

Summary of Product Characteristics

1 NAME OF THE MEDICINAL PRODUCT

Glycemager 2 mg Tablets

2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Each tablet contains 2 mg glimepiride

For excipients, see section 6.1.

3 PHARMACEUTICAL FORM

Tablet

Green, capsule shaped, flat faced tablets with “GM”-breakline- “2” on one side and “G”-breakline- “G” on the other side.

4 CLINICAL PARTICULARS

4.1 Therapeutic Indications

Glimepiride is indicated for the treatment of type 2 diabetes mellitus when diet, physical exercise and weight reduction alone are not adequate.

4.2 Posology and method of administration

For oral administration.

For the different dosage regimens, appropriate strengths are available.

The basis for successful treatment of diabetes is a good diet, regular physical activity, as well as routine checks of blood and urine. Tablets or insulin cannot compensate if the patient does not keep to the recommended diet.

Dosage is determined by the results of blood and urinary glucose determinations.

The starting dose is 1 mg of glimepiride per day. If good control is achieved, this dose should also be used for maintenance therapy.

If control is unsatisfactory, the dosage should be increased based on the glycaemic control, in a stepwise manner with an interval of about 1 to 2 weeks between each step, to 2, 3 or 4 mg glimepiride per day.

A dosage of more than 4 mg glimepiride per day gives better results only in exceptional cases. The maximum recommended dose is 6 mg glimepiride per day.

In patients not adequately controlled with the maximum daily dose of metformin, concomitant glimepiride therapy can be initiated.

While maintaining the metformin dose, the glimepiride therapy is started with a low dose, and is then titrated up depending on the desired level of metabolic control up to the maximum daily dose.

The combination therapy should be initiated under close medical supervision

In patients not adequately controlled with the maximum daily dose of glimepiride, concomitant insulin therapy can be initiated if necessary

While maintaining the glimepiride dose, insulin treatment is started at low dose and titrated up depending on the

desired level of metabolic control.

The combination therapy should be initiated under close medical supervision.

Normally a single daily dose of glimepiride is sufficient. It is recommended that this dose be taken shortly before or during a substantial breakfast or -if none is taken- shortly before or during the first main meal.

If a dose is forgotten, this should not be corrected by increasing the next dose. Tablets should be swallowed whole with some liquid.

If a patient has a hypoglycaemic reaction on 1 mg glimepiride daily, this indicates that they can be controlled by diet alone.

In the course of treatment, as an improvement in control of diabetes is associated with higher insulin sensitivity, glimepiride requirements may fall. To avoid hypoglycaemia timely dose reduction or cessation of therapy must therefore be considered. Change in dosage may also be necessary, if there are changes in weight or lifestyle of the patient, or other factors that increase the risk of hypo- or hyperglycaemia

Switch over from other oral hypoglycaemic agents to glimepiride

A switch over from other oral hypoglycaemic agents to glimepiride can generally be done. For the switch over to glimepiride the strength and the half life of the previous medication has to be taken into account. In some cases, especially in antidiabetics with a long half life (e.g. chlorpropamide), a wash out period of a few days is advisable in order to minimise the risk of hypoglycaemic reactions due to the additive effect.

The recommended starting dose is 1 mg glimepiride per day.

Based on the response the glimepiride dosage may be increased stepwise, as indicated earlier.

Switch over from insulin to glimepiride

In exceptional cases, where type 2 diabetic patients are regulated on insulin, a changeover to glimepiride may be indicated. The changeover should be undertaken under close medical supervision.

Use in renal or hepatic impairment

See section 4.3.

4.3 Contraindications

Glimepiride must not be used in the following cases:

- insulin-dependent diabetes
- diabetic coma
- ketoacidosis
- severe renal or hepatic function disorder
- hypersensitivity to glimepiride, other sulphonylureas or sulphonamides or excipients in the tablet.

In case of severe renal or hepatic function disorders, a change over to insulin is required.

4.4 Special warnings and precautions for use

Glimepiride must be taken shortly before or during a meal.

When meals are taken at irregular hours, or, skipped altogether, glimepiride therapy may result in hypoglycaemia. Possible symptoms of hypoglycaemia include headache, ravenous hunger, nausea, vomiting, lassitude, sleepiness, disordered sleep, restlessness, aggressiveness, impaired concentration, alertness and reaction time, depression, confusion, speech and visual disorders, aphasia, tremor, paresis, sensory disturbances, dizziness, helplessness, loss of self-control, delirium, cerebral convulsions, somnolence and loss of consciousness up to and including coma, shallow respiration and bradycardia.

In addition, signs of adrenergic counter-regulation may be present, such as sweating, clammy skin, anxiety, tachycardia, hypertension, palpitations, angina pectoris and cardiac arrhythmias.

The clinical picture of a severe hypoglycaemic attack may resemble that of a stroke. Symptoms can almost always be promptly controlled by immediate intake of carbohydrates (sugar). Artificial sweeteners have no effect.

It is known from other sulphonylureas that despite initially successful countermeasures hypoglycaemia may recur.

Severe hypoglycaemia, or prolonged hypoglycaemia, only temporarily controlled by the usual amount of sugar, require immediate medical treatment and occasionally hospitalisation.

The following factors may cause hypoglycaemia:

- unwillingness or (more commonly in the elderly) incapacity to co-operate
- under-nutrition, irregular mealtimes or missed meals, or periods of fasting
- imbalance between physical activity and intake of carbohydrates
- alterations in diet
- consumption of alcohol, especially in combination with skipped meals
- impaired renal function
- severe liver dysfunction
- overdose with glimepiride
- certain uncompensated disorders of the endocrine system affecting carbohydrate metabolism or the counter-regulation of hypoglycaemia (e.g. certain disorders of thyroid function and in anterior pituitary and adrenocortical insufficiency)
- concurrent use of certain other medicinal products (see section 4.5).

Treatment with glimepiride requires regular monitoring of glucose levels in blood and urine. In addition, determination of the relative proportion of glycosylated haemoglobin is recommended.

Regular hepatic and haematological monitoring (especially leukocytes and thrombocytes) are required during treatment with glimepiride.

In stress-situations (e.g. accidents, acute operations, infections with fever etc), a temporary switch to insulin may be indicated.

No experience has been gained concerning the use of glimepiride in patients with severe impairment of liver function or dialysis patients. In patients with severe impairment of renal or liver function disorders change over to insulin is indicated.

This product contains lactose. Patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption should not take this medicine.

Treatment of patients with G6PD-deficiency with sulfonylurea agents can lead to haemolytic anaemia. Since glimepiride belongs to the class of sulfonylurea agents, caution should be used in patients with G6PD-deficiency and a non-sulfonylurea alternative should be considered.

4.5 Interaction with other medicinal products and other forms of interaction

On concomitant administration of glimepiride and certain other medicinal products, both undesired increases and decreases in the hypoglycaemic action of glimepiride can occur. Consequently, other medicinal products should be taken only with the knowledge (or at the prescription) of a doctor.

Glimepiride is metabolized by cytochrome P450 2C9 (CYP2C9). Its metabolism is known to be influenced by concomitant administration of CYP2C9 inducers (e.g rifampicin) or inhibitors (e.g fluconazole).

Results from *in vivo* interaction study reported in literature show that glimepiride AUC is increased approximately 2-fold by fluconazole, one of the most potent CYP2C9 inhibitors.

Based on experience of glimepiride and other sulphonylureas, the following interactions have to be mentioned.

Hypoglycaemic reactions due to potentiation of the blood-glucose-lowering effect are possible during concomitant use of glimepiride and the following medicinal products:

- phenylbutazone, azapropazone and oxyphenbutazone
- insulin and other oral antidiabetic medicinal products
- sulphinpyrazone
- certain long-acting sulphonamides
- metformin
- tetracyclines
- salicylates and p-amino-salicylic acid
- MAO inhibitors
- anabolic steroids and male sex hormones
- quinolone antibiotics
- chloramphenicol
- probenecid
- coumarin anticoagulants
- miconazol
- fenfluramine
- pentoxifylline (high dose parenteral)
- fibrates,
- tritoqualine,
- ACE inhibitors,
- fluoxetine,
- allopurinol
- symphatolytics
- cyclo-, tro- and iphosphamides
- fluconazole.

Weakening of the blood-glucose-lowering effect and, thus raised blood glucose levels may occur on concomitant administration of glimepiride and preparations containing the following medicinal substances:

- oestrogens and progestagens,
- saluretics, thiazide diuretics,
- thyroid hormones glucocorticoids,
- phenothiazine derivatives, chlorpromazine,
- adrenaline and sympathomimetics,
- nicotinic acid (high dosage) and nicotinic acid derivatives,
- laxatives (long-term use),

- phenytoin, diazoxide,
- glucagon, barbiturates and rifampicin,
- acetazolamide,

H2 antagonists, beta blockers, clonidine and reserpine may lead to either potentiation or weakening of the blood-glucose-lowering effect.

Under the influence of sympatholytic medicinal products such as beta blockers, clonidine, guanethidine and reserpine, the signs of adrenergic counter-regulation to hypoglycaemia may be reduced or absent.

Alcohol intake may potentiate or weaken the hypoglycaemic effect of glimepiride in an unpredictable way.

Glimepiride may either potentiate or weaken the effects of coumarin derivatives.

4.6 Fertility, pregnancy and lactation

Pregnancy

Risk related to the diabetes

Abnormal blood glucose levels during pregnancy are associated with a higher incidence of congenital abnormalities and perinatal mortality. So the blood glucose level must be closely monitored during pregnancy in order to avoid the teratogenic risk. The use of insulin is required under such circumstances. Patients who consider pregnancy should inform their physician.

Risk related to glimepiride

There are no adequate data from the use of glimepiride in pregnant women. Animal studies have shown reproductive toxicity which likely was related to the pharmacologic action (hypoglycaemia) of glimepiride (see section 5.3).

Consequently, glimepiride should not be used during the whole pregnancy.

In case of treatment by glimepiride, if the patient plans to become pregnant or if a pregnancy is discovered, the treatment should be switched as soon as possible to insulin therapy.

Lactation

The excretion in human milk is unknown. Glimepiride is excreted in rat milk. As other sulfonylureas are excreted in human milk and because there is a risk of hypoglycaemia in nursing infants, breast-feeding is advised against during treatment with glimepiride.

4.7 Effects on ability to drive and use machines

No studies on the effects on the ability to drive and use machines have been performed.

The patient's ability to concentrate and react may be impaired as a result of hypoglycaemia or hyperglycaemia, or, for example, as a result of visual impairment. This may constitute a risk in situations where these abilities are of special importance (e.g. driving a car or operating machines).

Patients should be advised to take precautions to avoid hypoglycaemia while driving.

This is particularly important in those who have reduced or absent awareness of the warning symptoms of hypoglycaemia or have frequent episodes of hypoglycaemia. It should be considered whether it is advisable to drive or operate machinery in these circumstances.

4.8 Undesirable effects

Based on experience with glimepiride and other sulphonylureas the following undesirable effects should be mentioned.

The following undesirable effects are defined as follows:

Very common (>1/10), common (>1/100, <1/10), uncommon (>1/1000, <1/100), rare (>1/10000, <1/1000), very rare (< 1/10000).

	Common	Uncommon	Rare	Very rare
Blood and lymphatic system disorders			Changes in haematology Moderate or severe thrombocytopenia, leucopenia, erythrocytopenia, granulocytopenia, agranulocytosis, haemolytic anaemia and pancytopenia. These are in general reversible upon discontinuation of medication.	
Immune system disorders		Cross allergy to sulphonylureas, sulphonamides or their derivatives.		Mild hypersensitivity reactions may develop into severe reactions with dyspnoea, fall in blood pressure and occasionally shock. Allergic vasculitis.
Metabolism and nutrition disorders			Hypoglycaemic reactions, see section 4.4. These reactions mostly occur immediately, may be severe and are not always easy to correct. As with other hypoglycaemic therapies, the occurrence of such reactions depends on individual factors such as dietary habits and dosage.	
Eye disorders			Transient visual disturbances, especially on initiation of treatment due to changes in blood glucose levels.	

Gastrointestinal disorders				Nausea. Vomiting, diarrhoea, a feeling of fullness of the stomach, abdominal pain These disorders seldom lead to discontinuation of therapy.
Hepato-biliary disorders			Elevation of liver enzymes.	Hepatic impairment (e.g. cholestasis and jaundice) and hepatitis may develop, which can deteriorate to hepatic failure.
Skin and subcutaneous tissue disorders			Hypersensitivity reactions of the skin such as pruritus, rash and urticaria.	Photosensitivity.
Investigations				Decrease in serum sodium concentration.

4.9 Overdose

After ingestion of an overdosage hypoglycaemia may occur, lasting from 12 to 72 hours, and may recur after an initial recovery. Symptoms may not be present for up to 24 hours after ingestion. In general observation in hospital is recommended. Nausea, vomiting and epigastric pain may occur. The hypoglycaemia may in general be accompanied by neurological symptoms like restlessness, tremor, visual disturbances, co-ordination problems, sleepiness, coma and convulsions.

Treatment primarily consists of preventing absorption by drinking water or lemonade with activated charcoal (adsorbent) and sodium-sulphate (laxative). If large quantities have been ingested, gastric lavage is indicated, followed by activated charcoal and sodium-sulphate. In case of (severe) overdosage hospitalisation in an intensive care department is indicated. Start the administration of glucose as soon as possible, if necessary by a bolus intravenous injection of 50 ml of a 50 % solution, followed by an infusion of a 10 % solution with strict monitoring of blood glucose. Further treatment should be symptomatic.

In particular when treating hypoglycaemia due to accidental intake of glimepiride in infants and young children, the dose of glucose given must be carefully controlled to avoid the possibility of producing dangerous hyperglycaemia. Blood glucose should be closely monitored.

5 PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Oral blood glucose lowering medicinal products: Sulfonamides, urea derivatives.
ATC Code: A10B B12.

Glimepiride is an orally active hypoglycaemic substance belonging to the sulphonylurea group. It may be used in non-insulin dependent diabetes mellitus.

Glimepiride acts mainly by stimulating insulin release from pancreatic beta cells.

As with other sulphonylureas this effect is based on an increase of responsiveness of the pancreatic beta cells to the physiological glucose stimulus. In addition, glimepiride seems to have pronounced extrapancreatic effects also postulated for other sulphonylureas.

Insulin release

Sulphonylureas regulate insulin secretion by closing the ATP-sensitive potassium channel in the beta cell membrane. Closing the potassium channel induces depolarisation of the beta cell and results – by opening of calcium channels - in an increased influx of calcium into the cell.

This leads to insulin release through exocytosis.

Glimepiride binds with a high exchange rate to a beta cell membrane protein which is associated with the ATP-sensitive potassium channel but which is different from the usual sulphonylurea binding site.

Extrapancreatic activity

The extrapancreatic effects are for example an improvement of the sensitivity of the peripheral tissue for insulin and a decrease of the insulin uptake by the liver.

The uptake of glucose from blood into peripheral muscle and fat tissues occurs via special transport proteins, located in the cells membrane. The transport of glucose in these tissues is the rate limiting step in the use of glucose. Glimepiride increases very rapidly the number of active glucose transport molecules in the plasma membranes of muscle and fat cells, resulting in stimulated glucose uptake.

Glimepiride increases the activity of the glycosyl-phosphatidylinositol-specific phospholipase C which may be correlated with the medicinal product -induced lipogenesis and glycogenesis in isolated fat and muscle cells.

Glimepiride inhibits the glucose production in the liver by increasing the intracellular concentration of fructose-2,6-bisphosphate, which in its turn inhibits the gluconeogenesis.

General

In healthy persons, the minimum effective oral dose is approximately 0.6 mg. The effect of glimepiride is dose-dependent and reproducible. The physiological response to acute physical exercise, reduction of insulin secretion, is still present under glimepiride.

There was no significant difference in effect regardless of whether the medicinal product was given 30 minutes or immediately before a meal. In diabetic patients, good metabolic control over 24 hours can be achieved with a single daily dose.

Although the hydroxy metabolite of glimepiride caused a small but significant decrease in serum glucose in healthy persons, it accounts for only a minor part of the total medicinal product effect.

Combination therapy with metformin

Improved metabolic control for concomitant glimepiride therapy compared to metformin alone in patients not adequately controlled with the maximum dosage of metformin has been shown in one study.

Combination therapy with insulin

Data for combination therapy with insulin are limited. In patients not adequately controlled with the maximum dosage of glimepiride, concomitant insulin therapy can be initiated. In two studies, the combination achieved the same improvement in metabolic control as insulin alone; however, a lower average dose of insulin was required in combination therapy.

5.2 Pharmacokinetic properties

Absorption: The bioavailability of glimepiride after oral administration is complete. Food intake has no relevant influence on absorption, only absorption rate is slightly diminished. Maximum serum concentrations (C_{\max}) are reached approx. 2.5 hours after oral intake (mean 0.3 $\mu\text{g/ml}$ during multiple dosing of 4 mg daily) and there is a linear relationship between dose and both C_{\max} and AUC (area under the time/concentration curve).

Distribution: Glimepiride has a very low distribution volume (approx. 8.8 litres) which is roughly equal to the albumin distribution space, high protein binding (>99 %), and a low clearance (approx. 48 ml/min).

In animals, glimepiride is excreted in milk. Glimepiride is transferred to the placenta. Passage of the blood brain barrier is low.

Biotransformation and elimination: Mean dominant serum half-life, which is of relevance for the serum concentrations under multiple-dose conditions, is about 5 to 8 hours. After high doses, slightly longer half-lives were noted.

After a single dose of radiolabelled glimepiride, 58 % of the radioactivity was recovered in the urine, and 35 % in the faeces. No unchanged substance was detected in the urine. Two metabolites – most probably resulting from hepatic metabolism (major enzyme is CYP2C9) - were identified both in urine and faeces: the hydroxy derivative and the carboxy derivative. After oral administration of glimepiride, the terminal half-lives of these metabolites were 3 to 6 and 5 to 6 hours respectively.

Comparison of single and multiple once-daily dosing revealed no significant differences in pharmacokinetics, and the intraindividual variability was very low. There was no relevant accumulation.

Pharmacokinetics were similar in males and females, as well as in young and elderly (above 65 years) patients. In patients with low creatinine clearance, there was a tendency for glimepiride clearance to increase and for average serum concentrations to decrease, most probably resulting from a more rapid elimination because of lower protein binding. Renal elimination of the two metabolites was impaired. Overall no additional risk of accumulation is to be assumed in such patients.

Pharmacokinetics in five non-diabetic patients after bile duct surgery were similar to those in healthy persons.

5.3 Preclinical safety data

Preclinical effects observed occurred at exposures significantly in excess of the maximum human exposure as to indicate little relevance to clinical use or were due to pharmacodynamic action (hypoglycaemia) of the compound. The finding is based on conventional safety pharmacology, repeated dose toxicity, genotoxicity, carcinogenicity, teratogenicity and reproduction toxicity studies. In the latter (covering embryotoxicity, teratogenicity and developmental toxicity) adverse effects observed were considered to be secondary to the hypoglycaemic effects induced by the compound in dams and in offspring.

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Lactose monohydrate
 Povidone K25
 Cellulose microcrystalline
 Magnesium stearate
 Sodium starch glycolate Type A
 Iron oxide yellow (E172)
 Indigo carmine aluminium lake (E132)

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

2 years

6.4 Special precautions for storage

Do not store above 25 °C.
Store in the original package.

6.5 Nature and contents of container

Clear PVC/PVdC/aluminium blister

Pack sizes: 30, 50, 60, 90, 100, 120 or 250 tablets

Not all pack sizes may be marketed

6.6 Special precautions for disposal of a used medicinal product or waste materials derived from such medicinal product and other handling of the product

No special requirements.

7 MARKETING AUTHORISATION HOLDER

McDermott Laboratories Ltd.
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Grange Road
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Ireland

8 MARKETING AUTHORISATION NUMBER

PA 577/75/2

9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION

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