International Journal of Pharmacy and Pharmaceutical Science

ISSN Print: 2664-7222
ISSN Online: 2664-7230
IJPPS 2025; 7(2): 740-743
www.pharmacyjournal.org
Received: 06-10-2025
Accepted: 08-11-2025

Dr. Tripuramallu Rajithasree
Department of Pharmacy Practice, Chilkur Balaji College of Pharmacy, Hyderabad, Telangana, India

Vitrouth Akshitha
Department of Pharmacy Practice, Chilkur Balaji College of Pharmacy, Hyderabad, Telangana, India

Thudi Deekshitha Reddy
Department of Pharmacy Practice, Chilkur Balaji College of Pharmacy, Hyderabad, Telangana, India

Dr. Chandrasekhara Rao Baaru
Department of Pharmacy Practice, Chilkur Balaji College of Pharmacy, Hyderabad, Telangana, India

Corresponding Author:
Dr. Tripuramallu Rajithasree
Department of Pharmacy Practice, Chilkur Balaji College of Pharmacy, Hyderabad, Telangana, India

A comprehensive review on anti-diabetic drug profile of bexagliflozin

Tripuramallu Rajithasree, Vitrouth Akshitha, Thudi Deekshitha Reddy and Chandrasekhara Rao Baaru

DOI: https://www.doi.org/10.33545/26647222.2025.v7.i2i.270

Abstract
Bexagliflozin, a new therapeutic approach for the treatment of type 2 diabetes mellitus (T2DM), has emerged in the form of bexagliflozin, a novel sodium-glucose co-transporter 2 (SGLT2) inhibitor. The objective of this review paper is to offer a thorough examination of the pharmacology of bexagliflozin.
Bexagliflozin's pharmacological action is the selective inhibition of SGLT2 in the proximal renal tubules, which results in improvements to glycaemic control and urine glucose excretion. It differs from conventional antidiabetic drugs in that it works through a different mechanism, which makes it a desirable option for individuals who have not responded well to previous treatments.
Bexagliflozin has been shown in clinical research to be successful in lowering T2DM patients' HbA1c levels, body weight, and blood pressure. Furthermore, studies demonstrating encouraging results have drawn significant attention to its potential cardiovascular and renal benefits. A fair evaluation of the potential benefits and hazards is made possible by this review's analysis of recorded adverse events and exploration of the underlying mechanisms.
In conclusion, bexagliflozin is a useful addition to the arsenal of anti-diabetic medications. Its unique mechanism, along with its proven effectiveness in glucose control and possible cardiovascular advantages, place it in a promising therapeutic position for T2DM patients. To improve patient outcomes, clinicians who prescribe bexagliflozin must be aware of its safety profile and adopt the proper safety measures. Our grasp of its long-term efficacy and safety will keep getting better with more research and practical data.

Keywords: SGLT2 inhibitors, glycaemic control, type 2 diabetes mellitus, bexagliflozin

Introduction
Bexagliflozin is prescribed in combination with a diet and regular physical activity to manage blood sugar levels resulting from type 2 diabetes [1, 2]. Its mechanism of action involves reducing the reabsorption of glucose in the kidneys, thereby aiding in the reduction of blood sugar levels [3, 4]. It is important to note that bexagliflozin is not effective for individuals with type 1 diabetes [1].

About disease
Type 2 diabetes is a condition that occurs due to an issue in the body's regulation and utilization of sugar, also known as glucose, as an energy source. This chronic ailment leads to an excess of sugar in the bloodstream.

Signs and Symptoms
- Increased thirst.
- Frequent urination.
- Increased hunger.
- Unintended weight loss.
- Fatigue.
- Blurred vision.
- Slow-healing sores.
- Frequent infections.

Class of drug
Antidiabetic drug, SLGT2 Inhibitor [3, 5].

Dosing Considerations
Before starting therapy, it's important to take into account the patient's history that could increase the likelihood of ketoacidosis. This includes factors such as insulin deficiency, restricted calorie intake, and alcohol misuse**.** Additionally, it's necessary to consider the patient's history that may indicate a need for amputations, such as previous amputations, peripheral vascular disease, neuropathy, and diabetic foot ulcers [6].

Mechanism of action
Bexagliflozin acts by blocking the activity of a protein called sodium-glucose cotransporter 2 (SGLT2). This protein is responsible for moving glucose and sodium from the lumen to the epithelium in a part of the kidney called the proximal renal tubule. By inhibiting SGLT2, bexagliflozin reduces the reabsorption of glucose by the kidneys and increases its excretion through urine [3, 4]. This medication effectively lowers blood glucose levels in individuals diagnosed with type 2 diabetes mellitus (T2DM) regardless of their insulin sensitivity [3, 7].
Bexagliflozin may improve glycemic control while reducing body weight, albuminuria, and systolic blood pressure [7, 8]. Although the exact mechanism of action for these extra effects is unknown, it is likely that the initial natriuresis induced by bexagliflozin, followed by altered sodium handling in tissues, contributes to these benefits [3].

Pharmacokinetics
Absorption
The pharmacokinetic profiles of healthy individuals and adult patients with type 2 diabetes mellitus treated with bexagliflozin are comparable. The mean Cmax and AUC_0 of bexagliflozin in a fasting state were 134 ng/mL and 1,162 ng·h/mL, respectively [3, 4].

Volume of distribution:
The apparent volume of distribution of bexagliflozin, which is 68.7 L, demonstrates that it is dispersed throughout the body tissues.

Protein binding
Bexagliflozin's binding to plasma proteins is about 93% [4].

Metabolism
- **Site:** Bexagliflozin is predominantly metabolized in the liver, chiefly via the UGT 1A9 enzyme, where it produces a variety of metabolites [3, 4].
- **Enzymes:** The UGT1A9 (Uridine diphosphate Glucuronosyltransferase 1A9) enzyme plays a major role in the metabolism of bexagliflozin. This enzyme is essential for the glucuronidation pathway that creates the bexagliflozin metabolites.
- **Metabolites:** The glucuronide conjugates M5 and M8, generated predominantly by the UGT1A9 enzyme, are the major metabolites of bexagliflozin. These metabolites are eventually excreted in urine because they have lower pharmacological activity than the parent substance.
  UGT1A9 and, to a lesser extent, CYP3A are primarily responsible for bexagliflozin's liver metabolism. None of the metabolites is anticipated to have pharmacological effects that are clinically significant. [4]
- **Elimination:** Bexagliflozin is primarily excreted in urine, where 76 percent of the prescribed dose is excreted unchanged. Bexagliflozin has a 17.6-hour elimination half-life [6].
- **Bioavailability:** Oral bexagliflozin is 93% bioavailable.
- **Half-life:** Bexagliflozin has an apparent terminal elimination half-life of approximately 12 hours
- **Dose:** 20 mg PO qAM [1, 4].

Administration
- Oral Administration
- Take in the morning, with or without food.
- Swallow tablet whole; do not crush or chew.
- **Missed dose:** Take as soon as possible; advise patients not to double their next dose.
- **Storage:** Store at 20-25°C (68-77°F); excursions permitted to 15-30°C (59-86°F) [1, 6].

Organ-specific adverse effects
- **Genitourinary Tract Infections:** Due to the increased amount of glucose in urine which creates an ideal environment for microbial growth SGLT2 inhibitors can increase the risk of genital mycotic infections and urinary tract infections (UTIs). Genital infections tend to occur more often in women than in men. Patients should be educated on hygiene practices and monitored for symptoms of infection [3, 1, 6].
- **Dehydration and Volume Depletion:** SGLT2 inhibitors increase urinary glucose and sodium excretion, which may result in increased urine output and risk of dehydration or electrolyte imbalances. Patients should be advised to maintain adequate hydration, particularly elderly individuals or those on diuretics or other medications affecting fluid balance**.**
- **Orthostatic Hypotension:** SGLT2 inhibitors may cause mild reductions in blood pressure due to osmotic diuresis. This may occasionally lead to orthostatic hypotension, especially in patients taking antihypertensive medications [1, 6].
- **Acute Kidney Injury:** Although SGLT2 inhibitors overall have renal-protective benefits, cases of acute kidney injury (AKI) have been reported particularly in patients with pre-existing renal impairment, dehydration, or those taking nephrotoxic agents. Kidney function should be assessed before starting therapy and monitored periodically [6].
- **Ketoacidosis:** SGLT2 inhibitors have been associated with euglycemic diabetic ketoacidosis (DKA), characterised by elevated ketone levels despite normal or mildly elevated blood glucose. This rare but serious complication requires urgent medical attention [1, 6].
- **Bone Health:** Some evidence suggests that long-term SGLT2 inhibitor therapy may influence bone mineral density or bone turnover markers, potentially increasing fracture risk in susceptible individuals[3]. This should be considered in patients with osteoporosis or high fracture risk.

Other Adverse Effects Include
- Blood in urine
- Trouble in breathing

- Weight gain
- Swelling of the face or ears, or legs
- Unusual tiredness
- Increase in blood pressure
- Increase in thirst [3, 1, 6].

Contraindications

- Ketoacidosis.
- Lower Limb Amputation.
- Urosepsis.
- Pyelonephritis.
- Hypoglycemia with Concomitant Use of Insulin and Insulin Secretagogues [7, 9, 10].

Drug interactions

- **Carbamazepine:** Carbamazepine will decrease the level or effect of bexagliflozin
- **Chlorpropamide:** Bexagliflozin, chlorpropamide. Either increases the effects of the other by pharmacodynamic synergism.
- **Glimepiride:** Bexagliflozin, glimepiride. Either increases the effects of the other by pharmacodynamic synergism.
- **Glipizide:** Bexagliflozin, glipizide. Either increases the effects of the other by pharmacodynamic synergism.
- **Glyburide:** Bexagliflozin, glyburide. Either increases the effects of the other by pharmacodynamic synergism.
- **Insulin aspart:** Bexagliflozin increases effects of insulin aspart by pharmacodynamic synergism.
- **Insulin aspart protamine/insulin aspart:** Bexagliflozin increases effects of insulin aspart protamine/insulin aspart by pharmacodynamic synergism.
- **Insulin degludec:** Bexagliflozin increases effects of insulin degludec by pharmacodynamic synergism.
- **Insulin degludec/insulin aspart:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin detemir:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin glargine:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin glulisine:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin inhaled:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin isophane human/insulin regular human:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin lispro:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin lispro protamine/insulin lispro:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin NPH:** Increases effects of the other by pharmacodynamic synergism.
- **Insulin regular human:** Increases effects of the other by pharmacodynamic synergism.
- **Lithium:** Decreases effects of lithium by other, use Caution/Monitor.
- **Lonapegsomatropin:** Decreases effects of bexagliflozin by pharmacodynamic antagonism.
- **Mecasermin:** Decreases effects of bexagliflozin by pharmacodynamic antagonism.
- **Nateglinide:** Either increases effects of the other by pharmacodynamic synergism.
- **Phenobarbital:** Decreases effects of bexagliflozin
- **Phenytoin:** Decreases effects of bexagliflozin
- **Repaglinide:** Either increases effects of the other by pharmacodynamic synergism.
- **Rifampin:** Decreases effects of bexagliflozin
- **Ritonavir:** Decreases effects of bexagliflozin
- **Somapacitan:** Decreases effects of bexagliflozin by pharmacodynamic antagonism.
- **Somatrogon:** Decreases effects of bexagliflozin by pharmacodynamic antagonism.
- **Somatropin:** Decreases effects of bexagliflozin by pharmacodynamic antagonism.
- **Tolazamide:** Increases effects of the other by pharmacodynamic synergism.
- **Tolbutamide:** Increases the effects of the other by pharmacodynamic synergism [4].

Drug food interactions

In diabetic patients, alcohol may have an impact on blood glucose levels. Depending on how much and how frequently you drink, hypoglycemia (low blood sugar) or hyperglycemia (high blood sugar) could happen. If your diabetes is not under good control, you have high triglycerides, neuropathy (nerve damage), or pancreatitis, you should refrain from drinking alcohol. If your diabetes is under control, moderate alcohol consumption often has no effect on blood glucose levels. In contrast, it might be advisable to keep alcohol consumption below the recommended daily limits of one drink for women and two for men (1 drink equals 5 ounces of wine, 12 ounces of beer, or 1.5 ounces of distilled spirits) while maintaining your regular eating schedule. In order to reduce the risk of hypoglycemia, avoid drinking alcohol right before or right after exercise [1, 4].

Special Categories

Lactation

- There is no evidence on the effects of drugs on breastfed children or milk production, as well as the presence of drugs in human milk. Plasma ratio of 2 is present in nursing rats' milk
- Since lactation exposure may happen throughout the first two years of life, when human kidney maturation occurs in utero, there may be risk to the developing human kidney.
- Inform females who are or may become pregnant that taking bexagliflozin while breastfeeding is not advised [3, 1].

Pregnancy Categories

- **Acceptable in most cases:** No risk to the fetus has been identified in controlled studies in pregnant women.
- **It might be acceptable:** Animal studies either showed minimal dangers, and subsequent human studies confirmed no risk, or animal studies indicated no risk, but human studies were not available.
- **Use with care if hazards exceed benefits:** Risk is demonstrated by animal studies, but human studies are either not accessible or have not been conducted.

- **Use in Life-Threatening situations when there are no safer options available:** Positive proof of fetal danger in humans.
- **Avoid using when pregnant:** The risks outweigh any potential advantages. There are safer choices [1].

References

1. U.S. Food and Drug Administration. Drug Trials Snapshot Brenzavvy (bexagliflozin). Silver Spring (MD): U.S. FDA; 2023 Jan 20. Available from: U.S. Food and Drug Administration website.
2. Pharmacy Times. FDA approves bexagliflozin (Brenzavvy) for adults with type 2 diabetes. Pharmacy Times; 2023 Jan. Available from: Pharmacy Times website.
3. Bassett RL, Gallo G, Le KP, Volino LR, *et al*. Bexagliflozin: A comprehensive review of a recently approved SGLT2 inhibitor for the treatment of type 2 diabetes mellitus. Med Chem Res. 2024;33:1354-1367. DOI: 10.1007/s00044-024-03274-4.
4. DrugBank Online. Bexagliflozin (DB12236): Uses, interactions, mechanism of action and pharmacology. Edmonton (AB): DrugBank; 2024. Available from: DrugBank Online database.
5. Saleem MM. Novel FDA-approved bexagliflozin drug for treating type 2 diabetes: Review and clinical perspectives. [Internet]. 2024. Available from: PubMed Central (PMC).
6. TheracosBio; U.S. Food and Drug Administration. Integrated review and NDA documents for bexagliflozin (BRENZAVVY). Silver Spring (MD): U.S. FDA; 2023 Jan. Available from: FDA AccessData website.
7. Bexagliflozin in type 2 diabetes: A profile of its use. Clin Diabetes. 2024;42(1):169. Available from: Clinical Diabetes website.
8. Allegretti AS, Molitch ME, Kuo I, *et al*. Safety and effectiveness of bexagliflozin in patients with type 2 diabetes mellitus and stage 3a/3b chronic kidney disease. Am J Kidney Dis. 2019;74(3):328-337. DOI: 10.1053/j.ajkd.2019.03.417.
9. Bexagliflozin on renal outcomes in type 2 diabetes mellitus: A systematic review and meta-analysis of randomized controlled trials. Cureus; 2025 Apr 17.
10. Alkhafaji GA, Janabi MW. Protective effects of bexagliflozin on renal function in a rat model of ischemia-reperfusion injury: An experimental study. J Nephropharmacol; 2025.
DOI: 10.34172/npj.2025.12760.