

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

## Product Information

# Sifrol

## Pramipexole Tablets

### 1. NAME OF THE MEDICINAL PRODUCT

**Sifrol 0.25 mg tablets**

**Sifrol 1 mg tablets**

### 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each Sifrol 0.25 mg tablet contains 0.25 mg pramipexole dihydrochloride monohydrate (salt form) equivalent to 0.18 mg of pramipexole base.

Each Sifrol 1 mg tablet contains 1 mg pramipexole dihydrochloride monohydrate (salt form) equivalent to 0.7 mg of pramipexole base.

*Please note:*

Pramipexole doses as published in the literature refer to the salt form.

Therefore, doses will be expressed in terms of both pramipexole salt and pramipexole base (in brackets).

For a full list of excipients, see section 6.1.

### 3. PHARMACEUTICAL FORM

**Tablets.** The tablets are white, both faces flat with beveled edges, scored on both sides and have a code embossed.

Strength (mg salt)	Appearance
Sifrol 0.25	Oval, code embossed (one side with code P7 and one side with the Boehringer Ingelheim company symbol).
Sifrol 1	Round, code embossed (one side with code P9 and one side with the Boehringer Ingelheim company symbol).

Tablets can be divided into equal halves.

### 4. CLINICAL PARTICULARS

#### 4.1 Therapeutic indications

**Sifrol 0.25 mg and 1 mg** are indicated for the treatment of signs and symptoms of idiopathic Parkinson's disease, as monotherapy or in combination with levodopa.

**Sifrol 0.25 mg is also indicated** for symptomatic treatment of moderate to severe idiopathic Restless Legs Syndrome.

#### 4.2 Posology and method of administration

##### Posology

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

#### Parkinson's disease:

The daily dose is administered in equally divided doses 3 times a day.

#### Initial treatment

Doses should be increased gradually from a starting-dose of 0.375 mg salt (0.264 mg of base) per day and then increased every 5-7 days. Providing patients do not experience intolerable undesirable effects, the dose should be titrated to achieve a maximal therapeutic effect.

Ascending – Dose Schedule of SIFROL				
Week	Dose (mg of salt)	Total Daily Dose (mg of salt)	Dose (mg of base)	Total Daily Dose (mg of base)
1	3 x 0.125	0.375	3 x 0.088	0.264
2	3 x 0.25	0.75	3 x 0.18	0.54
3	3 x 0.5	1.5	3 x 0.35	1.1

If a further dose increase is necessary the daily dose should be increased by 0.75 mg of salt (0.54 mg base) at weekly intervals up to a maximum dose of 4.5 mg of salt (3.3 mg of base) per day. However, it should be noted that the incidence of somnolence is increased at doses higher than 1.5 mg (of salt) per day (see section 4.8).

#### Maintenance treatment

The individual dose of pramipexole should be in the range of 0.375 mg salt (0.264 mg base) to a maximum of 4.5 mg salt (3.3 mg base) per day. During dose escalation in pivotal studies, efficacy was observed starting at a daily dose of 1.5 mg salt (1.1 mg base). Further dose adjustments should be done based on the clinical response and the occurrence of adverse reactions. In clinical trials approximately 5% of patients were treated at doses below 1.5 mg salt (1.1 mg base). In advanced Parkinson's disease, pramipexole doses higher than 1.5 mg salt (1.1 mg base) per day can be useful in patients where a reduction of the levodopa therapy is intended. It is recommended that the dose of levodopa is reduced during both the dose escalation and the maintenance treatment with SIFROL, depending on reactions in individual patients (see section 4.5).

#### Treatment discontinuation

Abrupt discontinuation of dopaminergic therapy can lead to the development of a neuroleptic malignant syndrome or a dopamine agonist withdrawal syndrome. Pramipexole should be tapered off at a rate of 0.75 mg salt (0.54 mg base) per day until the daily dose has been reduced to 0.75 mg salt (0.54 mg base). Thereafter the dose should be reduced by 0.375 mg salt (0.264 mg base) per day (see section 4.4). Dopamine agonist withdrawal syndrome could still appear while tapering and a temporary increase of the dose could be necessary before resuming tapering (see section 4.4)

#### Renal impairment

The elimination of pramipexole is dependent on renal function. The following dose schedule is suggested for initiation of therapy:

Patients with a creatinine clearance above 50 ml/min require no reduction in daily dose or dosing frequency.

In patients with a creatinine clearance between 20 and 50 ml/min, the initial daily dose of SIFROL should be administered in two divided doses, starting at 0.125 mg salt (0.088 mg base) twice a day (0.25 mg salt/0.176 mg base daily). A maximum daily dose of 2.25 mg salt (1.57 mg base) should not be exceeded.

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

In patients with a creatinine clearance less than 20 ml/min, the daily dose of SIFROL should be administered in a single dose, starting at 0.125 mg salt (0.088 mg base) daily. A maximum daily dose of 1.5 mg salt (1.1 mg base) should not be exceeded.

If renal function declines during maintenance therapy the SIFROL daily dose should be reduced by the same percentage as the decline in creatinine clearance, i.e. if creatinine clearance declines by 30%, then the SIFROL daily dose should be reduced by 30%. The daily dose can be administered in two divided doses if creatinine clearance is between 20 and 50 ml/min and as a single daily dose if creatinine clearance is less than 20 ml/min.

#### Hepatic impairment

Dose adjustment in patients with hepatic failure is probably not necessary, as approx. 90% of absorbed active substance is excreted through the kidneys. However, the potential influence of hepatic insufficiency on SIFROL pharmacokinetics has not been investigated.

#### Paediatric population

The safety and efficacy of SIFROL in children below 18 years has not been established. There is no relevant use of SIFROL in the paediatric population in Parkinson's Disease.

#### Restless Legs Syndrome:

The recommended starting dose of SIFROL is 0.125 mg salt (0.088 mg base) taken once daily 2-3 hours before bedtime. For patients requiring additional symptomatic relief, the dose may be increased every 4-7 days to a maximum of 0.75 mg salt (0.54 mg base) per day (as shown in the table below).

Dose Schedule of SIFROL		
Titration Step	Once Daily Evening Dose (mg of salt)	Once Daily Evening Dose (mg of base)
1	0.125	0.088
2*	0.25	0.18
3*	0.50	0.35
4*	0.75	0.54
* if needed		

Patient's response should be evaluated after 3 months treatment and the need for treatment continuation should be reconsidered. If treatment is interrupted for more than a few days it should be re-initiated by dose titration carried out as above.

#### Treatment discontinuation

Since the daily dose for the treatment of Restless Legs Syndrome will not exceed 0.75 mg salt (0.54 mg base) SIFROL can be discontinued without tapering off. In a 26 week placebo controlled trial, rebound of RLS symptoms (worsening of symptom severity as compared to baseline) was observed in 10% of patients (14 out of 135) after abrupt discontinuation of treatment. This effect was found to be similar across all doses.

#### Renal impairment

The elimination of pramipexole is dependent on renal function. Patients with a creatinine clearance above 20 ml/min require no reduction in daily dose.

The use of SIFROL has not been studied in haemodialysis patients, or in patients with severe renal impairment.

#### Hepatic impairment

Dose adjustment in patients with hepatic failure is not required, as approx. 90% of absorbed active substance is excreted through the kidneys.

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

#### Paediatric population

SIFROL is not recommended for use in children and adolescents below 18 years due to a lack of data on safety and efficacy.

#### Tourette Disorder:

#### Paediatric population

SIFROL is not recommended for use in children and adolescents below 18 years since the efficacy and safety has not been established in this population. SIFROL should not be used in children or adolescents with Tourette Disorder because of a negative benefit-risk balance for this disorder (see section 5.1).

### **Method of administration**

The tablets should be taken orally, swallowed with water, and can be taken either with or without food.

### **4.3 Contraindications**

Hypersensitivity to the active substance or to any of the excipients listed in section 6.1.

### **4.4 Special warnings and precautions for use**

When prescribing SIFROL in a patient with Parkinson's disease with renal impairment a reduced dose is suggested in line with section 4.2.

#### Hallucinations

Hallucinations are known as a side effect of treatment with dopamine agonists and levodopa. Patients should be informed that (mostly visual) hallucinations can occur.

#### Dyskinesia

In advanced Parkinson's disease, in combination treatment with levodopa, dyskinesia can occur during the initial titration of SIFROL. If they occur, the dose of levodopa should be decreased.

#### Dystonia

Axial dystonia including antecollis, camptocormia and pleurothotonus (Pisa Syndrome) has occasionally been reported in patients with Parkinson's disease following initiation or incremental dose increase of pramipexole. Although dystonia may be a symptom of Parkinson's disease, the symptoms in these patients have improved after reduction or withdrawal of pramipexole. If dystonia occurs, the dopaminergic medication regimen should be reviewed and an adjustment in the dose of pramipexole considered.

#### Sudden onset of sleep and somnolence

Pramipexole has been associated with somnolence and episodes of sudden sleep onset, particularly in patients with Parkinson's disease. Sudden onset of sleep during daily activities, in some cases without awareness or warning signs, has been reported uncommonly. Patients must be informed of this and advised to exercise caution while driving or operating machines during treatment with SIFROL. Patients who have experienced somnolence and/or an episode of sudden sleep onset must refrain from driving or operating machines. Furthermore a reduction of the dose or termination of therapy may be considered. Because of possible additive effects, caution should be advised when patients are taking other sedating medicinal products or alcohol in combination with pramipexole (see sections 4.5, 4.7 and section 4.8).

#### Impulse control disorders

Patients should be regularly monitored for the development of impulse control disorders. Patients and carers should be made aware that behavioural symptoms of impulse control disorders including pathological gambling, increased libido, hypersexuality, compulsive spending or buying, binge eating and compulsive eating can occur in patients treated with dopamine agonists, including SIFROL. Dose reduction/tapered discontinuation should be considered if such symptoms develop.

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

#### Mania and delirium

Patients should be regularly monitored for the development of mania and delirium. Patients and carers should be made aware that mania and delirium can occur in patients treated with pramipexole. Dose reduction/tapered discontinuation should be considered if such symptoms develop.

#### Patients with psychotic disorders

Patients with psychotic disorders should only be treated with dopamine agonists if the potential benefits outweigh the risks.

Co-administration of antipsychotic medicinal products with pramipexole should be avoided (see section 4.5).

#### Ophthalmologic monitoring

Ophthalmologic monitoring is recommended at regular intervals or if vision abnormalities occur.

#### Severe cardiovascular disease

In case of severe cardiovascular disease, care should be taken. It is recommended to monitor blood pressure, especially at the beginning of treatment, due to the general risk of postural hypotension associated with dopaminergic therapy.

#### Neuroleptic malignant syndrome

Symptoms suggestive of neuroleptic malignant syndrome have been reported with abrupt withdrawal of dopaminergic therapy (see section 4.2).

#### Dopamine agonist withdrawal syndrome (DAWS)

DAWS has been reported with dopamine agonists, including pramipexole (see section 4.8). To discontinue treatment in patients with Parkinson's disease, pramipexole should be tapered off (see section 4.2). Limited data suggests that patients with impulse control disorders and those receiving high daily dose and/or high cumulative doses of dopamine agonists may be at higher risk for developing DAWS. Withdrawal symptoms may include apathy, anxiety, depression, fatigue, sweating and pain and do not respond to levodopa. Prior to tapering off and discontinuing pramipexole, patients should be informed about potential withdrawal symptoms. Patients should be closely monitored during tapering and discontinuation. In case of severe and/or persistent withdrawal symptoms, temporary re-administration of pramipexole at the lowest effective dose may be considered.

#### Augmentation

Reports in the literature indicate that treatment of Restless Legs Syndrome with dopaminergic medicinal products can result in augmentation. Augmentation refers to the earlier onset of symptoms in the evening (or even the afternoon), increase in symptoms, and spread of symptoms to involve other extremities. Augmentation was specifically investigated in a controlled clinical trial over 26 weeks. Augmentation was observed in 11.8% of patients in the pramipexole group (N = 152) and 9.4% of patients in the placebo group (N = 149). Kaplan-Meier analysis of time to augmentation showed no significant difference between pramipexole and placebo groups.

### **4.5 Interaction with other medicinal products and other forms of interaction**

#### Plasma protein binding

Pramipexole is bound to plasma proteins to a very low (< 20%) extent, and little biotransformation is seen in man. Therefore, interactions with other medicinal products affecting plasma protein binding or elimination by biotransformation are unlikely. As anticholinergics are mainly eliminated by biotransformation, the potential for an interaction is limited, although an interaction with anticholinergics has not been investigated. There is no pharmacokinetic interaction with selegiline and levodopa.

#### Inhibitors/competitors of active renal elimination pathway

Cimetidine reduced the renal clearance of pramipexole by approximately 34%, presumably by inhibition of the cationic secretory transport system of the renal tubules. Therefore, medicinal products that are inhibitors of this

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

active renal elimination pathway or are eliminated by this pathway, such as cimetidine, amantadine, mexiletine, zidovudine, cisplatin, quinine, and procainamide, may interact with pramipexole resulting in reduced clearance of pramipexole. Reduction of the pramipexole dose should be considered when these medicinal products are administered concomitantly with SIFROL.

#### Combination with levodopa

When SIFROL is given in combination with levodopa, it is recommended that the dose of levodopa is reduced and the dose of other anti-parkinsonian medicinal products is kept constant while increasing the dose of SIFROL. Because of possible additive effects, caution should be advised when patients are taking other sedating medicinal products or alcohol in combination with pramipexole (see sections 4.4, 4.7 and 4.8).

#### Antipsychotic medicinal products

Co-administration of antipsychotic medicinal products with pramipexole should be avoided (see section 4.4), e.g. if antagonistic effects can be expected.

### **4.6 Fertility, pregnancy and lactation**

#### **Pregnancy**

The effect on pregnancy and lactation has not been investigated in humans. Pramipexole was not teratogenic in rats and rabbits, but was embryotoxic in the rat at maternotoxic doses (see section 5.3). SIFROL should not be used during pregnancy unless clearly necessary, i.e. if the potential benefit justifies the potential risk to the foetus.

#### **Breast-feeding**

As pramipexole treatment inhibits secretion of prolactin in humans, inhibition of lactation is expected. The excretion of pramipexole into breast milk has not been studied in women. In rats, the concentration of active substance-related radioactivity was higher in breast milk than in plasma.

In the absence of human data, SIFROL should not be used during breast-feeding. However, if its use is unavoidable, breast-feeding should be discontinued.

#### **Fertility**

No studies on the effect on human fertility have been conducted. In animal studies, pramipexole affected oestrous cycles and reduced female fertility as expected for a dopamine agonist. However, these studies did not indicate direct or indirect harmful effects with respect to male fertility.

### **4.7 Effects on ability to drive and use machines**

SIFROL can have a major influence on the ability to drive and use machines.

Hallucinations or somnolence can occur.

Patients being treated with SIFROL and presenting with somnolence and/or sudden sleep episodes must be informed to refrain from driving or engaging in activities where impaired alertness may put themselves or others at risk of serious injury or death (e.g. operating machines) until such recurrent episodes and somnolence have resolved (see also sections 4.4, 4.5 and 4.8).

### **4.8 Undesirable effects**

Based on the analysis of pooled placebo-controlled trials, comprising a total of 1,923 patients on pramipexole and 1,354 patients on placebo, adverse drug reactions were frequently reported for both groups. 63% of patients on pramipexole and 52% of patients on placebo reported at least one adverse drug reaction.

The majority of adverse drug reactions usually start early in therapy and most tend to disappear even as therapy is continued.

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

Within the system organ classes, adverse reactions are listed under headings of frequency (number of patients expected to experience the reaction), using the following categories: very common ( $\geq 1/10$ ); common ( $\geq 1/100$  to  $< 1/10$ ); uncommon ( $\geq 1/1,000$  to  $< 1/100$ ); rare ( $\geq 1/10,000$  to  $< 1/1,000$ ); very rare ( $< 1/10,000$ ); not known (cannot be estimated from the available data).

#### Parkinson's disease, most common adverse reactions

The most commonly ( $\geq 5\%$ ) reported adverse drug reactions in patients with Parkinson's disease more frequent with pramipexole treatment than with Placebo were nausea, dyskinesia, hypotension, dizziness, somnolence, insomnia, constipation, hallucination, headache and fatigue. The incidence of somnolence is increased at doses higher than 1.5 mg pramipexole salt per day (see section 4.2.). A more frequent adverse drug reaction in combination with levodopa was dyskinesia. Hypotension may occur at the beginning of treatment, especially if pramipexole is titrated too fast.

Table 1: Parkinson's disease

<u>Body System</u>	<u>Very common</u> <u>(<math>\geq 1/10</math>)</u>	<u>Common</u> <u>(<math>\geq 1/100</math> to</u> <u><math>\leq 1/10</math>)</u>	<u>Uncommon</u> <u>(<math>\geq 1/1,000</math> to</u> <u><math>\leq 1/100</math>)</u>	<u>Rare</u> <u>(<math>\geq 1/10,000</math></u> <u>To <math>\leq 1/1,000</math>)</u>	<u>Not known</u>
<u>Infections and</u> <u>infestations</u>			pneumonia		
<u>Endocrine</u> <u>disorders</u>			inappropriate antidiuretic hormone secretion <sup>1</sup>		
<u>Psychiatric</u> <u>disorders</u>		Insomnia, Hallucinations, abnormal dreams, confusion, behavioural symptoms of impulse control disorders and compulsions	compulsive shopping, pathological gambling, restlessness, hypersexuality, delusion, libido disorder, paranoia, delirium, binge eating <sup>1</sup> hyperphagia <sup>1</sup>	mania	
<u>Nervous system</u> <u>disorders</u>	Somnolence, Dizziness, Dyskinesia	headache	sudden onset of sleep, amnesia, hyperkinesia, syncope		
<u>Eye disorders</u>		visual impairment including diplopia, vision blurred, visual acuity reduced			
<u>Cardiac</u> <u>disorders</u>			cardiac failure <sup>1</sup>		
<u>Vascular</u> <u>disorders</u>		hypotension			
<u>Respiratory,</u> <u>thoracic, and</u> <u>mediastinal</u> <u>disorders</u>			Dyspnoea, hiccups		
<u>Gastrointestinal</u> <u>disorders</u>	nausea	Constipation, vomiting			
<u>Skin and</u>			Hypersensitivity,		

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

<u>subcutaneous tissue disorders</u>			Pruritus, rash		
<u>General disorders and administration site conditions</u>		Fatigue, peripheral oedema			Dopamine agonist withdrawal syndrome including apathy, anxiety, depression, fatigue, sweating and pain.
<u>Investigations</u>		weight decrease including decreased appetite	weight increase		

<sup>1</sup> This side effect has been observed in post-marketing experience. With 95 % certainty, the frequency category is not greater than uncommon, but might be lower. A precise frequency estimation is not possible as the side effect did not occur in a clinical trial database of 2,762 patients with Parkinson's Disease treated with pramipexole.

#### Restless Legs Syndrome, most common adverse reactions

The most commonly ( $\geq 5\%$ ) reported adverse drug reactions in patients with Restless Legs Syndrome treated with Pramipexole were nausea, headache, dizziness and fatigue. Nausea and fatigue were more often reported in female patients treated with SIFROL (20.8% and 10.5%, respectively) compared to males (6.7% and 7.3%, respectively).

Table 2: Restless Legs Syndrome

<b><u>Body System</u></b>	<b><u>Very common (<math>\geq 1/10</math>)</u></b>	<b><u>Common (<math>\geq 1/100</math> to <math>\leq 1/10</math>)</u></b>	<b><u>Uncommon (<math>\geq 1/1,000</math> to <math>\leq 1/100</math>)</u></b>	<b><u>Not known</u></b>
Infections and infestations			pneumonia <sup>1</sup>	
Endocrine disorders			inappropriate antidiuretic hormone secretion <sup>1</sup>	
Psychiatric disorders		Insomnia, abnormal dreams	Restlessness, confusion, hallucinations, libido disorder, delusion <sup>1</sup> , hyperphagia <sup>1</sup> , paranoia <sup>1</sup> , mania <sup>1</sup> , delirium <sup>1</sup> , behavioural symptoms of impulse control disorders and compulsions <sup>1</sup> (such as: compulsive shopping, pathological gambling, hypersexuality, binge eating)	
Nervous system disorders		Headache, dizziness, somnolence	sudden onset of sleep, syncope, dyskinesia, amnesia <sup>1</sup> , hyperkinesia <sup>1</sup>	
Eye disorders			visual impairment including visual acuity, reduced diplopia, vision blurred	



Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

Cardiac disorders			cardiac failure <sup>1</sup>	
Vascular disorders			Hypotension	
Respiratory, thoracic, and mediastinal disorders			Dyspnoea, hiccups	
Gastrointestinal disorders	nausea	constipation, vomiting		
Skin and subcutaneous tissue disorders			Hypersensitivity, pruritus, rash	
General disorders and administration site conditions		fatigue	peripheral oedema	Dopamine agonist withdrawal syndrome including apathy, anxiety, depression, fatigue, sweating and pain
Investigations			weight decrease including decreased appetite weight increase	

<sup>1</sup> This side effect has been observed in post-marketing experience. With 95 % certainty, the frequency category is not greater than uncommon, but might be lower. A precise frequency estimation is not possible as the side effect did not occur in a clinical trial database of 1,395 patients with Restless Legs Syndrome treated with pramipexole

#### Description of selected adverse reactions

##### Somnolence

Pramipexole is commonly associated with somnolence and has been associated uncommonly with excessive daytime somnolence and sudden sleep onset episodes (see also section 4.4).

##### Libido disorders

Pramipexole may uncommonly be associated with libido disorders (increased or decreased).

##### Impulse control disorders

Pathological gambling, increased libido, hypersexuality, compulsive spending or buying, binge eating and compulsive eating can occur in patients treated with dopamine agonists including SIFROL (see section 4.4).

In a cross-sectional, retrospective screening and case-control study including 3,090 Parkinson's disease patients, 13.6% of all patients receiving dopaminergic or non-dopaminergic treatment had symptoms of an impulse control disorder during the past six months. Manifestations observed include pathological gambling, compulsive shopping, binge eating, and compulsive sexual behaviour (hypersexuality). Possible independent risk factors for impulse control disorders included dopaminergic treatments and higher doses of dopaminergic treatment, younger age (≤ 65 years), not being married and self-reported family history of gambling behaviours.

##### Dopamine agonist withdrawal syndrome

Non-motor adverse effects may occur when tapering or discontinuing dopamine agonists including pramipexole. Symptoms include apathy, anxiety, depression, fatigue, sweating and pain (see section

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

4.4).

#### Cardiac failure

In clinical studies and post-marketing experience cardiac failure has been reported in patients with pramipexole. In a pharmacoepidemiological study pramipexole use was associated with an increased risk of cardiac failure compared with non-use of pramipexole (observed risk ratio 1.86; 95% CI, 1.21-2.85).

You can report side effects to the Ministry of Health by following the link 'Reporting Side Effects of Drug Treatment' on the Ministry of Health home page ([www.health.gov.il](http://www.health.gov.il)) which links to an online form for reporting side effects. You can also use this link:

<https://sideeffects.health.gov.il>

## **4.9 Overdose**

There is no clinical experience with massive overdose. The expected adverse reactions would be those related to the pharmacodynamic profile of a dopamine agonist, including nausea, vomiting, hyperkinesia, hallucinations, agitation and hypotension. There is no established antidote for overdose of a dopamine agonist. If signs of central nervous system stimulation are present, a neuroleptic agent may be indicated. Management of the overdose may require general supportive measures, along with gastric lavage, intravenous fluids, administration of activated charcoal and electrocardiogram monitoring.

## **5. PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: anti-Parkinson drugs, dopamine agonists, ATC code: N04BC05.

#### Mechanism of action

Pramipexole is a dopamine agonist that binds with high selectivity and specificity to the D2 subfamily of dopamine receptors of which it has a preferential affinity to D<sub>3</sub> receptors, and has full intrinsic activity.

Pramipexole alleviates Parkinsonian motor deficits by stimulation of dopamine receptors in the striatum. Animal studies have shown that pramipexole inhibits dopamine synthesis, release, and turnover.

The mechanism of action of pramipexole as treatment for Restless Legs Syndrome is unknown. Neuropharmacological evidence suggests primary dopaminergic system involvement.

#### Pharmacodynamic effects

In human volunteers, a dose-dependent decrease in prolactin was observed. . In a clinical trial with healthy volunteers, where SIFROL prolonged-release tablets were titrated faster (every 3 days) than recommended up to 4.5 mg of salt (3.15 mg pramipexole base) per day, an increase in blood pressure and heart rate was observed. Such effect was not observed in patient studies.

#### Clinical efficacy and safety in Parkinson's disease

In patients pramipexole alleviates signs and symptoms of idiopathic Parkinson's disease. Placebo controlled clinical trials included approximately 1,800 patients of Hoehn and Yahr stages I – V treated with pramipexole. Out of these, approximately 1,000 were in more advanced stages, received concomitant levodopa therapy, and suffered from motor complications.

In early and advanced Parkinson's disease, efficacy of pramipexole in controlled clinical trials was maintained for approximately six months. In open continuation trials lasting for more than three years there were no signs of decreasing efficacy.

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

In a controlled double blind clinical trial of 2 year duration, initial treatment with pramipexole significantly delayed the onset of motor complications, and reduced their occurrence compared to initial treatment with levodopa. This delay in motor complications with pramipexole should be balanced against a greater improvement in motor function with levodopa (as measured by the mean change in UPDRS-score). The overall incidence of hallucinations and somnolence was generally higher in the escalation phase with the pramipexole group. However, there was no significant difference during the maintenance phase. These points should be considered when initiating pramipexole treatment in patients with Parkinson's disease.

#### Clinical efficacy and safety in Restless Legs Syndrome

The efficacy of pramipexole was evaluated in four placebo-controlled clinical trials in approximately 1,000 patients with moderate to very severe idiopathic Restless Legs Syndrome.

The mean change from baseline in the Restless Legs Syndrome Rating Scale (IRLS) and the Clinical Global Impression-Improvement (CGI-I) were the primary efficacy outcome measures. For both primary endpoints statistically significant differences have been observed for the pramipexole dose groups 0.25 mg, 0.5 mg and 0.75 mg pramipexole salt in comparison to placebo. After 12 weeks of treatment the baseline IRLS score improved from 23.5 to 14.1 points for placebo and from 23.4 to 9.4 points for pramipexole (doses combined). The adjusted mean difference was -4.3 points (CI 95% -6.4; -2.1 points, p-value <0.0001). CGI-I responder rates (improved, very much improved) were 51.2% and 72.0% for placebo and pramipexole, respectively (difference 20% CI 95%: 8.1%; 31.8%, p<0.0005). Efficacy was observed with 0.125 mg salt (0.088 mg base) per day after the first week of treatment.

In a placebo-controlled polysomnography study over 3 weeks SIFROL significantly reduced the number of periodic limb movements during time in bed.

Longer term efficacy was evaluated in a placebo-controlled clinical trial. After 26 weeks of treatment, there was an adjusted mean reduction in IRLS total score of 13.7 and 11.1 points in the pramipexole and placebo group, respectively, with a statistically significant (p = 0.008) mean treatment difference of -2.6. CGI-I responder rates (much improved, very much improved) were 50.3% (80/159) and 68.5% (111/162) for placebo and pramipexole, respectively (p = 0.001), corresponding to a number needed to treat (NNT) of 6 patients (95%CI: 3.5, 13.4).

#### Clinical efficacy and safety in Tourette Disorder

The efficacy of pramipexole (0.0625-0.5 mg/day) with paediatric patients aged 6-17 years with Tourette Disorder was evaluated in a 6-week, double-blind, randomised, placebo-controlled flexible dose study. A total of 63 patients were randomised (43 on pramipexole, 20 on placebo). The primary endpoint was change from baseline on the Total Tic Score (TTS) of the Yale Global Tic Severity Scale (YGTSS). No difference was observed for pramipexole as compared to placebo for either the primary endpoint or for any of the secondary efficacy endpoints including YGTSS total score, Patient Global Impression of Improvement (PGI-I), Clinical Global Impression of Improvement (CGI-I), or Clinical Global Impressions of Severity of Illness (CGI-S). Adverse events occurring in at least 5% of patients in the pramipexole group and more common in the pramipexole-treated patients than in patients on placebo were: headache (27.9%, placebo 25.0%), somnolence (7.0%, placebo 5.0%), nausea (18.6%, placebo 10.0%), vomiting (11.6%, placebo 0.0%), upper abdominal pain (7.0%, placebo 5.0%), orthostatic hypotension (9.3%, placebo 5.0%), myalgia (9.3%, placebo 5.0%), sleep disorder (7.0%, placebo 0.0%), dyspnoea (7.0%, placebo 0.0%) and upper respiratory tract infection (7.0%, placebo 5.0%). Other significant adverse events leading to discontinuation of study medication for patients receiving pramipexole were confusional state, speech disorder and aggravated condition (see section 4.2).

## **5.2 Pharmacokinetic properties**

### Absorption

Pramipexole is rapidly and completely absorbed following oral administration. The absolute bioavailability is greater than 90% and the maximum plasma concentrations occur between 1 and 3 hours. Concomitant administration with food did not reduce the extent of pramipexole absorption, but the rate of absorption was reduced. Pramipexole shows linear kinetics and a small inter-patient variation of plasma levels.

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

### Distribution

In humans, the protein binding of pramipexole is very low (< 20%) and the volume of distribution is large (400 l). High brain tissue concentrations were observed in the rat (approx. 8-fold compared to plasma).

### Biotransformation

Pramipexole is metabolised in man only to a small extent.

### Elimination

Renal excretion of unchanged pramipexole is the major route of elimination.

Approximately 90% of <sup>14</sup>C-labelled dose is excreted through the kidneys while less than 2% is found in the faeces. The total clearance of pramipexole is approximately 500 ml/min and the renal clearance is approximately 400 ml/min. The elimination half-life (t<sub>1/2</sub>) varies from 8 hours in the young to 12 hours in the elderly.

## **5.3 Preclinical safety data**

Repeated dose toxicity studies showed that pramipexole exerted functional effects, mainly involving the CNS and female reproductive system, and probably resulting from an exaggerated pharmacodynamic effect of pramipexole.

Decreases in diastolic and systolic pressure and heart rate were noted in the minipig, and a tendency to a hypotensive effect was discerned in the monkey.

The potential effects of pramipexole on reproductive function have been investigated in rats and rabbits. Pramipexole was not teratogenic in rats and rabbits but was embryotoxic in the rat at maternally toxic doses. Due to the selection of animal species and the limited parameters investigated, the adverse effects of pramipexole on pregnancy and male fertility have not been fully elucidated.

A delay in sexual development (i.e., preputial separation and vaginal opening) was observed in rats. The relevance for humans is unknown.

Pramipexole was not genotoxic. In a carcinogenicity study, male rats developed Leydig cell hyperplasia and adenomas, explained by the prolactin-inhibiting effect of pramipexole. This finding is not clinically relevant to man. The same study also showed that, at doses of 2 mg/kg (salt) and higher, pramipexole was associated with retinal degeneration in albino rats. The latter finding was not observed in pigmented rats, nor in a 2-year albino mouse carcinogenicity study or in any other species investigated.

## **6. PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

Mannitol, maize starch, anhydrous colloidal silica, povidone K25, magnesium stearate

### **6.2 Incompatibilities**

Not applicable

### **6.3 Special precautions for storage**

Store in the original package below 25°C.

### **6.4 Nature and contents of container**

OPA/aluminium/PVC-aluminium blisters.

10 tablets per aluminum blister strips

Cartons containing 10 blister strips (100 tablets)

### **6.5 Special precautions for disposal and other handling**

No special requirements

## **7. Manufacturer**

Boehringer Ingelheim Pharma KG, Ingelheim am Rhein, Germany.

Sifrol IR	Updated Prescribing Information
0.25 mg, 1 mg	April 2020

8. **Registration holder:** Boehringer Ingelheim Israel Ltd., 89 Medinat Ha-Yehudim St., P.O. Box 4124, Herzliya Pituach 4676672.

**Registration Numbers**

Sifrol 0.25 mg      126 17 30500

Sifrol 1 mg          126 16 30501

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