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Review Article

# An emerging antihistamine drug with multiple therapeutic benefits: Bilastine

Eldo Jacob[1], Karupanagounder Thangaraj Uthra[2], Soumya Gupta[3], Vellapandian Chitra[3], Narayanasamy Damodharan[4], Gururaja Perumal Pazhani[2*]

[1] Department of Quality Assurance, SRM College of Pharmacy, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India
[2] Department of Pharmaceutical Chemistry, SRM College of Pharmacy, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India
[3] Department of Pharmacology, SRM College of Pharmacy, SRM Institute of Science and Technology, Kattankulathur, Tamil Nadu, India
[4] Department of Pharmaceutics, SRM College of Pharmacy, SRM Institute of Science and Technology, Kattankolathur, Tamil Nadu, India

## ABSTRACT

Second-generation antihistamines (AHs) like cetirizine and third-generation drugs like fexofenadine are currently in practice for allergic rhinoconjunctivitis and urticaria due to their reduced impact on the central nervous system and fewer side effects. Clinically, bilastine has similar AH activity. Numerous studies showed that bilastine is a nonsedating AH, safe and effective in treating the allergies of all age groups. It is primarily indicated for allergic conditions; its potential use in other medical areas is being explored. Clinical trials, scientific experiments, real-world experience, and expert opinions will guide decisions on broader applications. This review aims to provide updated information on bilastine's potential off-target effects, interactions with food and drugs, and comparison with other newer $H_1$ AHs. PubMed literature search using the drug name "bilastine" was conducted. Additionally, the authors have included literature from the reference list of cited publications in the public domain. Clinical trials have established bilastine safety and efficacy, making it a frontline treatment for allergic conditions due to selective second-generation $H_1$ AH. It has gained approval for treating allergic rhinoconjunctivitis and urticaria in adolescents and adults in various countries, with recent approvals extending its use to children up to 12 years old. Many nations agreed to recommend bilastine as a first-line treatment for chronic urticaria due to minimal food and drug interaction, no CNS effect, long-acting, and environmentally safe. In addition, bilastine could be used as add-on therapy with other drugs for the treatment of inflammation and diabetic neuropathy and to reverse efflux-mediated drug resistance. More clinical trials are anticipated to support the use of this drug for other indications. However, several health benefits associated with bilastine, inadequate data on its safety during pregnancy, and pending US FDA approval rendered bilastine a lesser-known frontline $H_1$-AH in many countries.

**Keywords:**
Bilastine, H1-Antihistamine, Urticaria, Anti-inflammatory, Food and drug interaction

## 1. INTRODUCTION

Histamine mediates numerous physiological processes. It is crucial in controlling allergic reactions, immune system responses, and also plays a significant role in allergic inflammation. Histamine mainly exhibits its effects in the human body by mediating through receptors such as $H_1$, $H_2$, $H_3$, and $H_4$. H1 receptor is widely distributed in major cells types such as immune and inflammatory cells. The binding of histamine to this receptor the chronotropic and vasoconstriction effects, rendering H1 receptor as an essential therapeutic target for medications that treat various allergic illnesses, including allergic rhinoconjunctivitis, urticarial, or atopic dermatitis[1]. $H_1$ AHs, structurally distinct from histamine, stabilize the receptor's inactive conformation by acting as an inverse agonist. The first and second-generation $H_1$ antihistamines (AHs) are inverse agonists that stabilize the inactive conformation of the receptor in its active state. First-generation agents such as bromopheniramine, dimenhydrinate, diphenhydramine, and doxylamine can frequently interact with other receptors due to poor receptor selectivity, leading to anti-cholinergic,

***Corresponding author:**
*Gururaja Perumal Pazhani Email: gururajp@srmist.edu.in, pazhanigp@gmail.com

anti-adrenergic, and anti-serotonin effects. It interferes with histamine action in the central nervous system (CNS) due to its ability to cross the blood-brain barrier, resulting in adverse reactions such as sleepiness, sedation, drowsiness, exhaustion, and impairment of cognitive function, memory, and psychomotor performance. First-generation $H_1$ AHs are not regularly advised to manage chronic urticaria.

In contrast, second and third-generation AHs possess minimal CNS side effects due to their low ability to cross blood blood-brain barrier[2], Furthermore, the incidence of other side effects including cardiac toxicity or anti-cholinergic effects are also minimal[3]. The clinical trials have proven that newer AHs are safer than older first-generation AHs. In addition, second and third-generation AHs are considered frontline drugs to cure acute and chronic urticaria. The Canadian Society of Allergy Clinical Immunology (CSACI), therefore, recommended using newer AHs to treat allergic rhino-conjunctivitis and urticaria over first-generation AHs[4]. Bilastine is a selective second-generation $H_1$-AH. It is chemically a member of the piperidine-benzimidazole class. The IUPAC name is 2-[4-[2-[4-[1-(2-ethoxyethyl) benzimidazol-2-yl]piperidin-1-yl]ethyl]phenyl]-2-methylpropanoic acid. It was approved in the European Union in 2010 for the symptomatic treatment of allergic rhinoconjunctivitis and urticaria in adolescents and adults[5]. Recently, it has been approved for use in children aged up to 12 years[6-7]. It has been used in over 120 countries worldwide[8] but its use in the US market-related literature is not available in the public domain. It may be due to the pending US FDA approval (https://www.drugs.com/history/bilastine.html). The systematic review and meta-analysis have shown that individuals with allergic rhinitis or chronic urticaria benefit from the medication's strong efficacy, excellent safety profile, and increased quality of life when given the recommended adult dose of 20 mg once a day and 10 mg once a day for children up to 12 years[2]. Based on the International clinical trials in the Indian scenario, consensus statements have been prepared for using bilastine as a first-line AH in treating chronic urticaria[9]. A recent review on bilastine provides specific and best use among special populations with diverse clinical manifestations[10]. A decision regarding using bilastine for other indications may be aided by clinical trials, scientific experiments, real-world experience, and recommendations from expert opinion. The promising properties of bilastine mentioned above, make it a potentially attractive therapeutic option for rhinoconjunctivitis, urticaria and other related conditions. This review aimed to provide updated information on bilastine for the best use for other indications based on the literature available in the public domain related to off-target, food, and drug interactions.

## 2. PROPERTIES OF BILASTINE

Absorption of bilastine in healthy human subjects through the oral route of administration was rapid, and bioavailability was 60.67% with a 90% parametric confidence interval of 53.79 to 67.56. The drug does not significantly undergo hepatic metabolism, and approximately 95% is eliminated intact humans' urine (33%) or feces (67%). Frequent human consumption of this drug may be released into the environment in the unchanged form. However, there was no environmental concern with currently available information[11]. Based on the European ecological guidelines, environmental risk assessment (ERA) has been carried out using the log Kow from the molecular structure and biodegradability test to find this persistence, bioaccumulation, and toxicity to various aquatic and sediment-dwelling microorganisms. No observed effect concentration was detected on marine and microorganisms[11]. The maximum plasma drug concentration was measured at 1.31 hrs through the oral route of administration of bilastine[12]. However, no meaningful differences were reported in the bioequivalence trials of three pediatric oral formulations in children[13]. The ophthalmic administration of bilastine leads to low absorption into the bloodstream. The median time for maximum plasma concentration attained within 2.5 hrs and half-life in plasma has been reported as $7.88 \pm 6.72$ hrs[14]. However, a recent experiment on a rabbit model for biodistribution of 0.6% bilastine eye drops showed quantifiable concentrations of bilastine up to 24 hrs in the conjunctiva tissues after installation into the eyes[15]. Currently, tablet, solution, buccal, and oral disintegration tablet formulations of bilastine are in clinical use, and other routes of administration and bioavailability are yet to be established through clinical trials. The bioequivalence study confirmed that bilastine could be used interchangeably as an orodispersible tablet or an oral solution, and both formulations. These were well tolerated[13]. Pharmacokinetics (PK) of the intravenous route of administration of bilastine in man was predicted using a model developed with allometry and a semi-physiological method on the data of preclinical animal studies and oral administration of bilastine to man[16].

Summary: Bilastine, taken orally, shows rapid absorption with 60.67% bioavailability. It's mostly eliminated intact in urine and feces, but currently poses no environmental concern. It has low systemic absorption when applied to the eyes, yet recent rabbit studies detected bilastine in eye tissues for up to 24 hours. Based on animal studies and oral human clinical trial data, multiple formulations have shown bioequivalence in pediatric use. There are promising research paths yet to be explored concerning different ways of administering and enhancing bioavailability.

## 3. FOOD AND DRUG INTERACTIONS OF BILASTINE

Bilastine is a P-glycoprotein (P-gp) substrate, which restricts its ability to penetrate the blood-brain barrier, and no clinically significant interactions have yet been documented. The CYP450 family's substrates do not include bilastine. Healthy volunteers receiving a single 20 mg dose of medicine while eating high-fat meals reduced bioavailability by 30% or 25% compared to fasting conditions[17]. The clinical efficacy of bilastine is not affected when co-administration with food. However, a slight onset of action has been reported in clinical trial[18]. Flavonoids, polyphenolic compounds, and grapefruit juice have a high affinity with p-glycoproteins. Co-administration of grapefruit juice decreased the plasma Cmax, AUC(0-t), and AUC(0-inf) values for bilastine by 33%, 24%, and 24%, respectively[19]. A randomized clinical trial on human volunteers found that multiple doses of bilastine (20 mg and 80 mg) administered with alcohol (0.8 g/kg body weight) had a substantial effect at 80 mg[1].

In contrast, bilastine at a dose of 20 mg did not result in more severe psychomotor impairment[1]. Bilastine has a very low potential for drug-drug interaction due to the interacting properties of the cytochrome P450 system and is eliminated as an unchanged drug through urine and feces. Detailed drug-drug and drug-food interactions are listed in Table 1. Bilastine interacts with cytochrome P450 3A4 inhibitors ketoconazole[19], erythromycin, and diltiazem. A study on healthy volunteers evidenced that the AUC and Cmax values for bilastine significantly increased when it was co-administered with either erythromycin or ketoconazole[20]. It has been hypothesized that this affects intestinal transport networks and improves absorption. However, bilastine does not affect the pharmacokinetic attributes of erythromycin and ketoconazole[21].

Summary: Bilastine, a P-gp substrate, does not cross the blood-brain barrier. It lacks significant interactions with CYP450 substrates but shows reduced bioavailability with high-fat meals. Food doesn't affect its clinical efficacy, though slight delayed onset has been reported. Beverages like grapefruit juice reduce the plasma concentration. Higher doses of bilastine, particularly when combined with alcohol, may result in psychomotor impairment. Co-administration with ketoconazole or erythromycin notably increases bilastine levels in plasma. Conversely, bilastine doesn't alter the pharmacokinetics of erythromycin or ketoconazole.

## 4. OFF-TARGET ACTIVITIES OF BILASTINE

### 4.1. Anti-inflammatory effect of bilastine

*In-vitro* preclinical studies evidenced that bilastine has specific $H_1$ AH receptor activity and poor or no affinity for other histamine receptors[15]. It has anti-inflammatory effects by preventing human mast cells and degranulocytes from releasing histamine, IL-4, and tumor necrosis

**Table 1. Details of drug and food interaction of bilastine.**

| S.no | Drugs | Interaction with bilastine | Reference |
|---|---|---|---|
| 1 | Dextroamphetamine<br>Lisdexamfetamine | The CNS may contain H1 receptors. Bilastine doesn't cross the blood-brain barrier and has minimal adverse effects on the CNS. Bilastine's sedative effect may be further reduced by co-administration with CNS stimulants | 22, 23 |
| 2 | Atropine | Weakly interaction with the muscarinic receptor. Co-administration of bilastine with atropine may increase the risk of prolongation of QTc (ventricular repolarization). | 23, 24 |
| 3 | Ketoconazole<br>Voriconazole | Bilastine acts as a P-gp substrate, while ketoconazole serves as a P-gp inhibitor. Co-administering these drugs might lead to multiple drug interactions due to increased exposure to ketoconazole, potentially prolonging QTc | 25 |
| 4 | Lorazepam<br>Alprazolam<br>Diazepam | The coadministration of bilastine and benzodiazepines did not potentiate the depressant and CNS effects of benzodiazepines. However, both of these drugs can interact with P-glycoprotein | 26, 27 |
| 5 | Marijuana<br>(cannabis) | Cannabis use can modulate drugs that utilize glycoprotein pathways. P- glycoprotein isn't a substrate for cannabis, but its expression may decrease with prolonged cannabis use. When combined with bilastine, cannabis might impact heart rhythm and lead to irregular heartbeat and dizziness. | 28 |
| 6 | Erythromycin<br>Azithromycin<br>Clarithromycin | Interact with intestinal efflux transporters and it increases the Area Under Curve (AUC) and $C_{max}$ of bilastine into multiple folds. | 29 |
| 7 | Ritonavir | Inhibition of P-gp increases the plasma level of bilastine | 30 |
| 8 | Cyclosporine | Inhibition of P-gp increases the plasma level of bilastine | 30 |
| 9 | Grape juice | Inhibition of an organic anion transporter in the membrane reduces Cmax and AUC of bilastine by 33% and 24%. | 31 |
| 10 | Food | Downregulation of the cell transport activity in the intestinal mucosa, organic anion-transporting polypeptides (OATP1A2) causes slow absorption and AUC reduction by 30% (high-fat meal) and 25% (low-fat meal) | 21, 25 |
| 11 | Alcohol | Increases drowsiness | 1 |
| 12 | Disease | Interact in patients with kidney or liver problems, urinary tract blockage, an enlarged prostate, asthma, and stomach ulcers. | 5 |

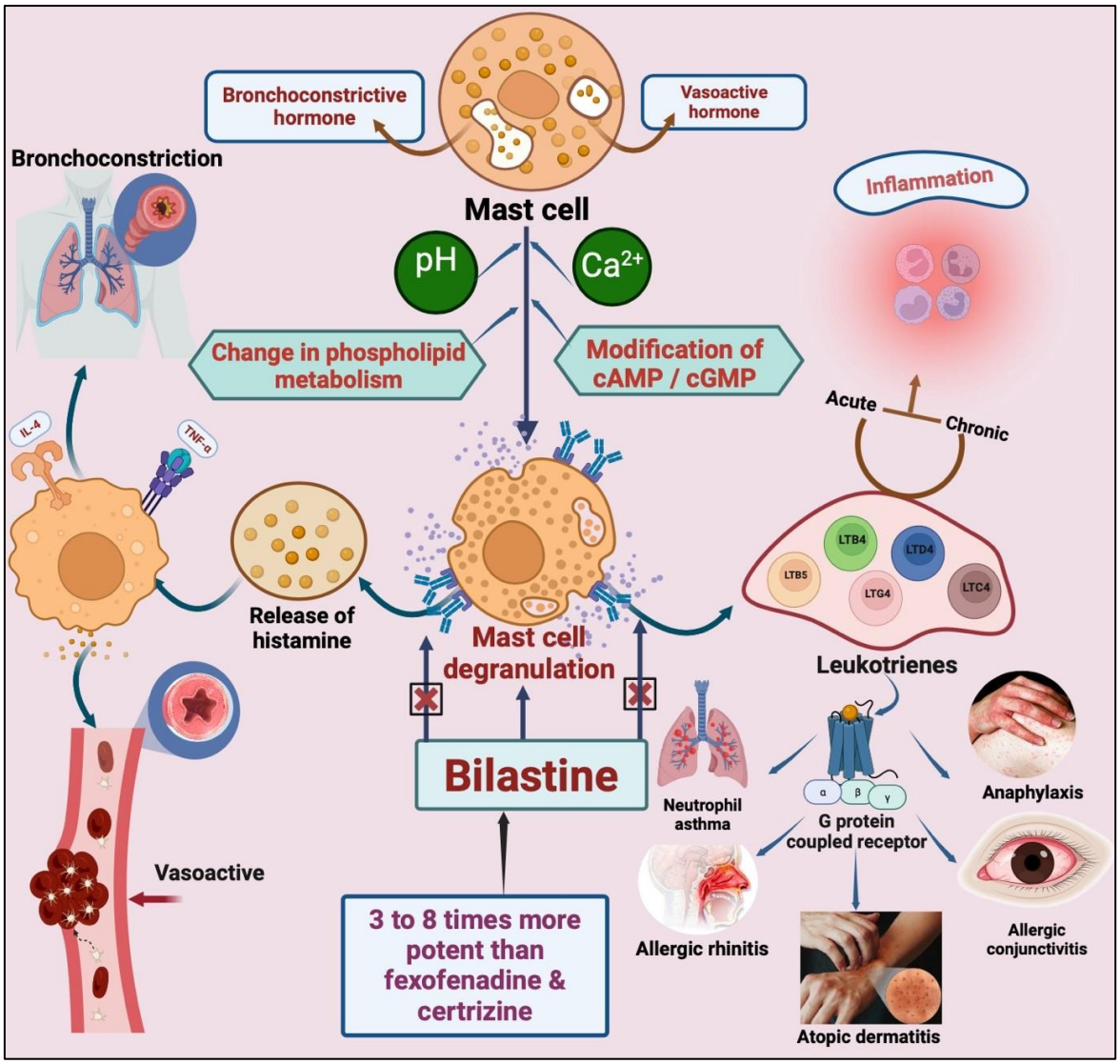



**Figure 1.** The possible anti-inflammatory mechanism of action with bilastine.

factor (TNF) and exhibits anti-inflammatory properties. It is three to eight times more potent than cetirizine and fexofenadine. In addition, it inhibits the release of leukotrienes from mast cells, thereby inhibiting acute and chronic inflammatory conditions and allergic reactions, as shown in Figure 1. It is a very complex event to evidence this phenomenal *in-vitro* model. The preclinical pharmacology of bilastine using Schultz-Dale Reaction demonstrated that Guinea-Pig ileum contracted with ovalbumin antigen was reverted by bilastine at 100 µM concentration[32]. Therefore bilastine as potential to reduce allergic inflammatory response. However, clinical evidences are lacking. It provides new research avenues for research to establish the anticipated support for this biological action.

### 4.2. Effect on type 2 diabetes and diabetic nephropathy

Free Fatty Acid Receptor 1 (FFA1) is a G protein-coupled receptor activated by fatty acids. It is expressed in pancreatic β-cells and intestines and plays a vital role in insulin secretion and energy metabolism. *In-silico* analysis has been performed to identify promising agonists for activation of FFA1 to trigger insulin production. Several ligands have been tested *in vitro* and *in vivo* to demonstrate that FFA1 is a potential target for type 2 diabetes and metabolic disorders[33]. *In-silico* analysis showed that bilastine is a good candidate for FFA1 agonists and can potentially be a lead compound for treating type 2 diabetes. This hypothesis was made based on the binding affinity of bilastine with target protein FFA1 (-36.97 kcal/mol), lipophilicity, and hydrogen bonding with aminoacid tyrosine at 91 positions of the target protein[34]. However, *in-vitro*, *ex-vivo*, and *in-vivo* experiments are required to confirm the activity. The long-term hyperglycemic condition leads to glomerular dysfunction, which has been a target for the histamine H1 receptor. The antagonist of this receptor drug, bilastine, has been reported to increase the albumin-to-creatine ratio and decrease a creatinine clearance murine model of streptozotocin-induced diabetes. It has been hypothesized that bilastine could be a potential add-on therapy for

diabetic nephropathy associated with glomerular dysfunction[35]. Clinical trial-based evidence is anticipated to confirm this activity.

Summary: Bilastine demonstrates targeted action on the H1 antihistaminic receptor, impacting histamine release and inflammatory markers. It differs from cetirizine and fexofenadine by inhibiting leukotriene release, potentially assisting in allergic reactions and inflammation reduction. In animal studies, it reversed Guinea-Pig ileum contraction induced by ovalbumin. Moreover, computational analysis hints at bilastine's potential as an FFA1 agonist, possibly stimulating insulin release could be a promising avenue for type 2 diabetes treatment. It might also influence glomerular dysfunction, potentially addressing diabetic nephropathy. Nevertheless, there's a lack of conclusive clinical evidence at present.

## 5. INTERACTION WITH THE HUMAN TRANSPORTER SYSTEM

The SLC22A1 gene encodes the organic cation uptake transporter OCT1, which is highly expressed in the liver and has been shown to have a broad substrate specificity. OCT1 enabled the diffusion and allowed several nutrients and drugs into cells. It plays a vital role in the influx of drugs used to treat various diseases, including cancer. A defective OCT1 leads to drug emergence of resistance[36]. Similarly, a gene SLCO1B1 encodes the organic anion transporting polypeptides (OATPs) responsible for dispositioning drugs and other xenobiotics into cells and mediating refluxing various endogenous substrates[37]. At a high concentration of 300 µM, bilastine could inhibit low levels of OATP2B1 and OCT1, 41% and 54%, respectively[38]. However, when co-administered with fruit juices, these proteins were inhibited completely. It confirms that the bilastine is a substrate for these proteins, so it is not recommended to take with fruit juices[39]. Several cell lines expressing multidrug efflux protein 1 (MDR1), multidrug resistance-associated protein (MRP2), bile salts-mediated efflux pump, and breast cancer resistance protein have been tested *in-vitro* conditions, and bilastine has been found to interact with MDR1 moderately and to act as a substrate for MDR1, but not for BCRP[38]. Bilastine dose for adults (20 mg oral) was recommended based on prediction models of physiologically-based pharmacokinetic (PBPK) and a semi-mechanistic population pharmacokinetic (Senescence). These two models were used to capture the value of Intestinal apical efflux and basolateral influx transporters after a single dose of intravenous (10 mg) and oral (20 mg) bilastine to young adults. The PBPK model evidenced gut transforports' influence on drug pharmacokinetics, which helped the drug for trial in geriatrics healthy people[40]. This model is adequate for quantitatively analyzing drug absorption, distribution, metabolism, and excretion (ADME) with integrated physiological parameters and preclinical data of adults or older adults[41]. However, the role of transporters interplay in deciding dose fixation for all age groups, including pregnant women, and meeting the regulatory requirements are yet to be established.

Summary: The SLC22A1 gene is responsible for encoding OCT1, a crucial factor in the absorption of both drugs and nutrients. A higher concentration of bilastine may partly interfere with drug transportation by inhibiting OATP2B1 and OCT1. When co-administered with bilastine, fruit juices completely inhibit these proteins, suggesting that bilastine itself is processed by these proteins. Bilastine moderately interacts with MDR1, serving as its substrate, but not with BCRP. Predictive models for adult dosages rely on PBPK and population PK models, emphasizing the influence of gut transporters. While these models prove beneficial in trials involving older adults, further evaluation is necessary to determine doses in diverse populations, including pregnant women, to adhere to regulatory standards.

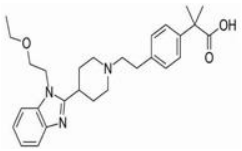
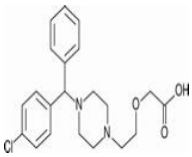
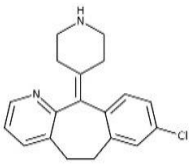
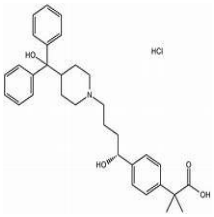
## 6. WHAT MAKES BILASTINE DIFFERENT FROM OTHER SECOND-GENERATION ANTIHISTAMINE

Bilastine is comparable in its clinical efficacy with other second-generation AHs such as cetirizine, desloratadine, and fexofenadine for treating allergic rhinoconjunctivitis. At the same time, levocetirizine is similar in its effectiveness when treating urticaria. The key differences among the second-generation AHs are shown in Table 2.

### 6.1. Unique features of bilastine

- High selectivity to H1 receptor poor or no selectivity to other receptors.
- Bilastine is a good treatment option for allergic rhinoconjunctivitis or urticaria for all age groups, from school-age children to older adults.
- There are no unusual pharmacokinetic or pharmacodynamic effects associated with this drug.
- It exhibits rapid and sustained action in a single oral dose, with maximum effect lasting 8 hrs and significant activity for at least 24 hrs afterward compared with other second-generation AHs.
- Ophthalmic preparation containing 0.6% bilastine is adequate in rapidly reducing ocular itching and lasts up to 16 hours.
- Effective in controlling perennial allergic rhinitis (PAR).
- Bilastine may prove effective in the treatment of the symptoms of BASCULE (Bier anemic spots, cyanosis, and urticaria-like eruption).
- In the presence of alcohol or benzodiazepines, low CNS impairment occurs.
- No metabolic drug interactions.
- It is safe to take this drug up to 220 mg or co-administer it with an inhibitor of CYP450 or P-gP.

**Table 2.** Comparison of bilastine with other second-generation antihistamines.

| | **Bilastine** | **Cetirizine** | **Desloratadine** | **Fexofenadine** | **Reference** |
|---|---|---|---|---|---|
| Chemical Structure |  |  |  |  | |
| Indications | Allergic rhinoconjunc-tivitis, urticaria | Allergic rhinitis and urticaria | Allergies and allergic rhinitis | Seasonal allergic rhinitis and chronic idiopathic urticaria. | 42-44 |
| Oral Bioavaila-bility | 60% | 70% | 50% | 30% | 45-48 |
| Plasma protein binding | 84-90% | 93-98% | 83-87% | 60-70% | 45-48 |
| Frequency of administration | Children (Up to 12 yrs); 10 mg;<br>Adults: 20 mg once daily | Children (6 months to 5 yrs):2.5mg<br>Others; 10 mg once daily | Children: 2.2 mg;<br>Adults- 5 mg once daily | Children (6 months to 2 yrs):15 mg<br>Children (2-12 yrs): 30 mg<br>Adults- 60 mg or 180 mg once daily | 42-44, 49 |
| Absorption (Cmax) | 1 to 1.5 hours. | within 1 hour. | 3 hours | 1-3 hours | 45-48, 50 |
| Distribution | A moderate volume of distribution binds exten-sively to albumin | Has a high binding affinity to plasma proteins, distributed throughout the respi-ratory tract and CNS | High protein binding capability | A high degree of plasma protein binding is distri-buted throughout the body including to the lungs, liver, kidneys, and tissues involved in allergic reac-tions. | |
| Metabolism | Minimal metabolism in the liver via hydroxyla-tion, specifically CYP3A4 and CYP2J2 | Metabolized through oxidative O-dealky-lation | Extensivelymetabo-lized in the liver by the enzyme cytochrome P450 3A4 (CYP3A4) | Minimal metabolism in the liver, primarily through the action of intestinal enzymes | |
| Elimination | Urine (approximately 60%) and feces (appro-ximately 40%). | Renal excretion, with about 70% of the administered dose excreted un-changed in the urine | Eliminated through the urine and feces | Primarily eliminated through feces, with only a small amount excreted in the urine | |
| Elimination Half-life | 14 to 15 hours | 6 to 10 hours | 27 hours | 14-17 hours | |
| Duration of action | up to 24 hours | 12 hours | up to 24 hours | 12 to 24 hours | |
| CNS effect | No CNS effect | No significant CNS activity, it binds to 30% of $H_1$ cerebral receptors | No CNS effect | No CNS effect | 44, 51 |
| Side effects | Dizziness, headache, dry mouth, and gastrointes-tinal disturbances | Dizziness, headache, dry mouth, and gas-trointestinal distur-bances | Drowsiness, headache, and dry mouth. | Headache, dizziness, dry mouth, and gastrointestinal disturbances | 17 |
| Special conside-ration | Less drug interactions, Not recommended for pregnant women, No environmental effect | US FDA pregnancy category B medicine taken when neces-sary affects aquatic animals, | US FDA pregnancy category C | US FDA pregnancy cate-gory C affects aquatic ecosystem | 42, 52-55 |
| Regulatory approval | Approved by Medsafe recognized authorities of Germany and the United Kingdom | Approved by US FDA | Approved by US FDA | Approved by US FDA | 56 |

- AH of choice for drivers or handling machinery or who are in sensitive jobs suffering from allergies.
- The dose does not need to be adjusted in renal or hepatic impairment patients.
- The most commonly reported adverse reactions were headache, drowsiness, and fatigue, less frequent than with cetirizine at 10 mg daily.
- Bilastine 20 mg once daily was significantly better than cetirizine 10 mg at relieving symptoms of SAR and experiencing fewer adverse events.
- Improve the quality of life; bilastine significantly reduces itching sensation on daily administration.
- Environmental safe, non-carcinogenic, and less harmful for aquatic and non-aquatic species.
- Most experts agree that managing allergic rhinoconjunctivitis and chronic urticaria conditions is beneficial with bilastine.
- For the primary outcomes, there was no difference in efficacy between bilastine and other OAHs, such as cetirizine, desloratadine, and fexofenadine.
- Bilastine meets current EAACI/ARIA criteria for medications used to treat allergic rhinitis.
- It has the potential to be used as add-on therapy for other indications.

### 6.2. Limitations

- The bioavailability of bilastine is reduced by approximately 30% when ingested with food and grapefruit juice.
- Investigations are required to evaluate the efficacy and safety of bilastine with other pharmacotherapy for AR, such as corticosteroids and leukotriene receptor antagonists.
- Insufficient clinical evidence is available for use in pregnancy conditions[57-58].
- Regulatory approval other than European national is anticipated.

## 7. CONCLUSION

Clinical experts from India and other countries made consensus statements to recommend bilastine as a first-line treatment for chronic urticaria. It exhibits linear pharmacokinetics within a dose range of 5 to 220 mg with low interindividual variability. Bilastine demonstrates rapid oral absorption and primarily exits the body unchanged through urine and feces, potentially posing environmental concerns but currently deemed safe. Its limited systemic absorption in ocular use contrasts with recent studies showing detectable levels in eye tissues for an extended period. Various formulations offer bioequivalence, especially in paediatric use, while predictive models aid in understanding intravenous use based on animal and human data. However, problems still exist with how it interacts with transporters, especially OATP2B1 and OCT1, which affects drug transport and makes it important to be careful when taking it with some substances, like fruit juices. Bilastine's promising potential in treating allergic reactions and inflammatory conditions, as well as its suggested role in diabetes treatment, provides numerous future research avenues to explore its potential therapeutic benefits. Additionally, refining dosage determination across diverse populations, including pregnant women, remains an area that needs more research to align with regulatory standards. Bilastine. Despite its unique advantages, the primary use of this drug as an AH is limited in many countries. Obtaining additional regulatory approvals beyond European regulations will enhance its visibility among clinicians for practical use in treating allergic rhinoconjunctivitis, chronic urticaria, and other therapeutic indications in the near future.

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The authors declare no conflict of interest.

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