

# TerranearPMC Safety Share

## Week of January 7, 2013 – Diabetes

The human body, with all its chemical reactions and biological interactions requires a very tightly controlled environment. A slight deviation in temperature, pH, or electrolytes can result in severe dysfunction leading to a host of conditions, including permanent incapacities and even death. Such is the case with the amount of sugar we have in our blood stream: specifically, glucose.

**Diabetes mellitus**, or simply **diabetes**, is actually a group of diseases in which a person has high concentrations of glucose in the blood, causing hyperglycemia. This condition leads to the classical symptoms of polyuria (frequent urination), polydipsia (increased thirst) and polyphagia (increased hunger). High glucose can be the result of the pancreas not producing enough insulin (insulin is the hormone used to regulate carbohydrates such as sugars including glucose), or because cells do not respond to the insulin that is produced. Insulin stops the use of fat as an energy source while causing cells in the liver, skeletal muscles, and fat tissue to take up glucose from the blood. In the liver and skeletal muscles, glucose is stored as glycogen, and in fat cells (adipocytes) it is stored as triglycerides. Insulin stops the production of glucose by inhibiting the hormone, glucagon, which initiates the liver to convert glycogen into glucose, which can then enter the bloodstream. Thus through insulin and glucagon, glucose is continuously regulated within a tight parameter. Whether there is too much glucose in our blood stream or too little, the effects can be quite serious.

Diabetes was one of the first diseases described, with an Egyptian manuscript from c. 1500 BCE mentioning "too great emptying of the urine". The first described cases are believed to be what today we refer to as Type 1 diabetes. Indian physicians around the same time identified the disease and classified it as *madhumeha* or "honey urine", noting the urine would attract ants

The word *diabetes* has its routes from Latin *diabētēs*, which in turn comes from Ancient Greek which literally means "a passer through; a siphon." The ancient Greek physician Aretaeus first used that word, with the intended meaning "excessive discharge of urine", as the name for the disease. The word "diabetes" is first recorded in English, in the form *diabete*, in a medical text written around 1425. The word mellitus is derived from the Latin word *mellītus*, which means sweetened with honey or honey-sweet. It was Thomas Willis who in 1675 added "mellitus" to the word "diabetes" as a designation for the disease, when he noticed the urine of a diabetic had a sweet taste (glycosuria).

There are three main types of diabetes mellitus (DM).

- Type 1 DM results from the body's failure to produce insulin, and presently requires the person to inject insulin or wear an insulin pump. This form was previously referred to as "insulin-dependent diabetes mellitus" or "juvenile diabetes".
- Type 2 DM results from insulin resistance, a condition in which cells fail to use insulin properly, sometimes combined with an absolute insulin deficiency. This form was previously referred to as non insulin-dependent diabetes mellitus or "adult-onset diabetes". From a global perspective, there are an estimated 346 million people have type 2 diabetes.

- The third main form, gestational diabetes occurs when pregnant women without a previous diagnosis of diabetes develop a high blood glucose level. It may precede development of type 2 DM.

Other forms of diabetes mellitus include congenital diabetes, which is due to genetic defects of insulin secretion, cystic fibrosis-related diabetes, steroid diabetes induced by high doses of certain steroid hormones.

Besides the classic symptoms of weight loss, frequent urination, increased thirst and hunger, the increased levels of glucose in the blood stream can result in glucose being absorbed in the lens of the eyes. Changes in the shape of the lens can cause vision changes where blurred vision is a common complaint. Diabetic retinopathy, which affects blood vessel formation in the retina of the eye, can lead to visual symptoms, reduced vision, and potentially blindness. Diabetic nephropathy, the impact of diabetes on the kidneys, can lead to scarring changes in the kidney tissue, loss of small or progressively larger amounts of protein in the urine, and eventually chronic kidney disease requiring dialysis. Diabetic neuropathy is the impact of diabetes on the nervous system, most commonly causing numbness, tingling and pain in the feet and also increasing the risk of skin damage due to altered sensation. Together with vascular disease in the legs, neuropathy contributes to the risk of diabetes-related foot problems (such as diabetic foot ulcers) that can be difficult to treat and occasionally require amputation. Skin rashes may also develop due to diabetes (known as diabetic dermadromes).

Symptoms may develop rapidly (weeks or months) in type 1 diabetes, while they usually develop much more slowly and may be subtle or absent in type 2 diabetes.

All forms of diabetes increase the risk of long-term complications, manifesting itself 10 – 20 years after the initial onset of the disease. Such complications include damage to blood vessels while doubling the risk of cardiovascular disease. The main "macrovascular" diseases (related to atherosclerosis of larger arteries) are ischemic heart disease (angina and myocardial infarction), stroke and peripheral vascular disease. While such conditions generally occur as a result having diabetes for a number of years, they can occur as a first symptom to those that have not had received a diagnosis before that time.

All forms of diabetes have been treatable since insulin became available in 1921, and type 2 diabetes may be controlled with medications. Both types 1 and 2 are chronic conditions that cannot be cured. Pancreas transplants have been tried with limited success in type 1 DM; gastric bypass surgery has been successful in many with morbid obesity and type 2 DM. Gestational diabetes usually resolves after delivery.

Diabetes is serious and ignoring or refusing treatment is playing a dangerous game. Yes, there have been many scientific breakthroughs; however, we should not be relying solely on others to help us when, in fact, we can do a number of things to positively influence our own health. This includes controlling one's blood pressure and living a healthy lifestyle. And a healthy lifestyle means not smoking and maintaining a healthy body weight.

**For last year's words belong to last year's language  
and next year's words await another voice**

T.S. Eliot