survive not for long, for they pass urine with pain, and the emaciation is dreadful; nor does any great portion of the drink get into the system, and many parts of the flesh pass out along with the urine." (From Adams F [ed], 1856, *The extant works of Aretaeus the Cappadocian*. The Sydenham Society, London.)

It is easy to see why Aretaeus is among the stalwarts of ancient medical history. He was a gifted medical writer whose words live on. And it is easy to feel blessed that at least some forms of treatment have been developed for the many who suffer today.

Toward the Modern Era

As we come down through history, we assume that medical practitioners followed the work of these ancient heroes, and although medical knowledge surely increased, it doesn't seem that any progress was made in treating the disease. Since the urine of people with diabetes was thought to be sweet tasting, diagnosis was often made by "water tasters" who drank the urine of those suspected of having diabetes. This went on for a number of centuries.

Then in the 1500s we find **Paracelsus**, a Renaissance-era Swiss contemporary of Copernicus, Leonardo da Vinci, and Martin Luther, and his is another name for the layman to remember. Paracelsus was a colorful character who is credited with being the "Father of Toxicology." Paracelsus believed strongly in the diagnostic properties of urine, and he identified diabetes as a serious systemic disease. Paracelsus was a medical revolutionary who established the role of chemistry in medicine. Carl Jung called him "not only a pioneer in the domains of chemical medicine, but also in those of an empirical psychological healing science." One of his famous quotes urges keeping wounds clean: "If you prevent infection, Nature will heal the wound all by herself." Those words are excellent advice today, don't you think?

In the next century, around 1674, **Thomas Willis**, personal physician to England's King Charles II, coined the term "diabetes mellitus" as he added the Latin word for "honey."

Another hundred years passes, and in the very important-to-us year of 1776, **Mathew Dobson**, a Liverpool physician, wrote *Medical Observations and Inquiries* for the London Medical Society and confirmed that the urine of diabetes patients was sweet to taste and after evaporation contained a large amount of white, granular material that was indistinguishable from sugar. Dobson also observed that the blood serum was also sweet to taste, and thus is called the discoverer of hyperglycaemia. He observed that, for some people, diabetes is fatal in less than five weeks and, for others, is a chronic condition. Apart from Sushruta's important work, this appears to be the first distinction between Type 1 and Type 2 diabetes. Dobson deduced that diabetic urine always contains sugar that is not formed in the kidney but previously existed in the serum of the blood. This simple observation, that diabetes is associated with a persistently raised *blood sugar* concentration, pivoted diabetes research in the right direction, towards a study of the mechanisms by which the body deals with carbohydrates. For this, he deserves to be remembered in our laymen's history of diabetes.

In 1797 **Dr. John Rollo**, a surgeon in the British Royal Artillery, applied the first significant dietary approach to the treatment of diabetes in his book *An Account of Two Cases of the Diabetes Mellitus*. He successfully treated a patient using a high fat and protein diet after observing that sugar in the urine increased after eating starchy food.

Dr. Rollo studied one Captain Meredith, 232 pounds, who suffered from intense polyuria and dehydration. Captain Meredith's diet was adjusted to one rich in protein and fat (largely from animal sources) and low in carbohydrates, in addition to medications. The result was substantial weight loss, the elimination of Meredith's symptoms, and the reversal of both his glycosuria and hyperglycemia. Dr. Rollo's study was a seminal point in unraveling ages-old mysteries about diabetes.

Things get busier in the Nineteenth Century. Around 1857 **Claude Bernard** reports of his discovery that glycogen is formed by the liver and speculates that this is the same sugar found in the urine of diabetics. His discovery resulted from his work on the pancreas and was the first linking of diabetes and glycogen metabolism.

In 1869 **Paul Langerhans Jr.**, a German medical student, wrote in his thesis, "Contributions to the Microscopic Anatomy of the Pancreas," about his discovery of nine different cells in the pancreas—which he dubbed the "abdominal salivary gland," and learned that the beta cells help produce the hormone insulin. Years later, these cells are named the "islets of Langerhans." Since 1978, the German Diabetes Association has awarded the Paul Langerhans Medal to great achievements in Diabetes research.

In 1889 **Oskar Minkowski** and **Joseph von Mering**, at the University of Strasbourg, in Alsace, France (on the German border), surgically removed the pancreas from a dog, which produced severe—and fatal—diabetes. Since 1966, the European Association for the Study of Diabetes has awarded the Minkowski Prize for outstanding contributions to the advancement of knowledge in the field of diabetes mellitus.

The Early 1900s

An important event occurred in 1908, and it gives us another name we should remember. **George Ludwig Züelzer** extracted a pancreatic “substance” [Acromatrol] from calf pancreases and injected it into five diabetes patients. Although the patients showed initial improvement, they died from the side effects of treatment. While Züelzer was not successful, his work led to the 1920 discovery of insulin credited to Canadian physicians **Frederick Banting** and **Charles Best**.

In 1909, **Jean de Meyer** of Belgium proposed the name “insulin” (Latin for *insula* or *island*) for the internal secretion of the pancreas, which would not be isolated for 13 more years.

In 1913, **Dr. Frederick M. Allen**’s book, *Studies Concerning Glycosuria and Diabetes*, stimulates a revolution in diabetes therapy. He, along with Dr. Joslin, were the foremost American experts on diabetes for many years.

From 1910 to 1920, Dr. Allen and **Elliot P. Joslin, M.D.**, are considered the two leading diabetes specialists in the United States. Between 1898 and 1906 Dr. Joslin, a graduate of Harvard Medical School, wrote 17 papers on diabetes and began work on his classic textbook that would be published ten years later. Joslin believed diabetes to be “the best of the chronic diseases” because it was “clean, seldom unsightly, not contagious, often painless, and susceptible to treatment.” (I’m not sure we diabetics would agree about the “painless part.”) Today the Joslin Diabetes Center in Boston is one of the most famous institutes in the world.

Between 1914 and 1916 a distinguished Romanian scientist and physiologist named **Nicolae Paulescu**, was head of the Physiology Department at the University of Bucharest Medical School, and also Professor of Clinical Medicine at St. Vincent De Paul Hospital in Bucharest. In 1916 he succeeded in developing a pancreatic extract which, when injected into a diabetic dog, proved to have a normalizing effect on the dog’s blood sugar levels. World War I caused a gap in his work, which he resumed when the war was over.

Paulescu published four papers about his work in 1921, and in 1922 he published an article describing his successful isolation of “pancreine” or insulin. His treatise, “Research on the

Role of the Pancreas in Food Assimilation” reports his 1916 *discovery* of the substance, which normalized the blood sugar of a dog with diabetes. When Dr. Frederick Banting and John James Richard McLeod of Toronto were awarded the Nobel Prize in 1923 for the discovery of insulin, Paulescu objected, claiming it was he who discovered it. His claims were rejected but later Paulescu was finally formally recognized as being significant in the history of insulin. Interestingly, Banting and McLeod even refer directly to the works of Paulescu, although they mis-quote him! (And when it comes to politics, some things never change, do they?)

By 1916 Dr. Joslin had published the first textbook of its kind in English on diabetes, *The Treatment of Diabetes Mellitus*. Dr. Allen worked on dietary matters and promoted a strict diet regimen, which was soon widely adopted. Dr. Allen believed that the diabetic's body cannot use food, so he limited the amount of food allowed to patients. Get this: His patients were admitted to the hospital and given only whiskey mixed with black coffee (or clear soup for teetotalers) every two hours from 7 am to 7 pm. The patients continued to follow this “starvation diet” until there was no sign of sugar in the urine—usually five days or less, followed by a strict diet. Outcomes were better than ever for Type 2 diabetics. Unfortunately, however, the patients with Type 1 commonly died during the treatment—probably from starvation! A few young people managed to survive and they became the first insulin users.

In 1919 Dr. Allen published *Total Dietary Regulation in the Treatment of Diabetes*, with exhaustive case records and observations of most of his 100 diabetes patients. He went on to become the Director of Diabetes Research at the Rockefeller Institute.

In 1920, Canadian physician **Frederick Banting** is alleged to have conceived of the idea of insulin after reading Moses Barron’s “The Relation of the Islets of Langerhans to Diabetes with Special Reference to Cases of Pancreatic Lithiasis” in the journal *Surgery, Gynecology and Obstetrics*. With help of his student **Charles H. Best**, Canadian chemist **James B. Collip**, and Scottish physiologist **J. J. R. Macleod**, Dr. Banting continued experimenting with different pancreatic extracts on dogs with no pancreas.

1921 apparently marks the historical year that Insulin is “discovered,” when a de-pancreatized dog is successfully treated with insulin. That same year, Dr. Frederick Banting presented “The Beneficial Influences of Certain Pancreatic Extracts on Pancreatic Diabetes,” summarizing the totality of his work at a session of the American Physiological Society at Yale University.

1922 was a big year. In Toronto, one of Collip's insulin extracts is tested on a human being, a 14-year-old boy named Leonard Thompson who had Type 1 diabetes. The boy had been

close to death before treatment, but he bounced back to life with the insulin. He thus became the first medical success using insulin for treatment of diabetes. I'm sure that the human interest aspect of this young boy's story contributed mightily to the recognition received by the Toronto team. The news rapidly spread beyond Canada, and Eli Lilly and the University of Toronto entered into a deal for the mass production of insulin in North America. Leonard Thompson lived another 13 years and died of pneumonia at the age of 27.

Another pioneering story had a better ending. On August 16, 1922, Elizabeth Evans Hughes, the 13-year-old daughter of U.S. Secretary of State Charles Evans Hughes, arrived in Toronto to be treated by Dr. Banting for her diabetes. She weighed only 45 pounds and was barely able to walk, but she responded immediately to the insulin treatment. Elizabeth went on live a productive life and died in 1981 of natural causes at age 73. Her life is chronicled in a recent book by Thea Cooper and Arthur Ainsberg, titled *Breakthrough*.

While insulin was shown to prevent early death from diabetic coma, insulin treatment did not, and to this day does not, prevent the chronic, disabling, and sometimes deadly *complications* of the disease, such as neuropathy, nephropathy, poor wound healing, and retinopathy. There is no substance nor has any drug been developed to treat the *root cause* of diabetes, which is metabolic failure.

In 1923 the Nobel Committee decided to award Banting and Macleod the Nobel Prize in Physiology or Medicine. Banting shares his award with Best; Macleod shares his with Collip. In his Nobel lecture Banting said, "Insulin is not a cure for diabetes; it is a treatment. It enables the diabetic to burn sufficient carbohydrates, so that proteins and fats may be added to the diet in sufficient quantities to provide energy for the economic burdens of life." Also in 1923, Eli Lilly began commercial production of insulin. The Toronto group called the substance "insulin"; Eli Lilly named its commercial product "Isletin Insulin."

In 1940, The American Diabetes Association was founded to address the increasing incidence of diabetes and the complications that develop from the disease. They grew large and continue to grow today (2015 reports show 40 employees listed with six-figure salaries and a net worth of \$160 million), as do the numbers of Americans with diabetes (29 Million).

In 1948, **Dr. Joslin** writes about the "unknown diabetic" in *Postgraduate Medicine*. Although by that time 1 Million people were known to have diabetes, Dr. Joslin speculated that a million more had it but didn't know it. He is the first expert to emphasize that insulin alone cannot solve all diabetes-related issues.

In 1953 the Canadian Diabetes Association was established. On July 7, 1989, Her Majesty Queen Elizabeth The Queen Mother kindled the Flame of Hope at Banting House National Historic Site, "The Birthplace of Insulin," in London, Ontario. As a symbol of hope, the flame will burn until a cure for diabetes is found. The flame still burns.

Metabolic syndrome, of which diabetes mellitus forms a part, was discovered by **Dr. Gerald Reaven** in 1988, who first described the condition as "Syndrome X" in a his now-famous Banting Lecture, "The Role of Insulin Resistance in Human Disease." Because of that lecture, Dr. Reaven is called "The Father of Insulin Resistance."

Products Are Developed to Help Diabetics

In the late 1940s, **Helen Murray Free** developed the "dip-and-read" urine test (Clinistix), allowing instant monitoring of blood glucose levels. She is well known for her creation of many self-testing systems for diabetes while working at Miles Laboratories, which is now owned by Bayer AG. She currently is an Adjunct Professor of Management at Indiana University South Bend, and a Consultant for Bayer AG. President Obama presented her with the National Medal of Technology and Innovation in 2009.

1955 saw the introduction of oral drugs that helped lower blood glucose levels. Sulfonylureas, oral medications that stimulate the pancreas to release more insulin, became available. New, more potent forms of these drugs were to become available later.

In the 1960s, home testing for glucose levels in the urine increased the level of control for people with diabetes. The first strips for testing blood glucose were introduced in 1964: a drop of blood is placed on the paper strip for 1 minute, and then washed off. Comparing the color to a color chart indicated blood glucose levels.

Ames introduced the first blood glucose meter in 1970, which was intended for use in doctors' offices and cost around \$500. The same year, insulin pumps were developed. The development of testing equipment and supplies provided patients with much greater control and flexibility in the management of their diabetes. Another 1970 development was that of laser therapy used to help slow or prevent diabetic blindness.

1973 witnessed the introduction of U-100 insulin, which helped correct dosing errors, and in 1976 the HbA1c test was introduced, which went on to become the "gold standard" for measuring long-term diabetes control. Today's doctors frequently ask about A1c as their first question about a diabetic's status.

The National Diabetes Information Clearinghouse (NDIC) was created by the federal government in 1978 to gather and document all diabetes literature. The NDIC is an

information dissemination service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health (NIH), which is part of the U.S. Department of Health and Human Services (www.diabetes.niddk.nih.gov).

Another turning point occurred in 1978 when the testing of the first recombinant DNA insulin is announced. Until then, insulin manufacturers had to stockpile animal pancreatic tissue. With this development, DNA technology allowed the manufacturing of a genetically engineered “human” type of insulin. In 1983 the first biosynthetic human insulin was introduced.

1983 saw the introduction of “Reflolux,” later known as “Accu-Chek,” which allowed relatively easy and accurate blood glucose self-monitoring. In 1986 the Insulin pen delivery system was introduced. Then in 1996 the FDA approved the first recombinant DNA human insulin analogue, lispro (Humalog).

On May 19, 1983, Boots Pharmaceuticals, of Shreveport LA, aired the first broadcast television commercial in the United States for a prescription drug, the pain reliever Rufen—a competitor of Motrin—and both products were a proprietary form of ibuprofen. Within 48 hours of the ad’s airing, the federal government told the company to take it down. Now more than 30 years later, the fight over marketing prescription drugs directly to the public is still raging, but the ads have only increased as of 2017. Drug companies use media blasts to urge patients to ask their doctors to prescribe the latest diabetes medication. Does a day go by that you don’t see a drug commercial in a magazine or on TV or radio? The American Medical Association wants to ban direct-to-consumer ads for prescription medicines, but the First Amendment has prevailed. And so it goes, on and on, as we just “Follow the Money.”

In 1995 the drug metformin became available in the U.S. Metformin is a biguanide that prevents glucose production in the liver. The drug remains in wide use today.

Current Diabetes Statistics

2004: The life expectancy for people with diabetes in 2004 was still lower than that for the general population by about 15 years.

2014: 26 million Americans have diabetes and 1 in 3 or 4 (depending on whom you ask) of them don’t know it. Another 79 (or 86) million Americans are categorized as “pre-diabetic” and are at risk of developing diabetes in the next ten years if they don't make appropriate lifestyle changes.

Major Studies & Events

1993: The Diabetes Control and Complications Trial (DCCT) demonstrated that any sustained lowering of blood glucose helps, even if the person has a history of poor control. The study clearly demonstrated that more active self-management through nutrition, exercise, and monitoring/adjustment of glucose levels delays the onset and progression of long-term complications in Type 1 individuals. The study results showed that proper management reduced risk complications significantly for eye disease (76%), kidney disease (50%) and nerve disease (60%).

1995: Japan's "Kumamoto Study" was a six-year randomized clinical trial on patients with non-insulin-dependent diabetes mellitus based on the firm establishment of the significance of intensive glycemic control shown in the DCCT and other studies, such as the Steno studies, the Kroc study, the Oslo studies, the Oxford study, and the Stockholm studies. It concluded that intensive glycemic control can delay the onset and progression of early stages of diabetic retinopathy, nephropathy, and neuropathy in both NIDDM and IDDM patients.

1998: The United Kingdom Prospective Diabetes Study (UKPDS) showed that people with type 2 diabetes who practice tight control of blood sugar levels and blood pressure levels reduce their risk of complications, similar to the results of the DCCT in people with type 1 diabetes. Together these two studies transformed the nature of diabetes care around the world.

2006: On December 20, The United Nations recognizes diabetes as a global threat and designates World Diabetes Day as November 14, in honor of Dr. Frederick Banting's birthday, a UN Day to be observed every year starting in 2007.

2008: The results of the ACCORD, ADVANCE and VADT studies are published and presented at the American Diabetes Association Scientific Sessions. **All three studies failed to show a benefit** of intensive glycemic control on cardiovascular outcomes in people with type 2 diabetes who are at high cardiovascular risk.

2016: The World Health Organization presented its Global Report on Diabetes in Geneva, with these findings:

- (1) Worldwide, 422 Million people with diabetes in 2014, up from 108 in 1980;
- (2) Diabetic prevalence of 8.5% in 2014 is up from 4.7% in 1980, and is rising more rapidly in middle- and low-income countries;
- (3) Diabetes is a major cause of blindness, kidney failure, heart attacks, stroke, and lower limb amputation; and

(4) almost half of all deaths attributable to high blood glucose occur before age 70, and WHO predicts that diabetes will be the 7th leading cause of death by 2030.

Conclusion

Without exception, all the “diabetes groups” agree that lifestyle changes are needed and that prevention is the only way to reduce the burden caused by diabetes. They urge early diagnosis, along with changes in diet and exercise. It almost sounds like the so-called experts think that we have done this to ourselves. But are we the ones who have crammed high fructose fruit sugar into everything on the grocers’ shelves for decades? Are we the ones who have caused the medical community to treat symptoms instead of the root cause of disease? Are we the ones who have caused the marketing frenzy of pharmaceutical ads everywhere we look?

I don’t think so. I think that the almighty dollar has ruled in nearly every instance. I think that no medical school curriculum has provided proper education on natural substances for keeping us healthy. Thankfully, an increasing number of doctors have jumped from the mainstream medical industry bandwagon and are helping us to be able to educate ourselves and find alternatives.

And as for diabetes? There is at least one company with a treatment that concentrates on the root cause, which is metabolic failure. One company that knows that the pancreas and liver must be re-trained to communicate with each other, just as God intended when He designed us. One company that has taken a long-known idea and refined it to get lasting results. One company that is restoring hope for diabetics who suffer from the many complications of the awful disease.

That company is Diabetes Relief, whose patented treatment for improvement in impaired hepatic glucose processing works! Its success is proven by the testimonials of its patients. It changed my life. Check it out at www.diabetesrelief.com.

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