

## **SUMMARY OF PRODUCT CHARACTERISTICS**

### **1 NAME OF THE MEDICINAL PRODUCT**

Risperidone Grindeks 4 mg film-coated tablets

### **2 QUALITATIVE AND QUANTITATIVE COMPOSITION**

Each film-coated tablet contains 4 mg risperidone.

Excipients with known effect:

Each film-coated tablet contains 292 mg lactose and Tartrazine (E102).

For a full list of excipients, see Section 6.1.

### **3 PHARMACEUTICAL FORM**

Film-coated tablet.

Yellowish-green, round biconvex film-coated tablet with double score line on one side. Size of tablet: approximately 11 mm x 4 mm. The tablet can be divided into equal doses.

### **4 CLINICAL PARTICULARS**

#### **4.1 Therapeutic indications**

Risperidone Grindeks is indicated for the treatment of schizophrenia.

Risperidone Grindeks is indicated for the treatment of moderate to severe manic episodes associated with bipolar disorders.

Risperidone Grindeks is indicated for the short-term treatment (up to 6 weeks) of persistent aggression in patients with moderate to severe Alzheimer's dementia, unresponsive to non-pharmacological approaches and when there is a risk of harm to self or others.

Risperidone Grindeks is indicated for the short-term symptomatic treatment (up to 6 weeks) of persistent aggression in conduct disorder in children from the age of 5 years and adolescents with subaverage intellectual functioning or mental retardation, diagnosed according to DSM-IV criteria, in whom the severity of aggressive or other disruptive behaviours require pharmacological treatment. Pharmacological treatment should be an integral part of a more comprehensive treatment programme, including psychosocial and educational intervention. It is recommended that risperidone be prescribed by a specialist in child neurology and child and adolescent psychiatry or physicians well familiar with the treatment of conduct disorder of children and adolescents.

## **4.2 Posology and method of administration**

### Posology

#### Schizophrenia

##### *Adults*

Risperidone Grindeks may be given once or twice daily.

Patients should start with 2 mg/day risperidone. The dosage may be increased on the second day to 4 mg. Subsequently, the dosage can be maintained unchanged, or further individualised, if needed. Most patients will benefit from daily doses between 4 and 6 mg. In some patients, a slower titration phase and a lower starting and maintenance dose may be appropriate.

Doses above 10 mg/day have not demonstrated superior efficacy to lower doses and may cause increased incidence of extrapyramidal symptoms. The safety of doses above 16 mg/day has not been evaluated, and are therefore not recommended.

##### *Elderly*

A starting dose of 0.5 mg twice daily is recommended. This dosage can be individually adjusted with 0.5 mg twice daily increments to 1 to 2 mg twice daily.

##### *Paediatric population*

Risperidone is not recommended for use in children below 18 years of age with schizophrenia due to a lack of data on efficacy.

## Manic episodes in bipolar disorder

### *Adults*

Risperidone Grindeks should be administered on a once daily schedule, starting with 2 mg risperidone. Dosage adjustments, if indicated, should occur at intervals of not less than 24 hours and in dosage increments of 1 mg per day. Risperidone can be administered in flexible doses a range of 1 to 6 mg per day to optimize the level of efficacy and tolerability for each patient. Daily doses above 6 mg risperidone have not been studied in patients with manic episodes.

As with all symptomatic treatment, the continued use of Risperidone Grindeks must be evaluated and justified on an ongoing basis.

### *Elderly*

A starting dose of 0.5 mg twice daily is recommended. This dosage can be individually adjusted with 0.5 mg twice daily increments to 1 to 2 mg twice daily. As clinical experience in elderly is limited, caution should be exercised.

### *Paediatric population*

Risperidone is not recommended for use in children below 18 years of age with bipolar mania due to a lack of data on efficacy.

## Persistent aggression in patients with moderate to severe Alzheimer's dementia

A starting dose of 0.25 mg of the oral solution twice daily is recommended. The oral solution is the recommended pharmaceutical form to administer 0.25 mg. This dosage can be individually adjusted by increments of 0.25 mg twice daily, not more frequently than every other day, if needed. The optimum dose is 0.5 mg twice daily for most patients. Some patients, however, may benefit from doses up to 1 mg twice daily.

Risperidone Grindeks should not be used more than 6 weeks in patients with persistent aggression in Alzheimer's dementia. During treatment, patients should be evaluated frequently and regularly, and the need for continuing treatment reassessed.

## Conduct disorder

### *Children and adolescents from 5 to 18 years of age*

For subjects weighing  $\geq 50$  kg, a starting dose of 0.5 mg once daily is recommended. This dosage can be individually adjusted by increments of 0.5 mg once daily not more frequently than every other day, if needed. The optimum dose is 1 mg once daily for most patients. Some patients, however, may benefit from 0.5 mg once daily, while others may require 1.5 mg once daily.

For subjects weighing <50 kg, a starting dose of 0.25 mg of the oral solution once daily is recommended. The oral solution is the recommended pharmaceutical form to administer 0.25 mg. This dose can be individually adjusted by increments of 0.25 mg once daily not more frequently than every other day, if needed. The optimum dose is 0.5 mg once daily for most patients. Some patients, however, may benefit from 0.25 mg once daily, while others may require 0.75 mg of the oral solution once daily. The oral solution is the recommended pharmaceutical form to administer 0.75 mg.

As with all symptomatic treatments, the continued use of Risperidone Grindeks should be evaluated and justified on an ongoing basis.

Risperidone Grindeks is not recommended in children less than 5 years of age, as there is no experience in children less than 5 years of age with this disorder.

#### Renal and hepatic impairment

Patients with renal impairment have less ability to eliminate the active antipsychotic fraction than in adults with normal renal function. Patients with impaired hepatic function have increases in plasma concentration of the free fraction of risperidone.

Irrespective of the indication, starting and consecutive dosing should be halved, and dose titration should be slower for patients with renal or hepatic impairment.

Risperidone Grindeks should be used with caution in these patient groups.

#### Method of administration

Risperidone Grindeks is for oral use. Food does not affect the absorption of Risperidone Grindeks.

Upon discontinuation, gradual withdrawal is advised. Acute withdrawal symptoms, including nausea, vomiting, sweating and insomnia have been very rarely been described after abrupt cessation of high doses of antipsychotic medicines (see section 4.8). Recurrence of psychotic symptoms may also occur, and the emergence of involuntary movement disorders (such as akathisia, dystonia and dyskinesia) have been reported.

#### *Switching from other antipsychotics*

When medically appropriate, gradual discontinuation of the previous treatment while Risperidone Grindeks therapy is initiated, is recommended. Also, if medically appropriate, when switching patients from depot antipsychotics, initiate Risperidone Grindeks therapy in place of the next scheduled injection. The need for continuing existing anti-Parkinson medicines should be re-evaluated periodically.

### 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

#### Elderly patients with dementia

##### *Increased mortality in elderly people with dementia*

In a meta-analysis of 17 controlled trials of atypical antipsychotics, including risperidone, elderly patients with dementia treated with atypical antipsychotics have an increased mortality compared to placebo. In placebo-controlled trials with oral risperidone in this population, the incidence of mortality was 4.0% for risperidone-treated patients compared to 3.1% for placebo-treated patients. The odds ratio (95% exact confidence interval) was 1.21 (0.7; 2.1). The mean age (range) of patients who died was 86 years (range 67-100). Data from two large observational studies showed that elderly people with dementia who are treated with conventional antipsychotics are also at a small increased risk of death compared with those who are not treated. There are insufficient data to give a firm estimate of the precise magnitude of the risk and the cause of the increased risk is not known. The extent to which the findings of increased mortality in observational studies may be attributed to the antipsychotics as opposed to some characteristic(s) of the patients is not clear.

##### *Concomitant use of furosemide*

In the placebo-controlled trials of risperidone in elderly patients with dementia, a higher incidence of mortality was observed in patients treated with furosemide plus risperidone (7.3%; mean age 89 years, range 75-97 years) when compared to patients treated with risperidone alone (3.1%; mean age 84 years, range 70-96 years) or furosemide alone (4.1%; mean age 80 years, range 67-90 years). The increased in mortality in patients treated with furosemide plus risperidone was observed in two of the four clinical trials. Concomitant use of risperidone with other diuretics (mainly thiazide diuretics used in low dose) was not associated with similar findings.

No pathophysiological mechanism has been identified to explain this finding, and no consistent pattern for cause of death observed. Nevertheless, caution should be exercised and the risks and benefits of this combination or co-treatment with other potent diuretics should be considered prior to the decision to use. There was no increased incidence of mortality among patients taking other diuretics as concomitant treatment with risperidone. Irrespective of treatment, dehydration was an overall risk factor for mortality and should therefore be carefully avoided in elderly patients with dementia.

### Cerebrovascular adverse events (CVAE)

An approximately 3-fold increased risk of cerebrovascular adverse events has been observed in randomized placebo-controlled clinical trials in the dementia population with some atypical antipsychotics. The pooled data from six placebo-controlled studies with risperidone in mainly elderly patients (>65 years of age) with dementia showed that CVAEs (serious and non-serious, combined) occurred in 3.3% (33/1,009) of patients treated with risperidone and 1.2% (8/712) of patients treated with placebo. The odds ratio (95% exact confidence interval) was 2.96 (1.34; 7.50). The mechanism for this increased risk is not known. An increased risk cannot be excluded for other antipsychotics or other patient populations. Risperidone Grindeks should be used with caution in patients with risk factors for stroke.

The risk of CVAEs was significantly higher in patients with mixed or vascular type of dementia when compared to Alzheimer's dementia. Therefore, patients with other types of dementias than Alzheimer's should not be treated with risperidone.

Physicians are advised to assess the risks and benefits of the use of Risperidone Grindeks in elderly patients with dementia, taking into account risk predictors for stroke in the individual patient. Patients/caregivers should be cautioned to immediately report signs and symptoms of a potential CVAEs such as sudden weakness or numbness in the face, arms or legs, and speech or vision problems. All treatment options should be considered without delay, including discontinuation of risperidone.

Risperidone Grindeks should only be used the short-term for persistent aggression in patients with moderate to severe Alzheimer's dementia to supplement non-pharmacological approaches which have had limited or no efficacy and when there is potential risk of harm to self or others.

Patients should be reassessed regularly, and the need for continuing treatment reassessed.

### Orthostatic hypotension

Due to the alpha-blocking activity of risperidone, (orthostatic) hypotension can occur, especially during the initial dose-titration period. Clinically significant hypotension has been observed post-marketing with concomitant use of risperidone and antihypertensive treatment. Risperidone Grindeks should be used with caution in patients with known cardiovascular disease (e.g., heart failure, myocardial infarction, conduction abnormalities, dehydration, hypovolemia or cerebrovascular disease), and the dosage should be gradually titrated as recommended (see section 4.2). A dose reduction should be considered if hypotension occurs.

### Leucopenia, neutropenia and agranulocytosis

Events of leucopenia, neutropenia and agranulocytosis have been reported with antipsychotic agents including risperidone. Agranulocytosis has been reported very rarely (<1/10,000 patients) during post-marketing surveillance.

Patients with a history of a clinically significant low white blood cell count (WBC) or a drug-induced leucopenia/neutropenia should be monitored during the first few months of treatment and discontinuation of Risperidone Grindeks should be considered at the first sign of a clinically significant decline in WBC in the absence of other causative factors.

Patients with clinically significant neutropenia should be carefully monitored for fever or other symptoms or signs of infection and treated promptly if such symptoms or signs occur. Patients with severe neutropenia (absolute neutrophil count <1 x 10<sup>9</sup>/L) should discontinue Risperidone Grindeks and have their WBC followed until recovery.

#### Tardive dyskinesia/extrapyramidal symptoms (TD/EPS)

Medicines with dopamine receptor antagonistic properties have been associated with the induction of tardive dyskinesia, characterised by rhythmical involuntary movements, predominantly of the tongue and/or face. The onset of extrapyramidal symptoms is a risk factor for tardive dyskinesia. If signs and symptoms of tardive dyskinesia appear, the discontinuation of all antipsychotics should be considered.

Caution is warranted in patients receiving both psychostimulants (e.g. methylphenidate) and risperidone concomitantly, as extrapyramidal symptoms could emerge when adjusting one or both medicinal products. Gradual withdrawal of stimulant treatment is recommended (see section 4.5).

#### Neuroleptic malignant syndrome (NMS)

Neuroleptic Malignant Syndrome, characterised by hyperthermia, muscle rigidity, autonomic instability, altered consciousness and elevated serum creatine phosphokinase levels has been reported to occur with antipsychotics. Additional signs may include myoglobinuria (rhabdomyolysis) and acute renal failure. In this event, all antipsychotics, including Risperidone Grindeks, should be discontinued.

#### Parkinson's disease and dementia with Lewy bodies

Physicians should weigh the risks versus the benefits when prescribing antipsychotics, including Risperidone Grindeks, to patients with Parkinson's Disease or Dementia with Lewy bodies (DLB). Parkinson's disease may worsen with risperidone. Both groups may be at increased risk of Neuroleptic Malignant Syndrome as well as having an increased sensitivity to antipsychotic medicinal products; these patients were excluded from clinical trials. Manifestation of the

increased sensitivity can include confusion, obtundation, postural instability with frequent falls, in addition to extrapyramidal symptoms.

### Hyperglycaemia and diabetes mellitus

Hyperglycaemia, diabetes mellitus and exacerbation of pre-existing diabetes have been reported during treatment with risperidone. In some cases, a prior increase in body weight has been reported, which may be a predisposing factor. Association with ketoacidosis has been reported very rarely with diabetic coma. Appropriate clinical monitoring is advisable in accordance with utilised antipsychotic guidelines. Patients treated with any atypical antipsychotic, including Risperidone Grindeks, should be monitored for symptoms of hyperglycaemia (such as polydipsia, polyuria, polyphagia and weakness) and patients with diabetes mellitus should be monitored regularly for worsening of glucose control.

### Weight gain

Significant weight gain has been reported with the use of risperidone. Weight should be monitored regularly.

### Hyperprolactinaemia

Hyperprolactinaemia is a common side effect of treatment with Risperidone Grindeks. Evaluation of the prolactin plasma level is recommended in patients with evidence of possible prolactin-related side effects (e.g., gynaecomastia, menstrual disorders, anovulation, fertility disorder, decreased libido, erectile dysfunction, and galactorrhoea).

Tissue culture studies suggest that cell growth in human breast tumours may be stimulated by prolactin. Although no clear association with the administration of antipsychotics has so far been demonstrated in clinical and epidemiological studies, caution is recommended in patients with relevant medical history. Risperidone Grindeks should be used with caution in patients with pre-existing hyperprolactinaemia and in patients with probable prolactin-dependent tumours.

### QT prolongation

QT prolongation has very rarely been reported post-marketing. As with other antipsychotics, caution should be exercised when risperidone is prescribed in patients with known cardiovascular disease, family history of QT prolongation, bradycardia or electrolyte disturbances (hypokalaemia, hypomagnesaemia), as it may increase the risk of arrhythmogenic effects, and in concomitant use with medicines known to prolong the QT interval.

### Seizures

Risperidone Grindeks should be used with caution in patients with a history of seizures or other conditions that potentially lower the seizure threshold.

### Priapism

Priapism may occur with risperidone treatment due to its alpha-adrenergic blocking effects.

### Body temperature regulation

Disruption of the body's ability to reduce core body temperature has been attributed to antipsychotic medicines. Appropriate care is advised when prescribing Risperidone Grindeks to patients who will be experiencing conditions which may contribute to an elevation in core body temperature, e.g., exercising strenuously, exposure to extreme heat, receiving concomitant treatment with anticholinergic activity, or being subject to dehydration.

### Antiemetic effect

An antiemetic effect was observed in preclinical studies with risperidone. This effect, if it occurs in humans, may mask the signs and symptoms of overdose with certain medicines or of conditions such as intestinal obstruction, Reye's syndrome, and brain tumour.

### Renal and hepatic impairment

Patients with renal impairment have less ability to eliminate the active antipsychotic fraction than adults with normal renal function. Patients with impaired hepatic function have increases in plasma concentration of the free fraction of risperidone (see section 4.2).

### Venous thromboembolism

Cases of venous thromboembolism (VTE) have been reported for antipsychotic medicines.

Since patients treated with antipsychotics often present with acquired risk factors for VTE, all possible risk factors for VTE should be identified before and during treatment with Risperidone Grindeks and preventive measures undertaken.

### Intraoperative Floppy Iris Syndrome

Intraoperative Floppy Iris Syndrome (IFIS) has been observed during cataract surgery in patients treated with medicines with alpha 1a-adrenergic antagonist effect, including Risperidone Grindeks (see section 4.8).

IFIS may increase the risk of eye complications during and after the operation. Current or past use of medicines with alpha 1a-adrenergic antagonist effect should be made known to the ophthalmic surgeon in advance of surgery. The potential benefit of stopping alpha 1-blocking therapy prior to cataract surgery has not been established and must be weighed against the risk of stopping antipsychotic treatment.

### Paediatric population

Before risperidone is prescribed to a child or adolescent with conduct disorder they should be fully assessed for physical and social causes of the aggressive behaviour such as pain or inappropriate environmental demands.

The sedative effect of risperidone should be closely monitored in this population because of possible consequences on learning ability. A change in the time of administration of risperidone could improve the impact of the sedation on attention faculties of children and adolescents.

Risperidone was associated with mean increases in body weight and body mass index (BMI). Baseline weight measurement prior to treatment and regular weight monitoring are recommended. Changes in height in the long-term open-label extension studies were within expected age-appropriate norms. The effect of long-term risperidone treatment on sexual maturation and height has not been adequately studied.

Because of the potential effects of prolonged hyperprolactinaemia on growth and sexual maturation in children and adolescents, regular clinical evaluation of endocrinological status should be considered, including measurements of height, weight, sexual maturation, monitoring of menstrual functioning and other potential prolactin-related effects.

Results from a small post-marketing observation study showed that risperidone-exposed subjects between the ages of 8 and 16 years were on average approximately 3.0 to 4.8 cm taller than those who received other atypical psychotropic medicines. This study was not adequate to determine whether the exposure to risperidone had any impact on final adult height, or whether the result was due to a direct effect of risperidone on bone growth, or the effect of the underlying disease itself on bone growth, or the result of better control of the underlying disease with resulting increase in linear growth.

During treatment with risperidone regular examination for extrapyramidal symptoms and other movement disorders should also be conducted.

For specific posology recommendations in children and adolescents see section 4.2.

#### Excipients

The film-coated tablets contain lactose. Patients with rare hereditary problems of galactose intolerance, total lactase deficiency or glucose-galactose malabsorption should not take this medicine.

The 4 mg film-coated tablets contain colourant Tartrazine (E102). It may cause allergic reactions.

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

### Pharmacodynamic-related interactions

#### *Medicinal products known to prolong the QT interval*

As with other antipsychotics, caution is advised when prescribing risperidone with medicinal products known to prolong the QT interval, such as antiarrhythmics (e.g., quinidine, disopyramide, procainamide, propafenone, amiodarone, sotalol), tricyclic antidepressants (i.e., amitriptyline) tetracyclic antidepressants (i.e., maprotiline), some antihistamines, other antipsychotics, some antimalarials (i.e., quinine and mefloquine) and with medicines causing electrolyte imbalance (hypokalaemia, hypomagnesaemia), bradycardia or those which inhibit the hepatic metabolism of risperidone. This list is indicative and not exhaustive.

#### *Centrally-acting medicines and alcohol*

Risperidone should be used with caution in combination with other centrally-acting substances, notably including alcohol, opiates, antihistamines and benzodiazepines due to the increased risk of sedation.

#### *Levodopa and dopamine agonists*

Risperidone Grindeks may antagonise the effect of levodopa and other dopamine agonists. If this combination is deemed necessary, particularly in end-stage of Parkinson's disease, the lowest effective doses of each treatment should be prescribed.

#### *Medicines with hypotensive effect*

Clinically significant hypotension has been observed post-marketing with concomitant use of risperidone and antihypertensive treatment.

#### *Psychostimulants*

The combined use of psychostimulants (e.g., methylphenidate) with risperidone can lead to extrapyramidal symptoms upon change of either or both treatments (see section 4.4).

### *Paliperidone*

Concomitant use of oral Risperidone Grindeks and paliperidone is not recommended as paliperidone is the active metabolite of risperidone, and the combination of the two may lead to additive active antipsychotic fraction exposure.

### Pharmacokinetic-related interactions

Food does not affect the absorption of Risperidone Grindeks.

Risperidone is mainly metabolised through CYP2D6 and to a lesser extent through CYP3A4. Both risperidone and its active metabolite 9-hydroxy-risperidone are substrates of P-glycoprotein (P-gp).

Substances that modify CYP2D6 activity or substances strongly inhibiting or inducing CYP3A4 and/or P-gp activity, may influence the pharmacokinetics of the risperidone active antipsychotic fraction.

### *Strong CYP2D6 inhibitors*

Co-administration of Risperidone Grindeks with a strong CYP2D6 inhibitor may increase the plasma concentration of risperidone, but less so for the active antipsychotic fraction. Higher doses of a strong CYP2D6 inhibitor may increase the concentration of the risperidone active antipsychotic fraction (e.g. paroxetine, see below). It is expected that other CYP2D6 inhibitors, such as quinidine, may effect the plasma concentrations of risperidone in a similar way. When concomitant paroxetine, quinidine or another strong CYP2D6 inhibitor, especially at higher doses, is initiated or discontinued, the physician should re-evaluate the dosing of Risperidone Grindeks.

### *CYP3A4 and/or P-gp inhibitors*

Co-administration of Risperidone Grindeks with a strong CYP3A4 and/or P-gp inhibitor may substantially elevate plasma concentrations of the risperidone active antipsychotic fraction. When concomitant itraconazole or another strong CYP3A4 and/or P-gp inhibitor is initiated or discontinued, the physician should re-evaluate the dosing of Risperidone Grindeks.

### *CYP3A4 and/or P-gp inducers*

Co-administration of Risperidone Grindeks with a strong CYP3A4 and/or P-gp inducer may decrease the plasma concentrations of the risperidone active antipsychotic fraction. When concomitant carbamazepine or another strong CYP3A4 and/or P-gp inducer is initiated or discontinued, the physician should re-evaluate the dosing of Risperidone Grindeks. CYP3A4 inducers exert their effect in a time-dependent manner, and it may take at least two weeks to reach maximum effect after introduction. Conversely, on discontinuation, CYP3A4 induction may take at least 2 weeks to decline.

### *Highly protein-bound medicinal products*

When Risperidone Grindeks is taken together with highly protein-bound medicinal products, there is no clinically relevant displacement of either medicine from the plasma proteins.

When using concomitant medicines, the corresponding label should be consulted for information on route of metabolism and the possible need to adjust dosage.

### Paediatric population

Interaction studies have only been performed in adults. The relevance of the results of these studies in paediatric patients is unknown.

The combined use of psychostimulants (e.g., methylphenidate) with risperidone in children and adolescents did not alter the pharmacokinetics and efficacy of risperidone.

### Examples

Examples of medicinal products that may potentially interact or that were shown not to interact with risperidone are listed below:

### Effect of other medicinal products on the pharmacokinetics of risperidone

#### Antibacterials:

- Erythromycin, a moderate CYP3A4 inhibitor and P-gp inhibitor, does not change the pharmacokinetics of risperidone and the active antipsychotic fraction.
- Rifampicin, a strong CYP3A4 inducer and a P-gp inducer, decreased the plasma concentration of the active antipsychotic fraction.

#### Anticholinesterases:

- Donepezil and galantamine, both CYP2D6 and CYP3A4 substrates, do not show clinically relevant effect on the pharmacokinetics of risperidone and the active antipsychotic fraction.

#### Antiepileptics:

- Carbamazepine, a strong CYP3A4 inducer and a P-gp inducer, has been shown to decrease the plasma concentration of the active antipsychotic fraction of risperidone. Similar effects may be observed with e.g., phenytoin and phenobarbital, which also induce CYP3A4 hepatic enzyme as well as P-glycoprotein.
- Topiramate modestly reduced the bioavailability of risperidone, but not that of the active antipsychotic fraction. Therefore, this interaction is unlikely to be of clinical significance.

#### Antifungals:

- Itraconazole, a strong CYP3A4 inhibitor and a P-gp inhibitor, at a dosage of 200 mg/day, increased the plasma concentrations of the active antipsychotic fraction by approximately 70% at risperidone doses of 2 to 8 mg/day.
- Ketoconazole, a strong CYP3A4 inhibitor and a P-gp inhibitor, at a dosage of 200 mg/day increased the plasma concentrations of risperidone and decreased the plasma concentrations of 9-hydroxy-risperidone.

#### Antipsychotics:

- Phenothiazines may increase the plasma concentrations of risperidone but not those of the active antipsychotic fraction.

#### Antivirals:

- Protease inhibitors: No formal study data are available; however, since ritonavir is a strong CYP3A4 inhibitor and a weak CYP2D6 inhibitor, ritonavir and ritonavir-boosted protease inhibitors potentially raise the concentration of the active antipsychotic fraction of risperidone.

#### Beta-blockers:

- Some beta-blockers may increase the plasma concentration of risperidone but not those of the active antipsychotic fraction.

#### Calcium channel blockers:

- Verapamil, a moderate inhibitor of CYP3A4 and an inhibitor of P-gp, increases the plasma concentration of risperidone and the active antipsychotic fraction.

#### Gastrointestinal medicinal products:

- H<sub>2</sub>-receptor antagonists: Cimetidine and ranitidine, both weak inhibitors of CYP2D6 and CYP3A4, increased the bioavailability of risperidone, but only marginally that of the active antipsychotic fraction.

#### Selective serotonin reuptake inhibitors (SSRIs) and tricyclic antidepressants:

- Fluoxetine, a strong CYP2D6 inhibitor, increases the plasma concentration of risperidone, but less so of the active antipsychotic fraction.
- Paroxetine, a strong CYP2D6 inhibitor, increases the plasma concentration of risperidone, but at dosages up to 20 mg/day, less so of the active antipsychotic fraction. However, higher doses of paroxetine may elevate concentrations of the active antipsychotic fraction of risperidone.
- Tricyclic antidepressants may increase the plasma concentration of risperidone but not those of the active antipsychotic fraction. Amitriptyline does not affect the pharmacokinetics of risperidone or the active antipsychotic fraction.
- Sertraline, a weak inhibitor of CYP2D6, and fluvoxamine, a weak inhibitor of CYP3A4, at dosages up to 100 mg/day are not associated with clinically significant changes in concentrations of the risperidone active antipsychotic fraction. However, doses higher than 100 mg/day of sertraline or fluvoxamine may elevate concentrations of the active antipsychotic fraction of risperidone.

#### Effect of risperidone on the pharmacokinetics of other medicinal products

#### Antiepileptics:

- Risperidone does not show a clinically relevant effect on the pharmacokinetics of valproate or topiramate.

Antipsychotics:

- Aripiprazole, a CYP2D6 and CYP3A4 substrate: Risperidone tablets or injection did not affect the pharmacokinetics of the sum of aripiprazole and its active metabolite dehydroaripiprazole.

Digitalis glycosides:

- Risperidone does not show a clinically relevant effect on the pharmacokinetics of digoxin.

Lithium:

- Risperidone does not show a clinically relevant effect on the pharmacokinetics of lithium.

Concomitant use of risperidone with furosemide:

- See section 4.4 regarding increased mortality in elderly patients with dementia concomitantly receiving furosemide.

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

Pregnancy

There are no adequate data from the use of risperidone in pregnant women. Risperidone was not teratogenic in animal studies, but other types of reproductive toxicity were seen (see section 5.3). The potential risk for humans is unknown.

Neonates exposed to antipsychotics (including risperidone) during the third trimester of pregnancy are at risk of adverse reactions including extrapyramidal and/or withdrawal symptoms that may vary in severity and duration following delivery. There have been reports of agitation, hypertonia, hypotonia, tremor, somnolence, respiratory distress or feeding disorder. Consequently, newborns should be monitored carefully.

Risperidone Grindeks should not be used during pregnancy unless clearly necessary. If discontinuation during pregnancy is necessary, it should not be done abruptly.

Breast-feeding

In animal studies, risperidone and 9-hydroxy-risperidone are excreted in the milk. It has been demonstrated that risperidone and 9-hydroxy-risperidone are also excreted in human breast milk in small quantities. There are no data available on adverse

reactions in breast-feeding infants. Therefore, the advantage of breast-feeding should be weighed against the potential risks for the child.

### Fertility

As with other medicinal products that antagonise dopamine D<sub>2</sub>-receptors, Risperidone Grindeks elevates prolactin level. Hyperprolactinaemia may suppress hypothalamic GnRH, resulting in reduced pituitary gonadotropin secretion. This, in turn, may inhibit reproductive function by impairing gonadal steroidogenesis in both female and male patients.

There were no relevant effects observed in the non-clinical studies.

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

Risperidone Grindeks may have minor or moderate influence on the ability to drive and use machines due to potential nervous system and visual effects (see section 4.8). Therefore, patients should be advised not to drive or operate machinery until their individual susceptibility is known.

## **4.8 Undesirable effects**

The most frequently reported adverse drug reactions (ADRs) (incidence  $\geq 10\%$ ) are: Parkinsonism, sedation/somnolence, headache and insomnia.

The ADRs that appeared to be dose-related included parkinsonism and akathisia.

The following are all the ADRs that were reported in clinical trials and post-marketing experience with risperidone by frequency category estimated from risperidone clinical trials. The following terms and frequencies are applied: 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 ( $< 1/10,000$ ) and not known (cannot be estimated from the available data).

Within each frequency grouping, undesirable effects are presented in order of decreasing seriousness.

System Organ Class	Adverse drug reactions					
	Frequency					
	Very common	Common	Uncommon	Rare	Very rare	Not known

System Organ Class	Adverse drug reactions					
	Frequency					
	Very common	Common	Uncommon	Rare	Very rare	Not known
<b>Infections and infestations</b>		pneumonia, bronchitis, upper respiratory tract infection, sinusitis, urinary tract infection, ear infection, influenza	respiratory tract infection, cystitis, eye infection, tonsillitis, onychomycosis, cellulitis localised infection, viral infection, acarodermatitis	infection		
<b>Blood and lymphatic system disorders</b>			neutropenia, white blood cell count decreased, thrombocytopenia, anaemia, haematocrit decreased, eosinophil count increased	agranulocytosis <sup>c</sup>		
<b>Immune system disorders</b>			hypersensitivity	anaphylactic reaction <sup>c</sup>		
<b>Endocrine disorders</b>		hyperprolactinaemia <sup>a</sup>		inappropriate excretion of antidiuretic hormone, glucose is presented in the urine		
<b>Metabolism and nutrition disorders</b>		weight increased, increased appetite, decreased appetite	diabetes mellitus <sup>b</sup> , hyperglycaemia, polydipsia, weight decreased, anorexia, blood cholesterol increased	water intoxication <sup>c</sup> , hypoglycaemia, hyperinsulinemia <sup>c</sup> , blood triglycerides increased	diabetic ketoacid osis	
<b>Psychiatric disorders</b>	insomnia <sup>d</sup>	sleep disorder, agitation, depression, anxiety	mania, confusional state, libido decreased, nervousness, nightmare	catatonia, somnia- bulism, sleep-related eating disorder, blunted affect, anorgasmia		
<b>Nervous system disorders</b>	sedation/ somnia- lence, parkinsonism <sup>d</sup> , headache	akathisia <sup>d</sup> , dystonia <sup>d</sup> , dizziness, dyskinesia <sup>d</sup> , tremor	tardive dyskinesia, cerebral ischaemia, unresponsive to stimuli, loss of consciousness, depressed level of consciousness, convulsion <sup>d</sup> , syncope, psychomotor hyperactivity, balance disorder, coordination abnormal, postural dizziness, disturbance in attention, dysarthria, dysgeusia, hypoesthesia, paraesthesia	neuroleptic malignant syndrome, cerebrovascular disorder, diabetic coma, head titubation		

System Organ Class	Adverse drug reactions					
	Frequency					
	Very common	Common	Uncommon	Rare	Very rare	Not known
Eye disorders		blurred vision, conjunctivitis	photophobia, dry eye, lacrimation increased, ocular hyperaemia	glaucoma, eye movement disorder, eye rolling, eyelid margin crusting, floppy iris syndrome (intraoperative) <sup>c</sup>		
Ear and labyrinth disorders			vertigo, tinnitus, ear pain			
Cardiac disorders		tachycardia	atrial fibrillation, atrioventricular block, conduction disorder, prolonged QT interval on electrocardiogram (ECG), bradycardia, abnormal ECG, palpitations	sinus arrhythmia		
Vascular disorders		hypertension	hypotension, orthostatic hypotension, flushing	pulmonary embolism, venous thrombosis		
Respiratory, thoracic and mediastinal disorders		dyspnoea, pharyngolaryngeal pain, cough, epistaxis, nasal congestion	aspiration pneumonia, pulmonary congestion, respiratory tract congestion, rales, wheezing, dysphonia, respiratory disorder	sleep apnoea syndrome, hyperventilatio n		
Gastrointestinal disorders		abdominal pain, abdominal discomfort, vomiting, nausea, constipation, diarrhoea, dyspepsia, dry mouth, toothache	faecal incontinence, faecaloma, gastroenteritis, dysphagia, flatulence	pancreatitis, intestinal obstruction, swollen tongue, cheilitis	ileus	
Skin and subcutaneous tissue disorders		rash, erythema	urticaria, pruritus, alopecia, hyperkeratosis, eczema, dry skin, skin discoloration, acne, seborrhoeic dermatitis, skin disorder, skin lesion	drug eruption, dandruff	angioedem a	Stevens- Johnson syndrome/ toxic epidermal necrolysis <sup>c</sup>
Musculoskeletal system and connective tissue disorders		muscle spasms, musculoskeletal pain, back pain, arthralgia	blood creatine phosphokinase increased, abnormal posture, joint stiffness, joint swelling, muscular weakness, neck pain	rhabdomyolysis		
Renal and urinary disorders		urinary incontinence	pollakiuria, urinary retention, dysuria			
Pregnancy, puerperium and perinatal period				neonatal drug withdrawal syndrome <sup>c</sup>		

System Organ Class	Adverse drug reactions					
	Frequency					
	Very common	Common	Uncommon	Rare	Very rare	Not known
Reproductive system and breast disorders			erectile dysfunction, ejaculation disorder, amenorrhoea, menstrual disorder <sup>d</sup> , gynecomastia, galactorrhoea, sexual dysfunction, breast pain, breast discomfort, vaginal discharge	priapism <sup>c</sup> , menstruation delayed, breast engorgement, breast enlargement, breast discharge		
General disorders and administration site conditions		oedema <sup>d</sup> , pyrexia, chest pain, asthenia, fatigue, pain	face oedema, chills, body temperature increased, abnormal gait, thirst, chest discomfort, malaise, abnormal feeling, discomfort	hypothermia, body temperature decreased, peripheral coldness, drug withdrawal syndrome, induration <sup>c</sup>		
Hepatobiliary disorders			transaminases increased, gamma- glutamyltransferase increased, hepatic enzyme increased	jaundice		
Injury, poisoning and procedural complications		fall	procedural pain			

- a Hyperprolactinaemia can, in some cases, lead to gynaecomastia, menstrual disturbances, amenorrhoea, anovulation, galactorrhoea, fertility disorder, decreased libido, erectile dysfunction.
- b In placebo-controlled trials, diabetes mellitus was reported in 0.18% in risperidone-treated subjects compared to a rate of 0.11% in placebo group. Overall incidence from all clinical trials was 0.43% in all risperidone-treated subjects.
- c Not observed in risperidone clinical studies but observed in post-marketing environment with risperidone.
- d Extrapyrimal disorder may occur: **Parkinsonism** (salivary hypersecretion, musculoskeletal stiffness, parkinsonism, drooling, cogwheel rigidity, bradykinesia, hypokinesia, masked facies, muscle tightness, akinesia, nuchal rigidity, muscle rigidity, parkinsonian gait, and glabellar reflex abnormal, parkinsonian rest tremor), **akathisia** (akathisia, restlessness, hyperkinesia and restless leg syndrome), tremor, **dyskinesia** (dyskinesia, muscle twitching, choreoathetosis, athetosis and myoclonus), dystonia. **Dystonia** includes dystonia, hypertonia, torticollis, involuntary muscle contractions, muscle contracture, blepharospasm, oculogyration, tongue paralysis, facial spasm, laryngospasm, myotonia, opisthotonus, oropharyngeal spasm, pleurothotonus, tongue spasm and trismus. It should be noted that a broader spectrum of symptoms are included, that do not necessarily have an extrapyramidal origin. **Insomnia** includes initial insomnia, middle insomnia. **Convulsion** includes grand mal convulsion. **Menstrual disorder** includes irregular menstruation, oligomenorrhoea. **Oedema** includes generalised oedema, peripheral oedema, pitting oedema.

#### Undesirable effects noted in paliperidone formulations

Paliperidone is the active metabolite of risperidone, therefore the adverse reaction profiles of these compounds (including both the oral and injectable formulations) are relevant to one another. In addition to the above adverse reactions, the following adverse reaction has been noted with the use of paliperidone products and can be expected to occur with risperidone.

### **Cardiac disorders**

Postural orthostatic tachycardia syndrome.

#### *Class effects*

As with other antipsychotics, very rare cases of QT prolongation have been reported post-marketing with risperidone. Other class-related cardiac effects reported with antipsychotics which prolong QT interval include ventricular arrhythmia, ventricular fibrillation, ventricular tachycardia, sudden death, cardiac arrest and Torsade de Pointes.

### **Venous thromboembolic disease**

Cases of venous thromboembolism, including cases of pulmonary embolism and cases of deep vein thrombosis, have been reported with antipsychotic medicines (frequency unknown).

### **Weight gain**

The proportions of risperidone and placebo-treated adult patients with schizophrenia meeting a weight gain criterion of  $\geq 7\%$  of body weight were compared in a pool of 6- to 8-week, placebo-controlled trials, revealing a statistically significantly greater incidence of weight gain for risperidone (18%) compared to placebo (9%). In a pool of placebo-controlled 3-week studies in adult patients with acute mania, the incidence of weight increase of  $\geq 7\%$  at endpoint was comparable in the risperidone (2.5%) and placebo groups (2.4%), and was slightly higher in the active-control group (3.5%).

In a population of children and adolescents with conduct and other disruptive behaviour disorders, in long-term studies, weight increased by a mean of 7.3 kg after 12 months of treatment. The expected weight gain for normal children between 5-12 years of age is 3 to 5 kg per year. From 12-16 years of age, this magnitude of gaining 3 to 5 kg per year is maintained for girls, while boys gain approximately 5 kg per year.

### Additional information on special populations

Adverse drug reactions that were reported with higher incidence in elderly patients with dementia or paediatric patients than in adult populations are described below:

#### *Elderly patients with dementia*

Transient ischaemic attack and cerebrovascular accident were ADRs reported in clinical trials with a frequency of 1.4% and 1.5%, respectively, in elderly patients with dementia. In addition, the following ADRs were reported with a frequency of  $\geq 5\%$  in elderly patients with dementia and with at least twice the frequency seen in other adult populations: urinary tract infection, peripheral oedema, lethargy and cough.

#### *Paediatric population*

In general, type of adverse reactions in children is expected to be similar to those observed in adults. The following ADRs were reported with a frequency of  $\geq 5\%$  in paediatric patients (5 to 17 years) and with at least twice the frequency seen in clinical trials in adults: somnolence/sedation, fatigue, headache, increased appetite, vomiting, upper respiratory tract infection, nasal congestion, abdominal pain, dizziness, cough, pyrexia, tremor, diarrhoea and enuresis.

The effect of long-term risperidone treatment on sexual maturation and height has not been adequately studied. (see section 4.4, subsection “Paediatric population”).

#### Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via Yellow Card Scheme at [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard) or search for MHRA Yellow Card in the Google Play or Apple App Store.

## **4.9 Overdose**

### Symptoms

In general, reported signs and symptoms have been those resulted from an exaggeration of the known pharmacological effects of risperidone. These include drowsiness and sedation, tachycardia and hypotension, and extrapyramidal symptoms. In overdose, QT prolongation and convulsions have been reported. Torsade de Pointes has been reported in association with combined overdose of risperidone and paroxetine.

In case of acute overdose, the possibility of multiple medicinal products involvement should be considered.

### Treatment

Establish and maintain a clear airway and ensure adequate oxygenation and ventilation. Administration of activated charcoal together with a laxative should be considered only when medicinal product intake was less than one hour before. Cardiovascular monitoring should commence immediately and should include continuous electrocardiographic monitoring to detect possible arrhythmias.

There is no specific antidote to Risperidone Grindeks. Therefore, appropriate supportive measures should be instituted. Hypotension and circulatory collapse should be treated with appropriate measures such as intravenous fluids and/or sympathomimetic agents. In case of severe extrapyramidal symptoms, an anticholinergic medicinal product should be administered. Close medical supervision and monitoring should continue until the patient recovers.

## 5 PHARMACOLOGICAL PROPERTIES

### 5.1 Pharmacodynamic properties

Pharmacotherapeutic group: other antipsychotics, ATC code: N05AX08

#### Mechanism of action

Risperidone is a selective monoaminergic antagonist with unique properties. It has a high affinity for serotonergic 5-HT<sub>2</sub> and dopaminergic D<sub>2</sub> receptors. Risperidone also binds to alpha<sub>1</sub>-adrenergic receptors and, with lower affinity, to H<sub>1</sub>-histaminergic and alpha<sub>2</sub>-adrenergic receptors. Risperidone has no affinity for cholinergic receptors. Although risperidone is a potent D<sub>2</sub> antagonist, which is considered to improve the positive symptoms of schizophrenia, it causes less depression of motor activity and induction of catalepsy than classical antipsychotics. Balanced central serotonin and dopamine antagonism may reduce extrapyramidal side effect liability and extend the therapeutic activity to the negative and affective symptoms of schizophrenia.

#### Pharmacodynamic effects

#### Clinical efficacy

##### *Schizophrenia*

The efficacy of risperidone in the short-term treatment of schizophrenia was established in four studies, 4 to 8 weeks in duration, which enrolled over 2,500 patients who met DSM-IV criteria for schizophrenia. In a 6-week, placebo-controlled trial involving titration of risperidone at doses up to 10 mg/day administered twice daily, risperidone was superior to placebo on the Brief Psychiatric Rating Scale (BPRS) total score. In an 8-week, placebo-controlled trial involving four fixed doses of risperidone (2, 6, 10 and 16 mg/day, administered twice daily), all four risperidone groups were superior to placebo on the Positive and Negative Syndrome Scale (PANSS) total score. In an 8-week, dose comparison trial involving five fixed doses of risperidone (1, 4, 8, 12 and 16 mg/day, administered twice daily), the 4, 8 and 16 mg/day risperidone groups were superior to the 1 mg risperidone dose group on PANSS total score. In a 4-week, placebo-controlled dose comparison trial involving two fixed doses of risperidone (4 and 8 mg/day, administered once daily), both risperidone dose groups were superior to placebo on several PANSS measures, including total PANSS and a response measure (> 20% reduction in PANSS total score). In a longer-term trial, adult outpatients predominantly meeting DSM-IV

criteria for schizophrenia and who had been clinically stable for at least 4 weeks on an antipsychotic medicinal product were randomised to risperidone 2 to 8 mg/day or to haloperidol for 1 to 2 years of observation for relapse. Patients receiving risperidone experienced a significantly longer time to relapse over this time period compared to those receiving haloperidol.

#### *Manic episodes in bipolar disorder*

The efficacy of risperidone monotherapy in the acute treatment of manic episodes associated with bipolar I disorder was demonstrated in three double-blind, placebo-controlled monotherapy studies in approximately 820 patients who had bipolar I disorder, based on DSM-IV criteria. In the three studies, risperidone 1 to 6 mg/day (starting dose 3 mg in two studies and 2 mg in one study) was shown to be significantly superior to placebo on the pre-specified primary endpoint, i.e., a change from baseline in total Young Mania Rating Scale (YMRS) score at week 3. Secondary efficacy outcomes were generally consistent with the primary outcome. The percentage of patients with a decrease of  $\geq 50\%$  in total YMRS score from baseline to the 3-week endpoint was significantly higher for risperidone than for placebo. One of the three studies included a haloperidol arm and a 9-week double-blind maintenance phase. Efficacy was maintained throughout the 9-week maintenance treatment period. Change from baseline in total YMRS showed continued improvement and was comparable between risperidone and haloperidol at week 12.

The efficacy of risperidone in addition to mood stabilisers in the treatment of acute mania was demonstrated in one of two 3-week double-blind studies in approximately 300 patients who met the DSM-IV criteria for bipolar I disorder. In one 3-week study, risperidone 1 to 6 mg/day starting at 2 mg/day in addition to lithium or valproate was superior to lithium or valproate alone on the pre-specified primary endpoint, i.e., the change from baseline in YMRS total score at week 3. In a second 3-week study, risperidone 1 to 6 mg/day starting at 2 mg/day, combined with lithium, valproate or carbamazepine was not superior to lithium, valproate or carbamazepine alone in the reduction of YMRS total score. A possible explanation for the failure of this study was induction of risperidone and 9-hydroxy-risperidone clearance by carbamazepine, leading to subtherapeutic levels of risperidone and 9-hydroxy-risperidone. When the carbamazepine group was excluded in a post-hoc analysis, risperidone combined with lithium or valproate was superior to lithium or valproate alone in reduction of YMRS total score.

#### *Persistent aggression in dementia*

The efficacy of risperidone in the treatment of Behavioural and Psychological Symptoms of Dementia (BPSD), which includes behavioural disturbances such as aggressiveness, agitation, psychosis, activity and affective disturbances was demonstrated in three double-blind, placebo-controlled studies in 1,150 elderly patients with moderate to severe dementia. One study included fixed risperidone doses of 0.5, 1 and 2 mg/day. Two flexible-dose studies included risperidone dose groups in the range of 0.5 to 4 mg/day and 0.5 to 2 mg/day, respectively. Risperidone showed statistically significant and clinically important effectiveness in treating aggression and less consistently in treating agitation and psychosis in elderly dementia patients (as measured by the Behavioural Pathology in Alzheimer's Disease Rating Scale [BEHAVE-AD] and the Cohen-Mansfield Agitation Inventory [CMAI]). The treatment effect of risperidone was independent of Mini-Mental State

Examination (MMSE) score (and consequently of the severity of dementia); of sedative properties of risperidone; of the presence or absence of psychosis; and of the type of dementia, Alzheimer's, vascular or mixed (see also section 4.4).

### Paediatric population

#### *Conduct disorder*

The efficacy of risperidone in the short-term treatment of disruptive behaviours was demonstrated in two double-blind, placebo-controlled studies in approximately 240 patients 5 to 12 years of age with a DSM-IV diagnosis of disruptive behaviour disorders (DBD) and borderline intellectual functioning or mild or moderate mental retardation/learning disorder. In the two studies, risperidone 0.02 to 0.06 mg/kg/day was significantly superior to placebo on the pre-specified primary endpoint, i.e., the change from baseline in the Conduct Problem subscale of the Nisonger-Child Behaviour Rating Form (N-CBRF) at week 6.

## **5.2 Pharmacokinetic properties**

Risperidone oral solution is bioequivalent to risperidone film-coated tablets.

Risperidone is metabolised to 9-hydroxy-risperidone, which has a similar pharmacological activity to risperidone (see *Biotransformation and elimination*).

### Absorption

Risperidone is completely absorbed after oral administration, reaching peak plasma concentrations within 1 to 2 hours. The absolute oral bioavailability of risperidone is 70% (CV=25%). The relative oral bioavailability of risperidone from a tablet is 94% (CV=10%) compared with a solution. The absorption is not affected by food and thus risperidone can be given with or without meals. Steady-state of risperidone is reached within 1 day in most patients. Steady-state of 9-hydroxy-risperidone is reached within 4-5 days of dosing.

### Distribution

Risperidone is rapidly distributed. The volume of distribution is 1-2 l/kg. In plasma, risperidone is bound to albumin and alpha<sub>1</sub>- acid glycoprotein. The plasma protein binding of risperidone is 90% that of 9-hydroxy-risperidone is 77%.

### Biotransformation and elimination

Risperidone is metabolised by CYP2D6 to 9-hydroxy-risperidone, which has a similar pharmacological activity as risperidone. Risperidone plus 9-hydroxy-risperidone form the active antipsychotic fraction. CYP2D6 is subject to genetic polymorphism. Extensive CYP2D6 metabolisers convert risperidone rapidly into 9-

hydroxy-risperidone, whereas poor CYP2D6 metabolisers convert it much more slowly. Although extensive metabolisers have lower risperidone and higher 9-hydroxy-risperidone concentrations than poor metabolisers, the pharmacokinetics of risperidone and 9-hydroxy-risperidone combined (i.e., the active antipsychotic fraction), after single and multiple doses, are similar in extensive and poor metabolisers of CYP2D6.

Another metabolic pathway of risperidone is N-dealkylation. *In vitro* studies in human liver microsomes showed that risperidone at clinically relevant concentrations does not substantially inhibit the metabolism of medicinal products metabolised by cytochrome P450 isozymes, including CYP1A2, CYP2A6, CYP2C8/9/10, CYP2D6, CYP2E1, CYP3A4, and CYP3A5. One week after administration, 70% of the dose is excreted in the urine and 14% in faeces. In urine, risperidone plus 9-hydroxy-risperidone represent 35-45% of the dose. The remainder is inactive metabolites. After oral administration to psychotic patients, risperidone is eliminated with a half-life of about 3 hours. The elimination half-life of 9-hydroxy-risperidone and of the active antipsychotic fraction is 24 hours.

#### Linearity/non-linearity

Risperidone plasma concentrations are dose-proportional within the therapeutic dose range.

#### Elderly, hepatic and renal impairment

A single-dose pharmacokinetic (PK) study with oral risperidone showed on average a 43% higher active antipsychotic fraction plasma concentration, a 38% longer half-life and a reduced clearance of the active antipsychotic fraction by 30% in the elderly.

In adults with moderate renal disease, the clearance of the active moiety was ~ 48% of the clearance in young healthy adults. In adults with severe renal disease, the clearance of the active moiety was ~ 31% of the clearance in young healthy adults. The half-life of the active moiety was 16.7 hours in young adults, 24.9 hours in adults with moderate renal disease (or ~ 1.5 times as long as in young adults) and 28.8 hours in those with severe renal disease (or ~ 1.7 times as long as in young adults). Risperidone plasma concentrations were normal in patients with liver insufficiency, but the mean free fraction of risperidone in plasma was increased by 37.1%.

The oral clearance and the elimination half-life of risperidone and of the active moiety in adults with moderate and severe hepatic impairment were not significantly different from those parameters in young healthy adults.

#### Paediatric population

The pharmacokinetics of risperidone, 9-hydroxy-risperidone and the active antipsychotic fraction in children are similar to those in adults.

### Gender, race and smoking habits

A population pharmacokinetic analysis revealed no apparent effect of gender, race or smoking habits on the pharmacokinetics of risperidone or the active antipsychotic fraction.

## **5.3 Preclinical safety data**

In (sub)chronic toxicity studies, in which dosing was started in sexually immature rats and dogs, dose-dependent effects were present in male and female genital tract and mammary gland. These effects were related to the increased serum levels of prolactin, resulting from the dopamine D<sub>2</sub> receptor blocking activity of risperidone. In addition, tissue culture studies suggest that cell growth in human breast tumours may be stimulated by prolactin. Risperidone was not teratogenic in rat and rabbit. In rat reproduction studies with risperidone, adverse effects were seen on mating behaviour of the parents and on the birth weight and survival of the offspring. In rats, intrauterine exposure to risperidone was associated with cognitive deficits in adulthood. Other dopamine antagonists, when administered to pregnant animals, have caused negative effects on learning and motor development in the offspring. In a toxicity study in juvenile rats, increased pup mortality and a delay in physical development was observed. In a 40-week study with juvenile dogs, sexual maturation was delayed. Based on AUC, long bone growth was not affected in dogs at 3.6-times the maximum human exposure in adolescents (1.5 mg/day); while effects on long bones and sexual maturation were observed at 15 times the maximum human exposure in adolescents.

Risperidone was not genotoxic in a battery of tests. In oral carcinogenicity studies of risperidone in rats and mice, increases in pituitary gland adenomas (mouse), endocrine pancreas adenoma (rat), and mammary gland adenomas (both species) were seen. These tumours can be related to prolonged dopamine D<sub>2</sub> antagonism and hyperprolactinaemia. The relevance of these tumour findings in rodents in terms of human risk is unknown. *In vitro* and *in vivo*, animal models show that at high doses risperidone may cause QT interval prolongation, which has been associated with a theoretically increased risk of Torsade de Pointes in patients.

## **6 PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

#### Tablet core:

Lactose

Cellulose, microcrystalline (E460)

Maize starch

Magnesium stearate (E572)

Film-coating

Macrogol poly(vinyl alcohol) grafted copolymer (E1209)

Talc (E553b)

Titanium dioxide (E171)

Glycerol monocaprylocaprate (E471)

Poly(vinyl alcohol) (E1203)

Tartrazine aluminum lake (E102)

Indigo carmine aluminum lake (E132)

## **6.2 Incompatibilities**

Not applicable.

## **6.3 Shelf life**

2 years.

## **6.4 Special precautions for storage**

This medicinal product does not require any special storage conditions.

## **6.5 Nature and contents of container**

PVC/PVdC//Alu foil blisters containing 20, 30, 60 or 100 film-coated tablets.

Not all pack sizes may be marketed.

## **6.6 Special precautions for disposal**

No special requirements for disposal.

Any unused medicinal product or waste material should be disposed of in accordance with local requirements.

## **7 MARKETING AUTHORISATION HOLDER**

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## **8 MARKETING AUTHORISATION NUMBER(S)**

PL 16647/0068

## **9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION**

07/03/2025

## **10 DATE OF REVISION OF THE TEXT**

07/03/2025