

Signs and symptoms Edit

Causes Edit

Pathophysiology Edit

The fluctuation of blood sugar (red) and the sugar-lowering hormone insulin (blue) in humans during the course of a day with three meals. One of the effects of a sugar -rich vs a starch -rich meal is highlighted. Mechanism of insulin release in normal pancreatic beta cells . Insulin production is more or less constant within the beta cells. Its release is triggered by food, chiefly food containing absorbable glucose. Insulin is the principal hormone that regulates the uptake of glucose from the blood into most cells of the body, especially liver, adipose tissue and muscle, except smooth muscle, in which insulin acts via the IGF-1.[citation needed] Therefore, deficiency of insulin or the insensitivity of its receptors play a central role in all forms of diabetes mellitus.[85] The body obtains glucose from three main sources: the intestinal absorption of food; the breakdown of glycogen (glycogenolysis), the storage form of glucose found in the liver; and gluconeogenesis, the generation of glucose from non-carbohydrate substrates in the body.[86] Insulin plays a critical role in regulating glucose levels in the body. Insulin can inhibit the breakdown of glycogen or the process of gluconeogenesis, it can stimulate the transport of glucose into fat and muscle cells, and it can stimulate the storage of glucose in the form of glycogen.[86] Insulin is released into the blood by beta cells ( $\beta$ -cells), found in the islets of Langerhans in the pancreas, in response to rising levels of blood glucose, typically after eating. Insulin is used by about two-thirds of the body's cells to absorb glucose from the blood for use as fuel, for conversion to other needed molecules, or for storage. Lower glucose levels result in decreased insulin release from the beta cells and in the breakdown of glycogen to glucose. This process is mainly controlled by the hormone glucagon, which acts in the opposite manner to insulin.[87] If the amount of insulin available is insufficient, or if cells respond poorly to the effects of insulin (insulin resistance), or if the insulin itself is defective, then glucose is not absorbed properly by the body cells that require it, and is not stored appropriately in the liver and muscles. The net effect is persistently high levels of blood glucose, poor protein synthesis, and other metabolic derangements, such as metabolic acidosis in cases of complete insulin deficiency.[86] When glucose concentration in the blood remains high over time, the kidneys reach a threshold of reabsorption, and the body excretes glucose in the urine (glycosuria).[88] This increases the osmotic pressure of the urine and inhibits reabsorption of water by the kidney, resulting in increased urine production (polyuria) and increased fluid loss. Lost blood volume is replaced osmotically from water in body cells and other body compartments, causing dehydration and increased thirst (polydipsia).[86] In addition, intracellular glucose deficiency stimulates appetite leading to excessive food intake (polyphagia).[89]

Diagnosis Edit

Prevention Edit

Management Edit

Epidemiology Edit

Main article: Epidemiology of diabetes Rates of diabetes worldwide in 2014. The worldwide prevalence was 9.2%. 28â€"91 92â€"114 115â€"141 142â€"163 164â€"184 185â€"209 210â€"247 248â€"309 310â€"404 405â€"1879 Mortality rate of diabetes worldwide in 2012 per million inhabitants In 2017, 425 million people had diabetes worldwide,[142] up from an estimated 382 million people in 2013[143] and from 108 million in 1980.[144] Accounting for the shifting age structure of the global population, the prevalence of diabetes is 8.8% among adults, nearly double the rate of 4.7% in 1980.[142][144] Type 2 makes up about 90% of the cases.[24][45] Some data indicate rates are roughly equal in women and men,[24] but male excess in diabetes has been found in many populations with higher type 2 incidence, possibly due to sex-related differences in insulin sensitivity, consequences of obesity and regional body fat deposition, and other contributing factors such as high blood pressure, tobacco smoking, and alcohol intake.[145][146] The WHO estimates that diabetes resulted in 1.5 million deaths in 2012, making it the 8th leading cause of death.[20][144] However another 2.2 million deaths worldwide were attributable to high blood glucose and the increased risks of cardiovascular disease and other associated complications (e.g. kidney failure), which often lead to premature death and are often listed as the underlying cause on death certificates rather than diabetes.[144][147] For example, in 2017, the International Diabetes Federation (IDF) estimated that diabetes resulted in 4.0 million deaths worldwide,[142] using modeling to estimate the total number of deaths that could be directly or indirectly attributed to diabetes.[142] Diabetes occurs throughout the world but is more common (especially type 2) in more developed countries. The greatest increase in rates has however been seen in low- and middle-income countries,[144] where more than 80% of diabetic deaths occur.[148] The fastest prevalence increase is expected to occur in Asia and Africa, where most people with diabetes will probably live in 2030.[149] The increase in rates in developing countries follows the trend of urbanization and lifestyle changes, including increasingly sedentary lifestyles, less physically demanding work and the global nutrition transition, marked by increased intake of foods that are high energy-dense but nutrient-poor (often high in sugar and saturated fats, sometimes referred to as the "Western-style" diet).[144][149] The global number of diabetes cases might increase by 48% between 2017 and 2045.[142] As of 2020, 38% of all US adults had prediabetes.[150] Prediabetes is an early stage of diabetes.

History Edit

Society and culture Edit

Further information: List of films featuring diabetes The 1989 "St. Vincent Declaration"[161][162] was the result of international efforts to improve the care accorded to those with diabetes. Doing so is important not only in terms of quality of life and life expectancy but also economically – expenses due to diabetes have been shown to be a major drain on health – and productivity-related resources for healthcare systems and governments. Several countries established more and less successful national diabetes programmes to improve treatment of the disease.[163] People with diabetes who have neuropathic symptoms such as numbness or tingling in feet or hands are twice as likely to be unemployed as those without the symptoms.[164] In 2010, diabetes-related emergency room (ER) visit rates in the United States were higher among people from the lowest income communities (526 per 10,000 population) than from the highest income communities (236 per 10,000 population). Approximately 9.4% of diabetes-related ER visits were for the uninsured.[165] Naming Edit The term "type 1 diabetes" has replaced several former terms, including childhood-onset diabetes, juvenile diabetes, and insulin-dependent diabetes mellitus. Likewise, the term "type 2 diabetes" has replaced several former terms, including adult-onset diabetes, obesity-related diabetes, and noninsulin-dependent diabetes mellitus. Beyond these two types, there is no agreed-upon standard nomenclature.[166] Diabetes mellitus is also occasionally known as "sugar diabetes" to differentiate it from diabetes insipidus.[167]

Other animals Edit

Main articles: Diabetes in dogs and Diabetes in cats Diabetes can occur in mammals or reptiles.[168][169] Birds do not develop diabetes because of their unusually high tolerance for elevated blood glucose levels.[170] In animals, diabetes is most commonly encountered in dogs and cats. Middle-aged animals are most commonly affected. Female dogs are twice as likely to be affected as males, while according to some sources, male cats are more prone than females. In both species, all breeds may be affected, but some small dog breeds are particularly likely to develop diabetes, such as Miniature Poodles.[171] Feline diabetes is strikingly similar to human type 2 diabetes. The Burmese, Russian Blue, Abyssinian, and Norwegian Forest cat breeds are at higher risk than other breeds. Overweight cats are also at higher risk.[172] The symptoms may relate to fluid loss and polyuria, but the course may also be insidious. Diabetic animals are more prone to infections. The long-term complications recognized in humans are much rarer in animals. The principles of treatment (weight loss, oral antidiabetics, subcutaneous insulin) and management of emergencies (e.g.

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ketoacidosis) are similar to those in humans.[171]

## Reference

[Understanding Adult Attachment in Family Relationships: Research, Assessment and Intervention](#)

[CRISPR'd: A Medical Thriller](#)