

# Review on Diabetes Mellitus Type 1 and Type 2

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**Abstract:** *Diabetes mellitus also called as simply Diabetes. It is a chronic medical condition of high blood sugar level over prolonged period. There are to types of diabetes Type 1 and Type 2 . Type 1 is typically diagnosed in adolescence, Childhood which results from immune system attacking and destroying insulin producing Beta cells in pancreas. Type 2 diabetes diagnosed in adulthood which is insulin resistance. It include thirst , weight loss , frequent urination, fatigue, blurred vision, etc Diagnosis is based on Blood test including sugar levels , Glucose tolerance and HbA1C measurements.*

**Keywords:** chronic , adolescence , resistance, Tolerance

## I. INTRODUCTION

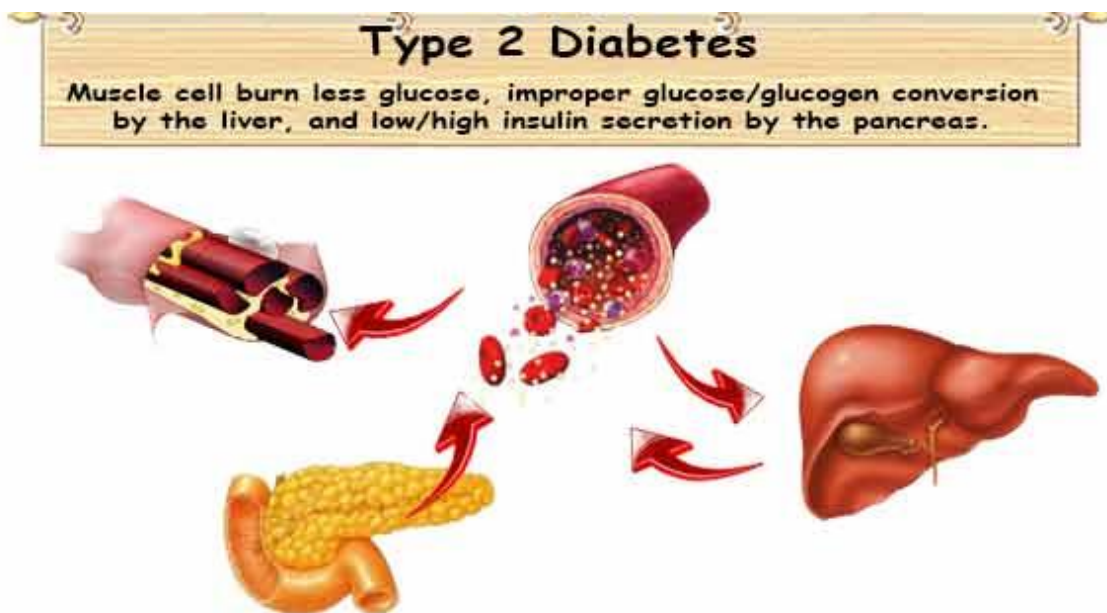
For the treatment of type 2 diabetes mellitus (T2DM) have multiplied as our understanding of the underlying pathophysiologic defects has evolved. Treatment should target multiple defects in T2DM and follow a patient-centered approach that considers factors beyond glycemic control, including cardiovascular risk reduction. The American Association of Clinical Endocrinologists/American College of Endocrinology and the American Diabetes Association recommend an initial approach consisting of lifestyle changes and monotherapy, preferably with metformin. Therapy choices are guided by glycemic efficacy, safety profiles, particularly effects on weight and hypoglycemia risk, tolerability, patient comorbidities, route of administration, patient preference, and cost. Balancing management of hyperglycemia with the risk of hypoglycemia and consideration of the effects of pharmacotherapy on weight figure prominently in US-based T2DM recommendations, whereas less emphasis has been placed on the ability of specific medications to affect cardiovascular outcomes. This is likely because, until recently, specific glucose-lowering agents have not been shown to affect cardiorenal outcomes. The Empagliflozin Cardiovascular Outcome Event Trial in Type 2 Diabetes Mellitus Patients-Removing Excess Glucose (EMPA-REG OUTCOME), the Liraglutide Effect and Action in Diabetes: Evaluation of Cardiovascular Outcome Results (LEADER) trial, and the Trial to Evaluate Cardiovascular and Other Long-term Outcomes with Semaglutide in Subjects with Type 2 Diabetes 6 (SUSTAIN-6) recently showed a reduction in overall cardiovascular risk with empagliflozin, liraglutide, and semaglutide treatment, respectively. Moreover, empagliflozin has become the first glucose-lowering agent indicated to reduce the risk of cardiovascular death in adults with T2DM and established cardiovascular disease. Results from cardiovascular outcomes trials have prompted an update to the 2017 American Diabetes Association standards of care, which now recommend consideration of empagliflozin or liraglutide for patients with suboptimally controlled long-standing T2DM and established atherosclerotic cardiovascular disease because these agents have been shown to reduce cardiovascular and all-cause mortality when added to standard care.

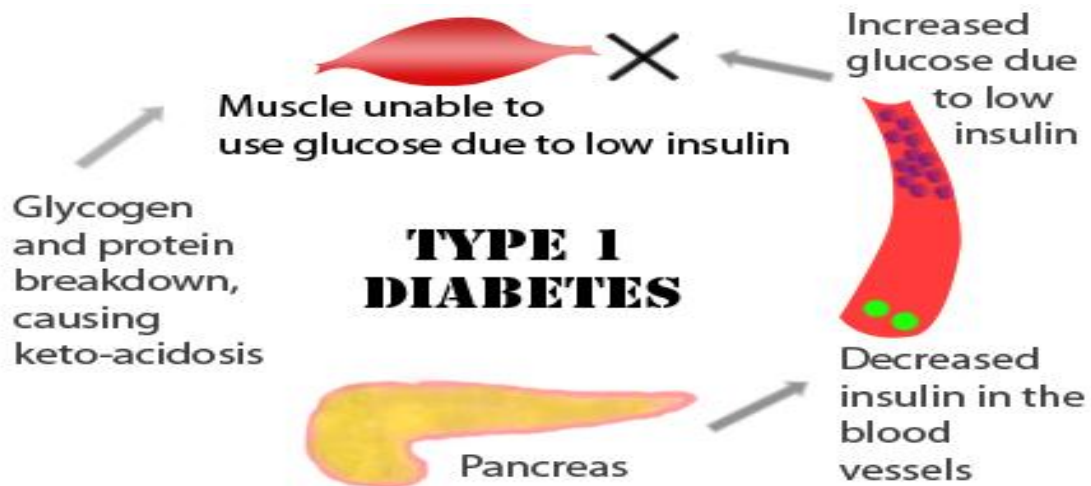
## Diabetes Mellitus

Diabetes mellitus (DM) is a major public health issue affecting more than 400 million people worldwide . This medical condition or metabolic disorder progressively leads to chronic microvascular, and neuropathic life threatening complications. DM is caused either by deficiency of insulin secretion, damage of pancreatic  $\beta$  cell or insulin resistance related to non-use of insulin. Inclination to sedentary lifestyle may be the major reason for the continual rise in the number of diabetic patients globally which is expected to strike 366 million in 2030 in the elderly population (>65 years) .The various complications associated with DM includes nephropathy, neuropathy, cardiovascular and renal complications, retinopathy, food related disorders and so on. Type 1 DM and type 2 DM are the mainly 2 types of DM. Type 1 DM is an autoimmune disorder that affects pancreatic cells which reduces or impairs the production of insulin while type 2 DM is a result of impairment of pancreatic beta cells that hinder the individual's ability to use insulin

The major conventional classes of drugs for the treatment of hyperglycemia includes sulfonylureas ,biguanides peroxisome proliferator-activated receptor- $\gamma$  (PPAR $\gamma$ ) agonists  $\alpha$ -glucosidase inhibitors . These classes of drugs are either administered as monotherapy or given in combination with other hypoglycaemics. Severe hypoglycemia,weight loss ,Thirst lower therapeutic efficacy owing to ineffective dosage regimen, low potency and altered side effects due to drug metabolism and lack of target specificity, solubility and permeability problems are the major drawbacks associated with the use of the above mentioned conventional drugs . Despite the advent of promising anti-hyperglycemic agents, the major challenges in efficient diabetes treatment include optimizing the existing therapies to guarantee optimum and balanced glucose concentrations, as well as reducing long-term diabetes-related complications .Today , nanoformulations have an established history in circumferences stated issues related to the conventional drug usage. Nanoformulations are not only improves the drug solubility but also shows numerous benefits such as reduced dosage, rapid onset of action, controlled drug release profile, less side effects, optimized drug delivery, half-life expanded , minimized patient variability and optimized bioavailability and can thus resolve several of the drawbacks of current anti-diabetics. Most significantly, it has been reported elsewhere that nanoformulations often work at molecular level to promote cellular drug uptake or disrupt efflux mechanisms such as the P-glycoprotein pump or target particular receptors that further strengthen the pharmacokinetics and pharmacodynamics profile of numerous anti-diabetic molecules .

This review explores the current conventional drugs which is used in the treatment of type 2 DM, the associated limitations related to their usage and the cutting edge novel Formulations that are under continual research for which stated drawbacks of the conventional drug use.





### Insulin

Insulin is a hormone made by beta cells in the pancreas. When we eat, insulin is released into the blood stream where it helps to move glucose from the food we have eaten into cells to be used as energy. With type 1 diabetes, the body produces little or no insulin as the cells that produce insulin have been destroyed by an autoimmune reaction in the body. Insulin replacement by daily injections is required. With type 2 diabetes the body produces insulin but the insulin does not work as well as it should (referred to as insulin resistance). To compensate the body makes more but eventually cannot make enough to keep the balance right. Lifestyle changes can delay the need for tablets and/or insulin to stabilise blood glucose levels. When insulin is required, it is important to understand that this is just the natural progression of the condition.

Pramlintide a synthetic amylin analog that is an injectable drug used with insulin to reduce blood sugar levels in patients with type 1 and type 2 diabetes.

Metformin is used together alongside diet to lower high blood sugar levels in patients with type 2 diabetes. Metformin has various actions, being, lowers the amount of glucose absorbed from intestines, decreases how much glucose is made in the liver and improves insulin sensitivity.

Sulfonylureas are a type of medicine used in the management of Type 2 diabetes. They work by stimulating beta cells of the pancreas to produce insulin hence lowering blood glucose levels. Their action is needs person to have functioning Beta cells, therefore, only work in people with type 2 diabetes.

### Treatment :

Diabetes Mellitus

The goal of diabetes management is to keep blood glucose levels as close to normal as safely possible. Since diabetes may greatly increase risk for heart disease and peripheral artery disease, measures to control blood pressure and cholesterol levels are an essential part of diabetes treatment as well.

People with diabetes must take responsibility for their day-to-day care. This includes monitoring blood glucose levels, dietary management, maintaining physical activity, keeping weight and stress under control, monitoring oral medications and, if required, insulin use via injections or pump.

### Dietary Management and Physical Activity

Modifying eating habits and increasing physical activity are typically the first steps toward reducing blood sugar levels. Cinnamon , Chromium , Vitamin B 12 , alpha Lipoic acid , Green tea , Biter melon , resveratrol , magnesium are some supplements which are beneficial for those who suffering from diabetes .

### Insulin Therapy

People with type 1 diabetes require multiple insulin injections each day to maintain safe insulin levels. Insulin is often required to treat type 2 diabetes too. Using an insulin pump is an alternative to injections. The pump is about the size of a pager and is usually worn on your belt. Insulin is delivered through a small tube (catheter) that is placed under the skin (usually in the abdomen).

There are four major types of insulin:

- Rapid-acting
- Short-acting
- Intermediate-acting
- Long-acting

Your doctor will determine your dose and how often you need to take insulin. There is no standard insulin dose as it depends on factors such as your body weight, when you eat, how often you exercise and how much insulin your body produces.

### Medications

Sometimes blood sugar levels remain high in people with type 2 diabetes even though they eat in a healthy manner and exercise. When this happens, medications taken in pill form may be prescribed. The medications work in several different ways. These include improve the effectiveness of the body's natural insulin, reduce blood sugar production, increase insulin production and inhibit blood sugar absorption. Oral diabetes medications are sometimes taken in combination with insulin.

Sulfonyl urea : Tolbutamide , Chlorpropamide , Glipizide , Glimepride

Biguanides :Metformin

Thiazolidinediones : Pioglitazone , Rosiglitazone

Meglitinides : Repaglinide, Nateglinide

Glucosidase inhibitors : Acrobose , Voglibose

Are some antidiabetic agents used to treat diabetes.

## II. CONCLUSION

Education of the populace is still key to the control of this emerging epidemic. Diabetes mellitus is a global health concern, with a significant increase in the number of cases in recent years. It is a complex and widespread condition that requires careful management to prevent complications and improve overall quality of life for those affected by it.

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