

Diabetes mellitus: Classification, mediators, and complications; A gate to identify potential targets for the development of new effective treatments

Abstract

Nowadays, diabetes mellitus has emerged as a significant global public health concern with a remarkable increase in its prevalence. This review article focuses on the definition of diabetes mellitus and its classification into different types, including type 1 diabetes (idiopathic and fulminant), type 2 diabetes, gestational diabetes, hybrid forms, slowly evolving immune-mediated diabetes, ketosis-prone type 2 diabetes, and other special types. Diagnostic criteria for diabetes mellitus are also discussed. The role of inflammation in both type 1 and type 2 diabetes is explored, along with the mediators and potential anti-inflammatory treatments. Furthermore, the involvement of various organs in diabetes mellitus is highlighted, such as the role of adipose tissue and obesity, gut microbiota, and pancreatic β -cells. The manifestation of pancreatic Langerhans β -cell islet inflammation, oxidative stress, and impaired insulin production and secretion are addressed. Additionally, the impact of diabetes mellitus on liver cirrhosis, acute kidney injury, immune system complications, and other diabetic complications like retinopathy and neuropathy is examined. Therefore, further research is required to enhance diagnosis, prevent chronic complications, and identify potential therapeutic targets for the management of diabetes mellitus and its associated dysfunctions

(Definition of diabetes mellitus (DM

Chronic hyperglycemia is a metabolic disorder caused by either a lack of insulin secretion, impaired insulin action, or both. Notably, insulin plays an important role as an anabolic hormone, affecting the metabolism of carbohydrates, lipids, and proteins [1]. The metabolic abnormalities associated with diabetes mainly affect tissues such as adipose tissue, skeletal muscles, and the liver due to insulin resistance. The severity of symptoms can vary depending on the duration and type of diabetes. Individuals with high blood sugar levels, particularly those with a complete lack of insulin, such as children, may experience symptoms such as increased appetite, polydipsia, dysuria, weight loss, increased appetite, and vision problems. Some people with diabetes may not experience any symptoms, especially type 2 diabetic patients in their early stages [2]. Without proper treatment, uncontrolled diabetes can lead to various complications such as coma, confusion, and in rare cases, .[death from ketoacidosis or nonketotic hyperosmolar syndrome not treated [1

In 2014, the WHO announced that 8.5% of adults aged 18 and above were affected by diabetes. In 2019, diabetes was responsible for 1.5 million deaths, with 48% of these occurring before the age of 70. Additionally, diabetes led to another 460,000 deaths due to kidney disease, and roughly 20% of cardiovascular-related deaths were attributed to elevated blood glucose levels. From 2000–2019, there was a 3% rise in standardized mortality rates related to diabetes. In lower-middle-income countries, the mortality rate associated with diabetes increased by 13%. In contrast, the likelihood of succumbing to any of the four primary non-communicable diseases (which include cardiovascular diseases, cancer, chronic respiratory diseases, or diabetes) between the ages of 30 and 70 declined .by 22% worldwide from 2000 to 2019