

Regulatory Affairs

ONBREZ® BREEZHALER®

(indacaterol maleate)

150 microgram and 300 microgram inhalation powder hard capsules

Malaysia Package Insert (Jun 21)

Swiss PI (Warnings-Lactose; Interaction-Drugs known to prolong QTc interval; Overdose-acute intoxication statement; PK absorption; Non-clinical-chronic toxicity study statement)

**FOR PROMOTIONAL MATERIALS PLEASE QUOTE THE FOLLOWING:
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Onbrez® Breezhaler®

Long-acting beta₂-adrenergic agonist.

DESCRIPTION AND COMPOSITION

Pharmaceutical form

Inhalation powder, hard capsules.

150 microgram: Black product code “IDL 150” printed above and black company logo printed under black bar on yellowish transparent (uncolored) capsule.

300 microgram: Blue product code “IDL 300” printed above and blue company logo printed under blue bar on yellowish transparent (uncolored) capsule.

Active substance

150 microgram inhalation powder hard capsules

Each capsule contains 194 microgram indacaterol maleate equivalent to 150 microgram indacaterol.

The delivered dose (the dose that leaves the mouthpiece of the Onbrez Breezhaler inhaler) is equivalent to 120 microgram indacaterol.

300 microgram inhalation powder hard capsules

Each capsule contains 389 microgram indacaterol maleate equivalent to 300 microgram indacaterol.

The delivered dose (the dose that leaves the mouthpiece of the Onbrez Breezhaler inhaler) is equivalent to 240 microgram indacaterol.

Certain dosage strengths may not be available in all countries.

Excipients

Lactose monohydrate and gelatin.

INDICATIONS

Onbrez Breezhaler is a long-acting beta₂-agonist indicated for maintenance bronchodilator treatment of airflow obstruction in adult patients with chronic obstructive pulmonary disease (COPD).

DOSAGE REGIMEN AND ADMINISTRATION

Dosage Regimen

General target population

Adults

The recommended dosage of Onbrez Breezhaler is the once-daily inhalation of the content of one 150 microgram capsule using the Onbrez Breezhaler inhaler. The dosage should only be increased on medical advice.

Once-daily inhalation of the content of one 300 microgram capsule, using the Onbrez Breezhaler inhaler, has been shown to provide additional clinical benefit to some patients, e.g. with regard to breathlessness, particularly for patients with severe COPD. The maximum dose is 300 microgram once-daily.

Special populations

Renal impairment

No dosage adjustment is required for patients with renal impairment.

Hepatic impairment

No dosage adjustment is required for patients with mild and moderate hepatic impairment. No data are available for patients with severe hepatic impairment (see section CLINICAL PHARMACOLOGY)

Pediatric patients (below 18 years)

Onbrez Breezhaler should not be used in patients under 18 years of age.

Geriatric patients (65 years of age or above)

No dosage regimen adjustment is required in patients 65 years of age or above.

Method of administration

Onbrez Breezhaler capsules must be administered only by the oral inhalation route and only using the Onbrez Breezhaler inhaler. Onbrez Breezhaler capsules must not be swallowed.

Onbrez Breezhaler should be administered at the same time of the day each day. If a dose is missed, the next dose should be taken at the usual time the next day.

Onbrez Breezhaler capsules must always be stored in the blister, and only be removed IMMEDIATELY BEFORE USE. Instructions on how to use the Onbrez Breezhaler inhaler are provided in section INFORMATION FOR PATIENTS at the end of this leaflet.

Patients should be instructed on how to administer the product correctly. Patients who do not experience improvement in breathing should be asked if they are swallowing the medicine rather than inhaling it.

CONTRAINDICATIONS

Onbrez Breezhaler is contraindicated in patients with hypersensitivity to indacaterol or to any of the excipients.

WARNINGS AND PRECAUTIONS

Asthma

Onbrez Breezhaler should not be used in asthma due to the absence of long-term outcome data in asthma with Onbrez Breezhaler.

Long-acting beta₂-adrenergic agonists may increase the risk of asthma-related serious adverse events, including asthma-related deaths, when used for the treatment of asthma.

Hypersensitivity

Immediate hypersensitivity reactions have been reported after administration of Onbrez Breezhaler. If signs suggesting allergic reactions (in particular, difficulties in breathing or swallowing, swelling of tongue, lips and face, urticaria, skin rash) occur, Onbrez Breezhaler should be discontinued immediately and alternative therapy instituted.

Paradoxical bronchospasm

As with other inhalation therapy, administration of Onbrez Breezhaler may result in paradoxical bronchospasm that may be life-threatening. If paradoxical bronchospasm occurs, Onbrez Breezhaler should be discontinued immediately and alternative therapy instituted.

Deterioration of disease

Onbrez Breezhaler is not indicated for the initial treatment of acute episodes of bronchospasm, *i.e.*, as a rescue therapy. In case of deterioration of COPD whilst on treatment with Onbrez Breezhaler, a re-evaluation of the patient and the COPD treatment regimen should be undertaken. An increase in the daily dose of Onbrez Breezhaler beyond the maximum dose is not appropriate.

Systemic effects

Although no clinically relevant effect on the cardiovascular system is usually seen after the administration of Onbrez Breezhaler at the recommended doses, as with other beta₂-adrenergic agonists, indacaterol should be used with caution in patients with cardiovascular disorders (coronary artery disease, acute myocardial infarction, cardiac arrhythmias, hypertension), in patients with convulsive disorders or thyrotoxicosis, and in patients who are unusually responsive to beta₂-adrenergic agonists.

As with other inhaled beta₂-adrenergic drugs, Onbrez Breezhaler should not be used more often or at higher doses than recommended.

Onbrez Breezhaler should not be used in conjunction with other long-acting beta₂-adrenergic agonists or medications containing long-acting beta₂-adrenergic agonists.

Onbrez Breezhaler contains lactose.

Cardiovascular effects

Like other beta₂-adrenergic agonists, indacaterol may produce a clinically significant cardiovascular effect in some patients as measured by increases in pulse rate, blood pressure, and/or symptoms. In case such effects occur, the drug may need to be discontinued. In addition, beta₂-adrenergic agonists have been reported to produce ECG changes, such as flattening of the T wave, prolongation of QT interval, and ST segment depression, although the clinical significance of these findings is unknown. Therefore, long-acting beta₂-adrenergic agonists (LABA) or LABA containing products such as Onbrez Breezhaler should be used with caution in patients with known or suspected prolongation of the QT interval or patients treated with medicinal products affecting the QT interval.

Hypokalemia

Beta₂-adrenergic agonists may produce significant hypokalemia in some patients, which has the potential to produce adverse cardiovascular effects. The decrease in serum potassium is usually transient, not requiring supplementation. In patients with severe COPD, hypokalemia may be potentiated by hypoxia and concomitant treatment (see section INTERACTIONS) which may increase the susceptibility to cardiac arrhythmias.

Hyperglycemia

Inhalation of high doses of beta₂-adrenergic agonists may produce increases in plasma glucose. Upon initiation of treatment with Onbrez Breezhaler plasma glucose should be monitored more closely in diabetic patients.

During clinical studies, clinically notable changes in blood glucose were generally more frequent by 1-2% in patients on Onbrez Breezhaler at the recommended doses than in patients on placebo. Onbrez Breezhaler has not been investigated in patients with not well controlled diabetes mellitus.

ADVERSE DRUG REACTIONS

Summary of the safety profile

The safety experience with Onbrez Breezhaler comprises exposure of up to one year at doses two- to four-fold the recommended therapeutic doses.

The most common adverse drug reactions at the recommended doses were nasopharyngitis, upper respiratory tract infection, cough, headache, and muscle spasms. These were in the vast majority mild or moderate and became less frequent when treatment was continued.

At the recommended doses, the adverse drug reaction profile of Onbrez Breezhaler in patients with COPD shows clinically insignificant systemic effects of beta₂-adrenergic stimulation. Mean heart rate changes were less than one beat per min, and tachycardia was infrequent and reported at a similar rate as under placebo treatment. Relevant prolongations of QT_{cF} were not detectable in comparison to placebo. The frequency of notable QT_{cF} intervals [*i.e.*, >450 ms

(males) and >470 ms (females)] and reports of hypokalemia were similar to placebo. The mean of the maximum changes in blood glucose were similar on Onbrez Breezhaler and on placebo.

Description of population

The Onbrez Breezhaler Phase III clinical development program consisted of 16 key studies and enrolled over 9,000 patients with a clinical diagnosis of moderate to severe COPD. Safety data from 11 of these studies with treatment durations of 12 weeks or longer were pooled from 4,764 patients exposed to indacaterol up to 600 microgram once-daily, of which 2,611 were on treatment with 150 microgram once-daily and 1,157 on treatment with 300 microgram once-daily. Approximately 41% of patients had severe COPD. The mean age of patients was 64 years, with 48% of patients aged 65 years or older, and the majority (80%) was Caucasian.

Tabulated summary of adverse drug reactions from clinical trials

Adverse drug reactions in Table 1 are from this pooled COPD safety database, listed according to MedDRA system organ class and sorted in descending order of frequency on indacaterol 150 microgram once-daily. Within each system organ class, the adverse reactions are ranked by frequency, with the most frequent reactions first. In addition, the corresponding frequency category using the following convention (CIOMS III) is also provided for each adverse reaction: Very common ($\geq 1/10$); common ($\geq 1/100$, $< 1/10$); uncommon ($\geq 1/1,000$, $< 1/100$); rare ($\geq 1/10,000$, $< 1/1,000$); very rare ($< 1/10,000$).

Table 1 Adverse drug reactions in pooled COPD safety database

Adverse Drug Reactions	Indacaterol 150 microgram o.d. N= 2,611 n (%)	Indacaterol 300 microgram o.d. N= 1,157 n (%)	Placebo N= 2,012 n (%)	Frequency category
Infections and infestations				
- Nasopharyngitis	167 (6.4)	165 (14.3)	169 (8.4)	Very common
- Upper respiratory tract infection	175 (6.7)	164 (14.2)	206 (10.2)	Very common
- Sinusitis	52 (2.0)	37 (3.2)	42 (2.1)	Common
Immune System Disorders				
- Hypersensitivity ¹	11 (0.4)	4 (0.4)	7 (0.4)	Uncommon
Metabolism and nutrition disorders				
- Diabetes and hyperglycaemia*	18 (0.7)	19 (1.6)	18 (0.9)	Common
Nervous system disorders				
- Headache	93 (3.6)	43 (3.7)	61 (3.0)	Common
- Dizziness	37 (1.4)	29 (2.5)	40 (2.0)	Common
- Paraesthesia	9 (0.3)	3 (0.3)	3 (0.2)	Uncommon
Cardiac disorders				
- Ischaemic heart disease*	22 (0.8)	19 (1.6)	8 (0.4)	Common
- Palpitations	13 (0.5)	14 (1.2)	23 (1.1)	Common
- Atrial fibrillation	12 (0.5)	8 (0.7)	11 (0.5)	Uncommon
- Tachycardia	5 (0.2)	7 (0.6)	8 (0.4)	Uncommon
Respiratory, thoracic and mediastinal disorders				
- Cough	129 (4.9)	95 (8.2)	104 (5.2)	Common

Adverse Drug Reactions	Indacaterol 150 microgram o.d. N= 2,611 n (%)	Indacaterol 300 microgram o.d. N= 1,157 n (%)	Placebo N= 2,012 n (%)	Frequency category
- Oropharyngeal pain incl. throat irritation	50 (1.9)	37 (3.2)	33 (1.6)	Common
- Rhinorrhea	40 (1.5)	37 (3.2)	22 (1.1)	Common
- Paradoxical bronchospasm	5 (0.2)	8 (0.7)	13 (0.7)	Uncommon
Skin and subcutaneous tissue disorders				
- Pruritus/rash	22 (0.8)	17 (1.5)	19 (0.9)	Common
Musculoskeletal and connective tissue disorders				
- Muscle spasm	46 (1.8)	40 (3.5)	21 (1.0)	Common
- Musculoskeletal pain	16 (0.6)	26 (2.3)	23 (1.1)	Common
- Myalgia	23 (0.9)	8 (0.7)	12 (0.6)	Uncommon
General disorders and administration site conditions				
- Chest pain	33 (1.3)	19 (1.6)	24 (1.2)	Common
- Peripheral oedema	28 (1.1)	16 (1.4)	13 (0.7)	Common

Adverse drug reactions (ADRs) selected based on pooled COPD safety database; frequencies based on percentage of patients with respective ADR in the COPD safety population; frequency category based on 150 microgram or 300 microgram dose, whichever had higher rate. ¹ Reports of hypersensitivity have been received from post-approval marketing experience in association with the use of Onbrez Breezhaler. Because these were reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate the frequency or establish a causal relationship to drug exposure. Therefore the frequency was calculated from clinical trial experience. Terms marked with * are Standard MedDRA Query terms.

At a higher, non-recommended dose, *i.e.*, 600 microgram once-daily, the safety profile of Onbrez Breezhaler was overall similar to that of recommended doses. An additional adverse drug reaction was tremor. Nasopharyngitis, muscle spasm, headache and peripheral oedema occurred more frequently than at the recommended doses.

Description of selected adverse drug reactions

In Phase III clinical studies, health care providers observed during clinic visits that on average 17-20% of patients experienced a sporadic cough that occurred usually within 15 seconds following inhalation and typically lasted for 5 seconds. This cough experienced post inhalation was generally well tolerated and did not lead to any patient discontinuing from the studies at the recommended doses (cough is a symptom of COPD and up to 8.2% of patients reported cough as an adverse event). There is no evidence that cough experienced post inhalation is associated with bronchospasm, exacerbations, deteriorations of disease or loss of efficacy.

INTERACTIONS

Medicinal products known to prolong QTc interval

As with other beta₂ agonists, there is a theoretical risk that medicinal products known to prolong the QTc interval may cause a pharmacodynamic interactions with indacaterol and increase the

potential risk of ventricular arrhythmia. Examples of such medicinal products are certain antihistamines (e.g. terfenadine, mizolastine), certain antiarrhythmic agents (e.g. quinidine), phenothiazines, erythromycin, ritonavir and tricyclic antidepressants. Concomitant administration of sympathomimetic agents may exacerbate adverse cardiovascular effects. Caution is required when giving Onbrez Breezhaler to patients receiving treatment with MAO inhibitors or tricyclic antidepressants since the action of beta₂-stimulants on the cardiovascular system may be potentiated.

Concomitant administration of levodopa, leothyroxine and oxytocin may have a negative impact on cardiac tolerance to beta₂-sympathomimetic agents.

Sympathomimetic agents

Concomitant administration of other sympathomimetic agents (alone or as part of combination therapy) may potentiate the undesirable effects of Onbrez Breezhaler (see section WARNINGS AND PRECAUTIONS).

Hypokalemia

Concomitant treatment with methylxanthine derivatives, steroids, or non-potassium-sparing diuretics may potentiate the possible hypokalemic effect of beta₂-adrenergic agonists (see section WARNINGS AND PRECAUTIONS).

Beta-adrenergic blockers

Beta-adrenergic blockers may weaken or antagonise the effect of beta₂-adrenergic agonists. Therefore Onbrez Breezhaler should not be given together with beta-adrenergic blockers (including eye drops) unless there are compelling reasons for their use. Where required, cardioselective beta-adrenergic blockers should be preferred, although they should be administered with caution.

Metabolic and transporter based drug interaction

Inhibition of the key contributors of indacaterol clearance, CYP3A4 and P-gp, has no impact on safety of therapeutic doses of Onbrez Breezhaler. Drug interaction studies were carried out using potent and specific inhibitors of CYP3A4 and P-gp (*i.e.*, ketoconazole, erythromycin, verapamil and ritonavir). Verapamil was used as the prototypic inhibitor of P-gp and resulted in 1.4- to two-fold increase in AUC and 1.5-fold increase in C_{max}. Co-administration of erythromycin with Onbrez Breezhaler resulted in an increase of 1.4- to 1.6-fold for AUC and 1.2 fold for C_{max}. Combined inhibition of P-gp and CYP3A4 by the very strong dual inhibitor ketoconazole caused a 2-fold and 1.4-fold increase in AUC and C_{max}, respectively. Concomitant treatment with ritonavir, another dual inhibitor of CYP3A4 and P-gp, resulted in a 1.6- to 1.8-fold increase in AUC whereas C_{max} was unaffected. Taken together, the data suggest that systemic clearance is influenced by modulation of both P-gp and CYP3A4 activities and that the 2-fold AUC increase caused by the strong dual inhibitor ketoconazole reflects the impact of maximal combined inhibition. The magnitude of exposure increases due to drug interactions does not raise any safety concerns given the safety experience of treatment with Onbrez

Breezhaler in clinical trials of up to one year at doses two- to four-fold the recommended therapeutic doses.

In vitro investigations have indicated that indacaterol has negligible potential to cause metabolic interactions with medications at the systemic exposure levels achieved in clinical practice.

PREGNANCY, LACTATION , FEMALES AND MALES OF REPRODUCTIVE POTENTIAL

Pregnancy

Risk Summary

There are no adequate and well-controlled studies in pregnant women to inform a product-associated risk. There are no data from the use of indacaterol in pregnant women. Indacaterol was not teratogenic in rats or rabbits following subcutaneous administration.

The potential risk for humans is unknown. Therefore, indacaterol should be used during pregnancy only if the expected benefit justifies the potential risk to the fetus.

Clinical considerations

Labour and delivery

Like other beta₂-adrenergic agonists, indacaterol may inhibit labor due to a relaxant effect on uterine smooth muscle.

Data

Animal data

Adverse effects with respect to pregnancy and embryonal/foetal development in rabbits after subcutaneous administration, was only be demonstrated at doses more than 500-fold than achieved following the daily inhalation of 150 microgram in humans (based on AUC_{0-24h}).

Lactation

Risk Summary

It is not known whether indacaterol passes into human breast milk. There are no data on the effects of indacaterol on the breastfed child or on milk production. Indacaterol has been detected in the milk of lactating rats after subcutaneous administration. Because many drugs are transferred into human milk, as with other inhaled beta₂-adrenergic drugs, the use of Onbrez Breezhaler by breast-feeding women should only be considered if the expected benefit to the woman is greater than any possible risk to the infant.

Females and males of reproductive potential

There are no special recommendations.

Infertility

Reproduction studies or other data in animals did not reveal a problem or potential problem concerning fertility in either males or females.

OVERDOSAGE

In COPD patients single doses of 10 times the maximum recommended therapeutic dose were associated with a moderate increase in pulse rate, systolic blood pressure increase and QTc interval.

Acute intoxication following inadvertent oral ingestion of Onbrez Breezhaler capsules is unlikely because the bioavailability of indacaterol is low.

An overdose of indacaterol is likely to lead to exaggerated effects typical of beta₂-adrenergic stimulants *i.e.*, tachycardia, tremor, palpitations, headache, nausea, vomiting, drowsiness, ventricular arrhythmias, metabolic acidosis, hypokalemia and hyperglycemia.

Supportive and symptomatic treatment is indicated. In serious cases, patients should be hospitalized. Use of cardioselective beta-blockers may be considered, but only under the supervision of a physician and with extreme caution since the use of beta-adrenergic blockers may provoke bronchospasm.

CLINICAL PHARMACOLOGY

Pharmacotherapeutic group, ATC

Pharmacotherapeutic group: long-acting beta₂-adrenergic agonist, ATC code: R03AC18

Mechanism of action (MOA)

Indacaterol is an 'ultra' long-acting beta₂-adrenergic agonist for once-daily administration. The pharmacological effects of beta₂-adrenoceptor agonists, including indacaterol, are at least in part attributable to stimulation of intracellular adenylyl cyclase, the enzyme that catalyzes the conversion of adenosine triphosphate (ATP) to cyclic-3', 5'-adenosine monophosphate (cyclic monophosphate). Increased cyclic AMP levels cause relaxation of bronchial smooth muscle. *In vitro* studies have shown that indacaterol has more than 24-fold greater agonist activity at beta₂-receptors compared to beta₁-receptors and 20-fold greater agonist activity compared to beta₃-receptors. This selectivity profile is similar to formoterol.

When inhaled, indacaterol acts locally in the lung as a bronchodilator. Indacaterol is a nearly full agonist at the human beta₂-adrenergic receptor with nanomolar potency. In isolated human bronchus, indacaterol has a rapid onset of action and a long duration of action.

Although beta₂-receptors are the predominant adrenergic receptors in bronchial smooth muscle and beta₁-receptors are the predominant receptors in the human heart, there are also beta₂-adrenergic receptors in the human heart comprising 10% to 50% of the total adrenergic receptors. The precise function of beta₂-adrenergic receptors in the heart is not known, but their presence raises the possibility that even highly selective beta₂-adrenergic agonists may have cardiac effects.

Pharmacodynamics (PD)

Primary pharmacodynamic effects

Onbrez Breezhaler provided consistently significant improvement in lung function (as measured by the forced expiratory volume in one second, FEV₁) over 24 hours in a number of clinical pharmacodynamic and efficacy trials. There was a rapid onset of action within 5 minutes after inhalation of Onbrez Breezhaler, comparable to the effect of the fast-acting beta₂-agonist salbutamol and a peak effect occurring between 2-4 hours following the dose. There was no evidence for tachyphylaxis to the bronchodilator effect after repeated dosing for up to 52 weeks. The bronchodilator effect did not depend on the time of dosing (morning or evening).

Onbrez Breezhaler reduced both dynamic and resting hyperinflation in patients with moderate to severe COPD. Inspiratory capacity during constant, sub-maximal exercise increased by 317 mL compared to placebo after administration of 300 microgram once-daily over 14 days. A statistically significant increase in resting inspiratory capacity, exercise endurance and FEV₁ were also demonstrated as well as a significant improvement in measures of dyspnoea.

Secondary pharmacodynamic effects

The characteristic adverse effects of inhaled beta₂-adrenergic agonists occur as a result of activation of systemic beta-adrenergic receptors. The most common adverse effects include skeletal muscle tremor and cramps, insomnia, tachycardia, decreases in serum potassium and increases in plasma glucose.

Effects on cardiac electrophysiology

The effect of Onbrez Breezhaler on the QT interval was evaluated in a double-blind, placebo- and active (moxifloxacin)-controlled study following multiple doses of indacaterol 150 microgram, 300 microgram or 600 microgram once-daily for 2 weeks in 404 healthy volunteers. Fridericia's method for heart rate correction was employed to derive the corrected QT interval (QT_{cF}). Maximum mean prolongation of QT_{cF} intervals were <5 ms, and the upper limit of the 90% confidence interval was below 10 ms for all time-matched comparisons versus placebo. There was no evidence of a concentration-delta QT_c relationship in the range of doses evaluated.

Electrocardiographic monitoring in patients with COPD

The effect of Onbrez Breezhaler on heart rate and rhythm was assessed using continuous 24-hour ECG recording (Holter monitoring) in a subset of 605 patients with COPD from a 26-week, double-blind, placebo-controlled Phase III study (see section CLINICAL STUDIES). Holter monitoring occurred once at baseline and up to 3 times during the 26-week treatment period (at weeks 2, 12 and 26).

A comparison of the mean heart rate over 24 hours showed no increase from baseline for both doses evaluated, 150 microgram once-daily and 300 microgram once-daily. The hourly heart rate analysis was similar for both doses compared to placebo and tiotropium. The pattern of diurnal variation over 24 hours was maintained and was similar to placebo.

No difference from placebo or tiotropium was seen in the rates of atrial fibrillation, time spent in atrial fibrillation and also the maximum ventricular rate of atrial fibrillation.

No clear patterns in the rates of single ectopic beats, couplets or runs were seen across visits.

Because the summary data on rates of ventricular ectopic beats can be difficult to interpret, specific pro-arrhythmic criteria were analyzed. In this analysis, baseline occurrence of ventricular ectopic beats was compared to change from baseline, setting certain parameters for the change to describe the pro-arrhythmic response. The number of patients with a documented pro-arrhythmic response was very similar across both indacaterol doses compared to placebo and tiotropium.

Overall, there was no clinically relevant difference in the development of arrhythmic events in patients receiving indacaterol treatment over those patients who received placebo or treatment with tiotropium.

Effects on serum potassium and plasma glucose

Changes in serum potassium and plasma glucose were evaluated in a 26-week, double-blind, placebo-controlled Phase III study (see section CLINICAL STUDIES). At 1 hour post-dose at week 12, mean changes compared to placebo in serum potassium ranging from 0.03 to 0.05 mmol/L and in mean plasma glucose ranging from 0.25 to 0.31 mmol/L were observed.

Pharmacokinetics (PK)

Absorption

Inhalational administration

The median time to reach peak serum concentrations of indacaterol was approximately 15 min after single or repeated inhaled doses. Systemic exposure to indacaterol increased with increasing dose (150 microgram to 600 microgram) in a dose proportional manner. Absolute bioavailability of indacaterol after an inhaled dose was on average 43-45%. Systemic exposure results from a composite of pulmonary and intestinal absorption.

Indacaterol serum concentrations increased with repeated once-daily administration. Steady-state was achieved within 12 to 15 days. The mean accumulation ratio of indacaterol, *i.e.*, AUC over the 24-h dosing interval on Day 14 or Day 15 compared to Day 1, was in the range of 2.9 to 3.8 for once-daily inhaled doses between 75 microgram and 600 microgram. Systemic exposure following inhalation comprises a composite of oral and pulmonary absorption, with pulmonary absorption being the main contributor.

Oral administration

The oral bioavailability of indacaterol when swallowed from a capsule is approximately 25%, with an orogastrintestinal absorption rate of 30–50%. C_{max} is reached within 0.5–2 hours.

Distribution

After intravenous infusion the volume of distribution (V_z) of indacaterol was 2,361 L to 2,557 L indicating an extensive distribution. The *in vitro* human serum and plasma protein binding was 94.1 to 95.3% and 95.1 to 96.2%, respectively.

Biotransformation/Metabolism

After oral administration of radiolabelled indacaterol in a human ADME (absorption, distribution, metabolism, excretion) study, unchanged indacaterol was the main component in serum, accounting for about one third of total drug-related AUC over 24 h. A hydroxylated derivative was the most prominent metabolite in serum. Phenolic O-glucuronides of indacaterol and hydroxylated indacaterol were further prominent metabolites. A diastereomer of the hydroxylated derivative, a N-glucuronide of indacaterol, and C- and N-dealkylated products were further metabolites identified.

In vitro investigations indicated that UGT1A1 is the only UGT isoform that metabolized indacaterol to the phenolic O-glucuronide. The oxidative metabolites were found in incubations with recombinant CYP1A1, CYP2D6, and CYP3A4. CYP3A4 is concluded to be the predominant isoenzyme responsible for hydroxylation of indacaterol. *In vitro* investigations further indicated that indacaterol is a low affinity substrate for the efflux pump P-gp.

Elimination

In clinical studies which included urine collection, the amount of indacaterol excreted unchanged via urine was generally lower than 2% of the dose. Renal clearance of indacaterol was, on average, between 0.46 and 1.20 L/h. When compared with the serum clearance of indacaterol of 18.8 to 23.3 L/h, it is evident that renal clearance plays a minor role (about 2 to 6% of systemic clearance) in the elimination of systemically available indacaterol.

In a human ADME study where indacaterol was given orally, the fecal route of excretion was dominant over the urinary route. Indacaterol was excreted into human feces primarily as unchanged parent drug (54% of the dose) and, to a lesser extent, hydroxylated indacaterol metabolites (23% of the dose). Mass balance was complete with $\geq 90\%$ of the dose recovered in the excreta.

Indacaterol serum concentrations declined in a multi-phasic manner with an average terminal half-life ranging from 45.5 to 126 hours. The effective half-life, calculated from the accumulation of indacaterol after repeated dosing ranged from 40 to 56 hours which is consistent with the observed time-to-steady state of approximately 12 to 15 days.

Special populations

A population analysis of the effect of age, gender and weight on systemic exposure in COPD patients after inhalation indicated that Onbrez Breezhaler can be used safely in all age and weight groups and regardless of gender. It did not suggest any difference between ethnic subgroups in this population. Limited treatment experience is available for the black population.

The pharmacokinetics of indacaterol was investigated in two different UGT1A1 genotypes – the fully functional [(TA)₆, (TA)₆] genotype and the low activity [(TA)₇, (TA)₇] genotype (Gilbert's syndrome genotype). The study demonstrated that steady-state AUC and C_{max} of indacaterol were 1.2-fold higher in the [(TA)₇, (TA)₇] genotype, indicating that systemic exposure to indacaterol is only insignificantly affected by this UGT1A1 genotypic variation.

Patients with mild and moderate hepatic impairment showed no relevant changes in C_{max} or AUC of indacaterol, nor did protein binding differ between mild and moderate hepatic impaired

subjects and their healthy controls. Studies in subjects with severe hepatic impairment were not performed.

Due to the very low contribution of the urinary pathway to total body elimination, a study in renally impaired subjects was not performed.

CLINICAL STUDIES

The Onbrez Breezhaler Phase III clinical development program consisted of 16 key studies and enrolled over 9,000 patients with a clinical diagnosis of moderate to severe COPD, who were 40 years old or older, had a smoking history of at least 20 pack years, had a post-bronchodilator FEV₁ <80% and ≥30% of the predicted normal value and a post-bronchodilator FEV₁/FVC ratio of less than 70%.

In these studies, indacaterol, administered once-daily at doses of 150 microgram and 300 microgram, showed clinically meaningful improvements in lung function (as measured by the forced expiratory volume in one second, FEV₁) over 24 hours. At the 12-week primary endpoint (24-hour trough FEV₁), the 150 microgram dose resulted in a 0.13-0.18 L increase compared to placebo (p<0.001) and a 0.06 L increase compared to salmeterol 50 microgram twice a day (p<0.001). The 300 microgram dose resulted in a 0.17-0.18 L increase compared to placebo (p<0.001) and a 0.1 L increase compared to formoterol 12 microgram twice a day (p<0.001). Both doses resulted in an increase of 0.04-0.05 L over open-label tiotropium 18 microgram once-daily (150 microgram, p=0.004; 300 microgram, p=0.01).

Indacaterol administered once-daily at the same time each day, either in the morning or evening, had a rapid onset of action within 5 minutes similar to that of salbutamol 200 microgram and statistically significantly faster compared to salmeterol/fluticasone 50/500 microgram, and mean peak improvements in FEV₁ relative to baseline of 0.25-0.33 L at steady-state occurring between 2-4 hours following the dose. The 24-hour bronchodilator effect of Onbrez Breezhaler was maintained from the first dose throughout a one-year period with no evidence of loss of efficacy (tachyphylaxis).

In a 26-week, placebo- and active (open label tiotropium)-controlled study in 2,059 patients, the mean improvement relative to baseline in FEV₁ at 5 minutes was 0.12 L and 0.13 L for Onbrez Breezhaler 150 microgram and 300 microgram once-daily, respectively, and the mean peak improvement, relative to baseline, after the first dose (Day 1) was 0.19 L and 0.24 L, respectively, and improved to 0.23 L and 0.26 L, respectively, when pharmacodynamic steady-state was reached (Day 14). At the primary end point (Week 12), both Onbrez Breezhaler 150 microgram and 300 microgram once-daily treatment groups showed a significantly higher trough FEV₁ value compared to placebo (both 0.18 L, p<0.001) and to tiotropium (0.05 L, p=0.004, and 0.04 L, p=0.01, respectively).

In this study, 12-hour serial spirometric measurements were performed in a subset of patients throughout daytime hours (12 hours). Serial FEV₁ values over 12 hours at Day 1 and trough FEV₁ values at Day 2 are shown in Figure 1, and at Day 182/183 in Figure 2, respectively. Improvement of lung function was maintained for 24 hours after the first dose and consistently maintained over the 26-week treatment period with no evidence of tolerance.

Figure 1 Serial least square mean FEV₁ over 12 h at Day 1 and trough FEV₁ at Day 2 (ITT subset with 12 hour serial spirometry)

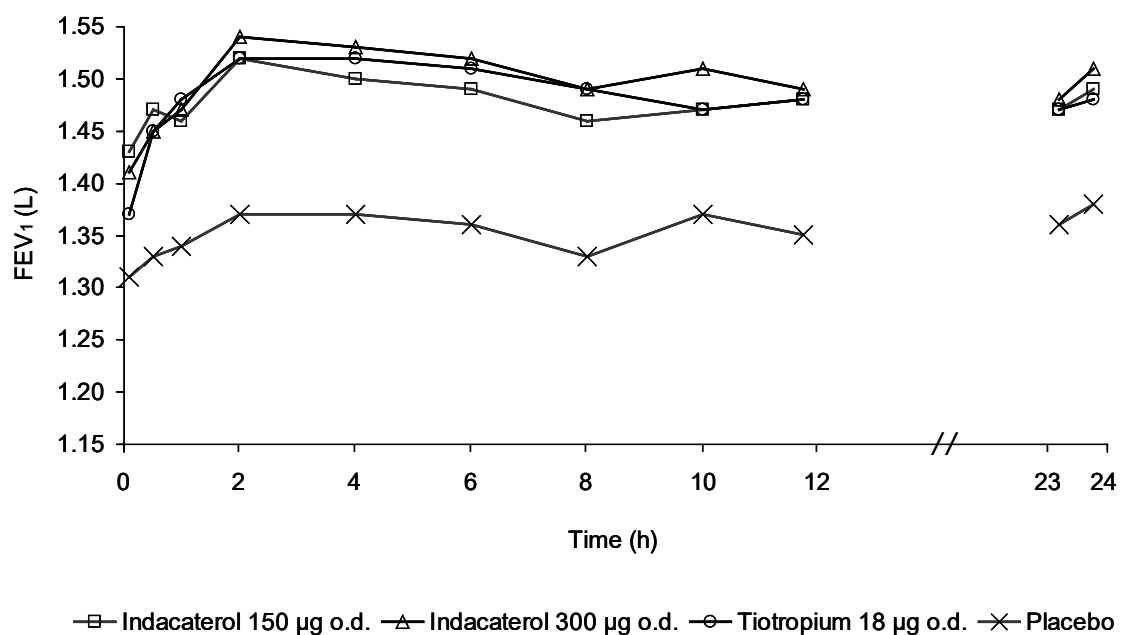
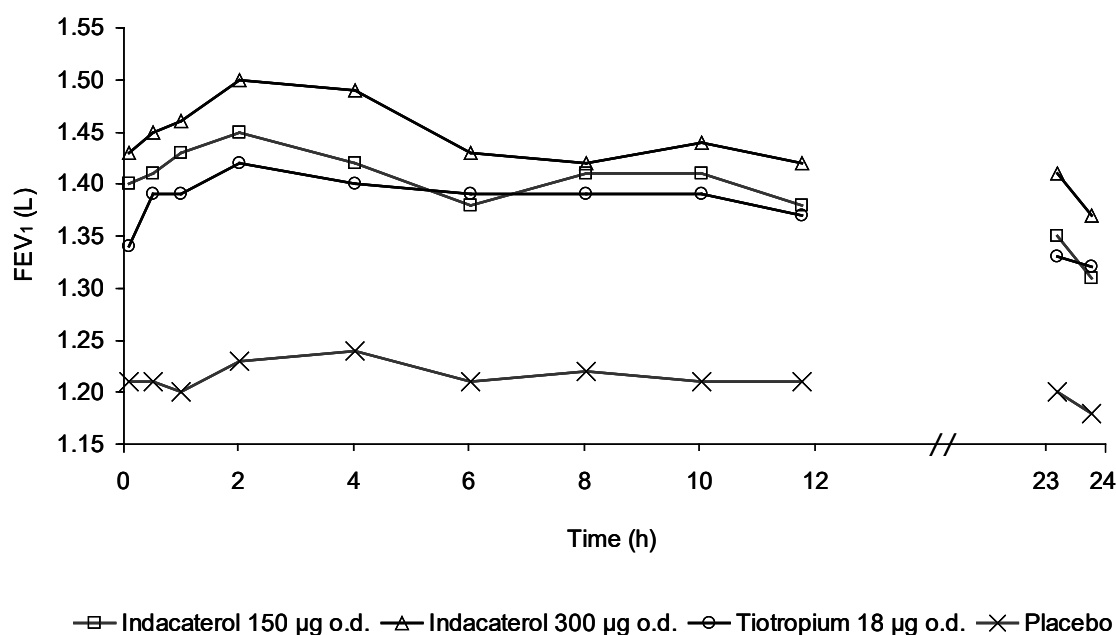


Figure 2 Serial least square mean FEV₁ over 12 h at Day 182 and trough FEV₁ at Day 183 (ITT subset with 12 hour serial spirometry)



In a 26-week, placebo-controlled safety extension to this study in 414 patients, efficacy was not a primary endpoint, however at the secondary end point (Week 52) of trough FEV₁, treatment with both Onbrez Breezhaler 150 microgram and 300 microgram once-daily resulted in a significantly higher trough FEV₁ value compared to placebo (0.17 L, $p<0.001$ and 0.18L, $p<0.001$, respectively).

Results of a 12-week, placebo-controlled study in 416 patients which evaluated the 150 microgram once-daily dose, were similar to the results for this dose in the 26-week study. The mean peak improvement in FEV₁, relative to baseline, was 0.23 L after 1 day of once-daily treatment. At the primary end point (Week 12), treatment with Onbrez Breezhaler 150 microgram once-daily resulted in a significantly higher trough FEV₁ value compared to placebo (0.13 L, $p<0.001$).

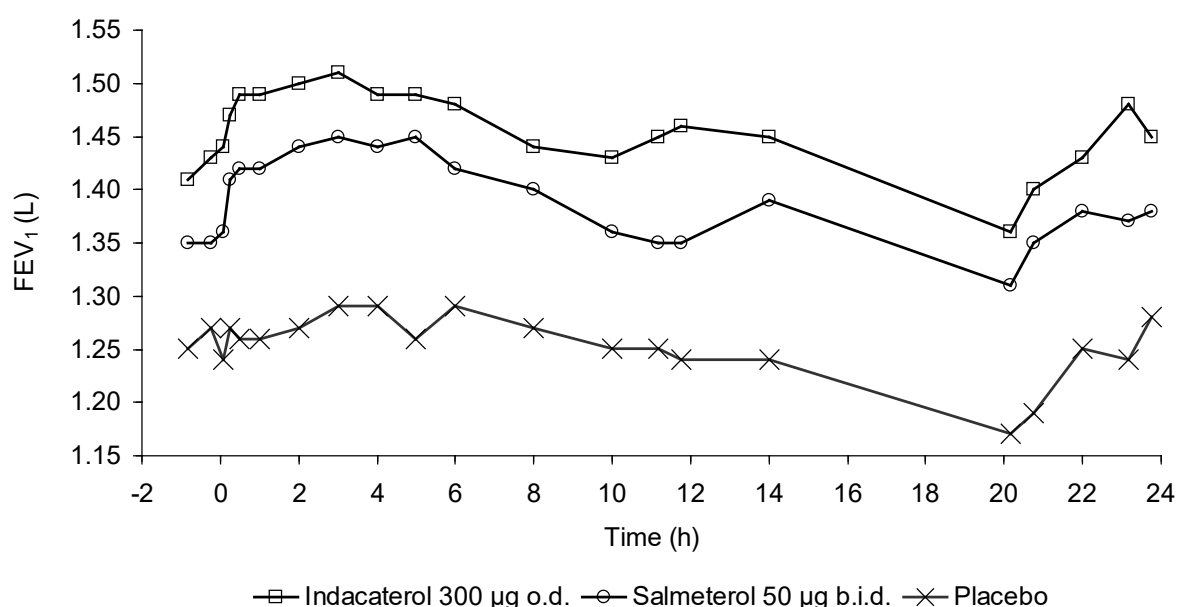
In a 26-week, placebo- and active (blind salmeterol)-controlled study in 1,002 patients which evaluated the Onbrez Breezhaler 150 microgram once-daily dose, the mean improvement in FEV₁, relative to baseline, at 5 minutes was 0.11 L with a peak improvement of 0.25 L relative to baseline after the first dose (Day 1). At the primary end point (Week 12), treatment with Onbrez Breezhaler 150 microgram once-daily showed a significantly higher trough FEV₁ value compared to both placebo (0.17 L, $p<0.001$) and to salmeterol (0.06 L, $p<0.001$).

In a 52-week, placebo- and active (formoterol)-controlled study in 1,732 patients which evaluated the Onbrez Breezhaler 300 microgram once-daily dose and a higher dose, the mean improvement in FEV₁, relative to baseline, at 5 minutes was 0.14 L with a peak improvement of 0.20 L relative to baseline after the first dose (Day 1). At the primary end point (Week 12), treatment with Onbrez Breezhaler 300 microgram once-daily resulted in a significantly higher trough FEV₁ value compared to placebo (0.17 L, $p<0.001$) and to formoterol (0.1 L, $p<0.001$). This improvement of lung function was maintained over the 52-week treatment period with no

evidence of loss of efficacy over this period. Onbrez Breezhaler was superior to formoterol with regard to trough FEV₁ at all visits.

In a 2-week, placebo- and active (open label salmeterol)-controlled crossover study, 24-hour spirometry was assessed in 68 patients. Serial spirometry values over 24 hours are displayed in Figure 3. After 14 days of once-daily treatment, improvement of lung function compared to placebo was maintained for 24 hours, and in addition, the trough FEV₁ value was statistically significantly higher compared to salmeterol (0.09 L, p=0.011). Similar results from 24-hour serial spirometry were observed after 26 weeks in a subset of patients (n=236) from the 26-week study. Both studies further support the improvement in FEV₁ over placebo with Onbrez Breezhaler administered once-daily, and that bronchodilation was maintained throughout the 24-hour dosing interval, in comparison to placebo.

Figure 3 24 h profile of least squares means of FEV₁ (L) after 14 days treatment (Modified ITT population)



The following health outcome effects were demonstrated in the long-term studies of 12-, 26- and 52-week treatment duration:

Onbrez Breezhaler significantly improved dyspnea compared to baseline in the 26-week study (as evaluated using the Transitional Dyspnea Index, TDI) by the first assessment (day 29), and this was maintained for the entire 26 weeks in the 150 microgram and 300 microgram once-daily treatments compared to placebo. Onbrez Breezhaler 300 microgram once-daily was also statistically superior to open label tiotropium at all timepoints (p≤0.01). The proportion of patients who achieved a score of ≥1.0 (corresponding to a clinically important difference) in TDI focal score was significantly greater in the indacaterol group at all 4 assessment points compared to the placebo group (p≤0.001). At 26 weeks, the proportions were 62.4% and 70.8% with Onbrez Breezhaler 150 microgram once-daily and 300 microgram once-daily,

respectively, compared to 57.3% and 46.6% with tiotropium and with placebo, respectively. In the 26-week, placebo- and active (blind salmeterol)-controlled study Onbrez Breezhaler 150 microgram once-daily also significantly improved dyspnea over the entire 26-week treatment period. The proportion of patients who achieved a TDI focal score of ≥ 1.0 (corresponding to a clinically important difference) was significantly greater in the indacaterol group at all four assessment points (Day 29, Day 57, Day 84, and Day 182) than in the placebo group ($p \leq 0.005$).

In this study statistically significant differences between either active treatment and placebo were seen for the change from baseline in mean daily, daytime and night time number of puffs of rescue medication at every 4-weekly interval of the 26-week treatment period. Onbrez Breezhaler-treated patients required numerically fewer daily, daytime and night time puffs of rescue medication compared with salmeterol-treated patients at certain 4-week intervals, but none of the differences between active treatments were statistically significant. In the 52-week study there was a statistically significant reduction in the number of puffs of rescue short-acting beta₂-adrenergic agonists with Onbrez Breezhaler 300 microgram once-daily compared to formoterol and placebo (1.69, 1.35 and 0.02 fewer puffs, respectively). Similarly, in the 26-week study, reductions in rescue use in the Onbrez Breezhaler 150 microgram once-daily and 300 microgram once-daily groups were statistically significant compared to open label tiotropium and placebo (1.45 and 1.56 compared to 0.99 and 0.39 fewer puffs, respectively). In the 12-week study (which had no active comparator) a similar pattern was observed with Onbrez Breezhaler 150 microgram once-daily.

Patients treated with Onbrez Breezhaler 150 microgram and 300 microgram once-daily had numerically lower risks of COPD exacerbation compared to placebo in long-term trials of 12-, 26- and 52-week treatment duration. Time-to-first-COPD exacerbation as compared to placebo was significantly longer in the 26-week study under treatment with 150 microgram once-daily and in the 52-week study under treatment with 300 microgram once-daily ($p=0.019$ and $p=0.03$, respectively). Pooled analyses showed that patients treated with Onbrez Breezhaler 150 microgram and 300 microgram once-daily had statistically lower risks of COPD exacerbations compared to placebo in both the 6-month and 12-month pooled populations. Time-to-first-COPD exacerbation as compared to placebo was significantly longer in the 6-month population under treatment with 150 microgram and 300 microgram doses once-daily ($p=0.005$ and $p=0.006$, respectively) and in the 12-month population under treatment with 300 microgram once-daily ($p=0.022$). Pooled efficacy analysis over 6 and 12 months of treatment demonstrated that the rate of COPD exacerbations was statistically significantly lower than the placebo rate. Treatment comparisons to placebo over 6 months showed a ratio of rates of 0.70 (95% CI [0.53,0.94]; p -value 0.014) and 0.74 (95% CI [0.57,0.96]; p -value 0.024) for Onbrez Breezhaler 150 microgram and 300 microgram, respectively, and over 12 months the ratio of rates was of 0.78 (95% CI [0.62,0.98]; p -value 0.034) for treatment with 300 microgram once-daily.

Onbrez Breezhaler also significantly improved health-related quality of life (as measured using the St. George's Respiratory Questionnaire) in long-term trials of 12-, 26- and 52-week treatment duration. Both doses of 150 microgram and 300 microgram once-daily demonstrated a significantly lower (improved) mean total score in the SGRQ, as well as each component score, in comparison to placebo: An improvement compared to placebo exceeding the minimal clinically important difference of 4 units was shown at 8 and 12 weeks in the 12-week study, and in the 52-week study this was shown for treatment with 300 microgram once-daily at 8, 24,

44 and 52 weeks. In the 26-week study, patients treated with 150 microgram once-daily showed a significantly lower mean total score in the SGRQ compared to tiotropium ($p \leq 0.05$), and at the end of the 26-week, placebo-controlled safety extension to this study the mean change in SGRQ total score was a decrease (improvement) of 3.2 units for Onbrez Breezhaler 150 microgram versus placebo after 52 weeks of treatment. In the other 26-week study, treatment with both Onbrez Breezhaler 150 microgram and salmeterol resulted in a significantly lower (improved) mean SGRQ total scores compared to placebo with mean differences of 6.3 units ($p < 0.001$) and 4.2 units ($p < 0.001$), respectively, that exceeded the minimal clinically important difference of 4 units after 12 weeks and thus were also clinically relevant. Onbrez Breezhaler also achieved statistical superiority over salmeterol by 2.1 units ($p = 0.033$).

Onbrez Breezhaler 150 microgram and 300 microgram once-daily treatment over 26 weeks significantly improved the percentage of days with no daytime symptoms ($p < 0.02$) and the percentage of days where patients were able to perform their normal daily activities as compared to placebo ($p < 0.001$).

NON-CLINICAL SAFETY DATA

Non-clinical data reveal no special hazard for humans based on conventional studies of safety pharmacology, repeated-dose toxicity, genotoxicity, carcinogenic potential, and toxicity to reproduction. The effects of indacaterol seen in toxicity studies in dogs were mainly on the cardiovascular system and consisted of tachycardia, arrhythmias and myocardial lesions. These effects are known pharmacological effects and could be explained by the beta₂-agonistic properties of indacaterol. During a chronic toxicity study in dogs, elevated levels of creatinine were detected in the blood, but no evidence of altered renal function was seen in the results of either this or any other study. Other relevant effects noted in repeated-dose toxicity studies were mild irritancy of the upper respiratory tract in rats consisting of rhinitis and epithelial changes of the nasal cavity and larynx. All these findings were observed only at exposures considered sufficiently in excess of the maximum human exposure indicating little relevance to clinical use.

Studies on genotoxicity did not reveal any mutagenic or clastogenic potential. The carcinogenic potential of indacaterol has been evaluated in a 2-year inhalation study in rats and a 26-week oral transgenic mouse study. Lifetime treatment of rats resulted in increased incidences of benign ovarian leiomyoma and focal hyperplasia of ovarian smooth muscle in females at doses approximately 68-times the maximum recommended dose of 300 microgram once-daily for humans (on a mg/m^2 basis). Increases in leiomyomas of the rat female genital tract have been similarly demonstrated with other β_2 -adrenergic agonist drugs. A 26-week oral (gavage) study in CB6F1/TgrasH2 hemizygous mice with indacaterol did not show any evidence of tumorigenicity at doses approximately 9800-times the maximum recommended dose of 300 microgram once-daily for humans (on a mg/m^2 basis).

INCOMPATIBILITIES

Not applicable.

STORAGE

Do not store above 30°C.

Store in the original packaging in order to protect from moisture.

Onbrez Breezhaler should not be used after the date marked “EXP” on the pack.

Onbrez Breezhaler must be kept out of the reach and sight of children.

PACK SIZE

Available in Alu-Alu blister packs of 3x10 film-coated tablets with 1 inhaler.

INSTRUCTIONS FOR USE AND HANDLING

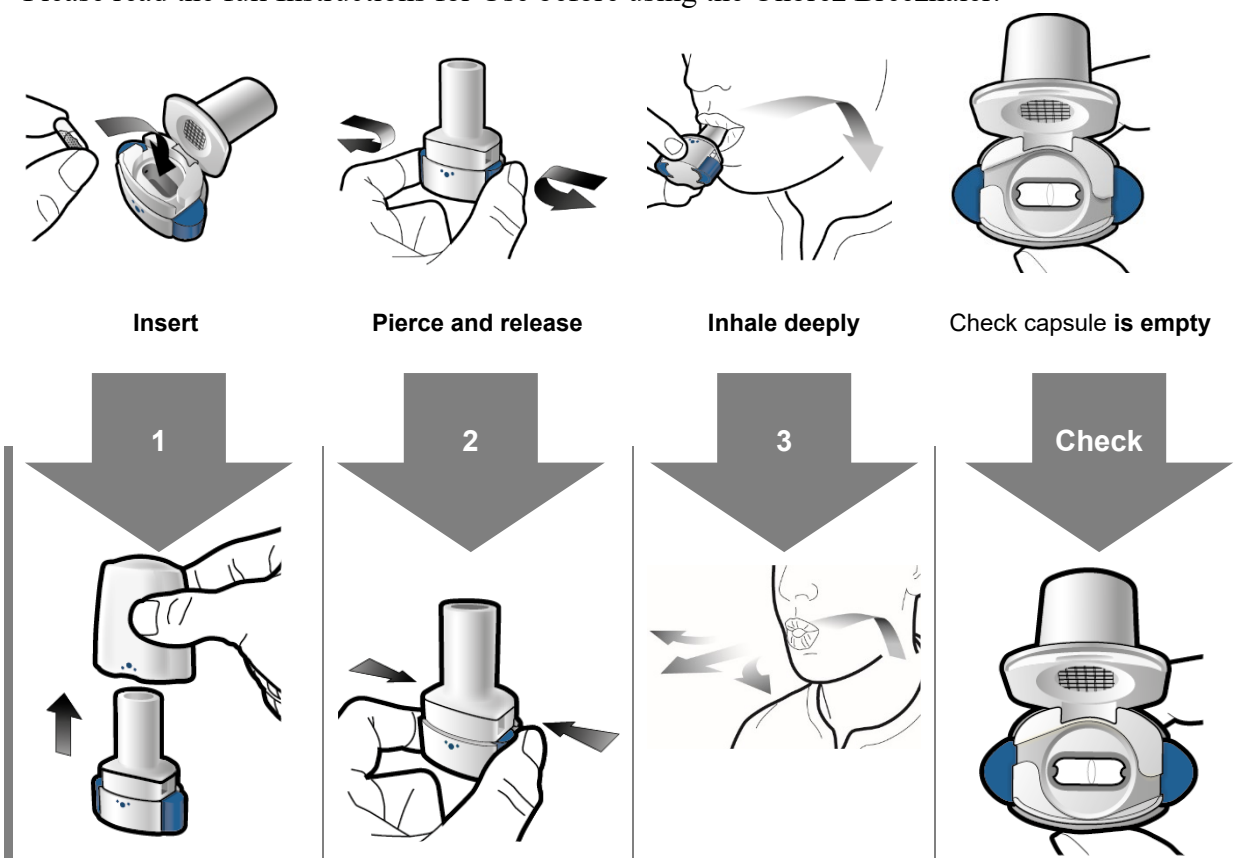
For correct administration/use of the product please refer to section DOSAGE REGIMEN AND ADMINISTRATION.

INFORMATION FOR PATIENTS

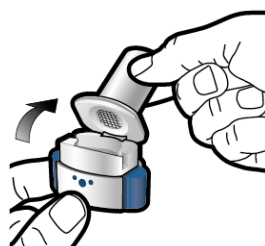
This part of the leaflet explains how to use and care for your Onbrez Breezhaler inhaler. Please read carefully and follow these instructions.

If you have any questions, **ask your doctor or pharmacist.**

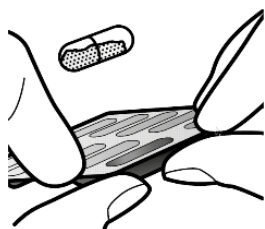
Please read the full Instructions for Use before using the Onbrez Breezhaler.



Step 1a:
Pull off cap



Step 1b:
Open inhaler



Step 1c:
Remove capsule

Remove one capsule from the blister.

Do not swallow the capsule.

Step 2a:
Pierce capsule once

Hold the inhaler upright.

Pierce capsule by firmly pressing both side buttons at the same time.

You should hear a noise as the capsule is pierced.

Only pierce the capsule once.



Step 2b:
Release side buttons

Step 3a:
Breathe out fully
Do not blow into the inhaler.



Step 3b:
Inhale medicine deeply

Hold the inhaler as shown in the picture.

Place the mouthpiece in your mouth and close your lips firmly around it.

Do not press the side buttons.

Breathe in quickly and as deeply as you can.

During inhalation you will hear a whirring noise.

You may taste the medicine as you inhale.



Step 3c:
Hold breath

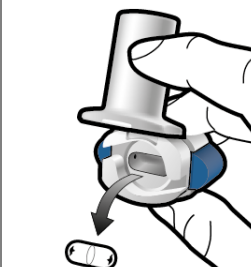
Hold your breath for up to 5 seconds.

Check capsule is empty

Open the inhaler to see if any powder is left in the capsule.

If there is powder left in the capsule:

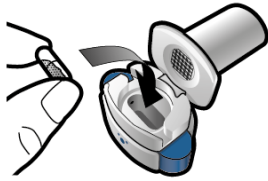
- Close the inhaler.
- Repeat steps 3a to 3c.



Remove empty capsule

Put the empty capsule in your household waste.

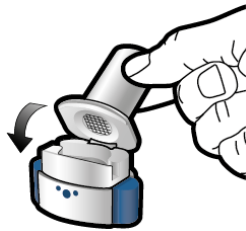
Close the inhaler and replace the cap.



Step 1d:

Insert capsule

Never place a capsule directly into the mouthpiece.



Step 1e:

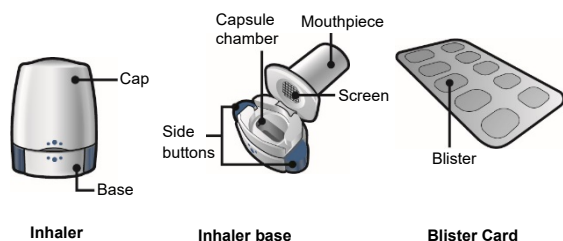
Close inhaler

• **Important Information**

- Onbrez Breezhaler capsules must always be stored in the blister card and only removed immediately before use.
- Do not swallow the capsule.
- Do not use the Onbrez Breezhaler capsules with any other inhaler.
- Do not use the Onbrez Breezhaler inhaler to take any other capsule medicine.
- Never place the capsule into your mouth or the mouthpiece of the inhaler.
- Do not press the side buttons more than once.
- Do not blow into the mouthpiece.
- Do not press the side buttons while inhaling through the mouthpiece.
- Do not handle capsules with wet hands.
- Never wash your inhaler with water.

Your Onbrez Breezhaler Inhaler pack contains:

- One Onbrez Breezhaler inhaler
- One or more blister cards, each containing either 6 or 10 Onbrez Breezhaler capsules to be used in the inhaler



Frequently Asked Questions

Why didn't the inhaler make a noise when I inhaled?

The capsule may be stuck in the capsule chamber. If this happens, carefully loosen the capsule by tapping the base of the inhaler. Inhale the medicine again by repeating steps 3a to 3c.

What should I do if there is powder left inside the capsule?

You have not received enough of your medicine. Close the inhaler and repeat steps 3a to 3c.

I coughed after inhaling – does this matter?

This may happen. As long as the capsule is empty you have received enough of your medicine.

I felt small pieces of the capsule on my tongue – does this matter?

This can happen. It is not harmful. The chances of the capsule breaking into small pieces will be increased if the capsule is pierced more than once.

Cleaning the inhaler

Wipe the mouthpiece inside and outside with a clean, dry, lint-free cloth to remove any powder residue.

Keep the inhaler dry. Never wash your inhaler with water.

Disposing of the inhaler after use

Each inhaler should be disposed of after all capsules have been used. Ask your pharmacist how to dispose of medicines and inhalers that are no longer required.

Product Registration Holder:

Novartis Corporation (Malaysia) Sdn. Bhd.
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No. 8, Jalan SS21/37, Damansara Uptown,
47400 Petaling Jaya, Selangor

Malaysia Package Leaflet

Information issued: 27 Jul 2020

Date of revision: June 2021

® = registered trademark

Novartis Pharma AG, Basel, Switzerland