Prescribing information (Summary of products characteristics)

1. Name of the medicinal product

INN Name **:** Irbesartan and Hydrochlorothiazide Tablets 300 mg/12.5 mg

Propriority Name **:** IRBIS-HT 300/12.5

Strength **:** 300 mg/12.5 mg

2. Qualitative and quantitative composition

Each film coated tablet contains Irbesartan Ph.Eur 300 mg

Hydrochlorothiazide Ph.Eur 12.5 mg

For Excipients kindly refer to 6.1 list of excipients

3. Pharmaceutical form

Film-coated tablet.

Description: Pink coloured, capsule shaped, biconvex film coated tablets, debossed with '199' on one side and 'I' on the other side.

4. Clinical particulars

4.1 Therapeutic indications

Treatment of essential hypertension.

This fixed dose combination is indicated in adult patients whose blood pressure is not adequately controlled on irbesartan or hydrochlorothiazide alone.

4.2 Posology and method of administration

General Considerations

The side effects of irbesartan are generally rare and apparently independent of dose; those of hydrochlorothiazide are a mixture of dose-dependent (primarily hypokalemia) and dose-independent phenomena (e.g., pancreatitis), the former much more common than the latter.

Maximum antihypertensive effects are attained within 2 to 4 weeks after a change in dose.

Irbesartan and hydrochlorothiazide tablet may be administered with or without food.

Irbesartan and hydrochlorothiazide tablet may be administered with other antihypertensive agents.

Renal impairment. The usual regimens of therapy with Irbesartan and hydrochlorothiazide tablet may be followed as long as the patient's creatinine clearance is >30 mL/min. In patients with

more severe renal impairment, loop diuretics are preferred to thiazides, so Irbesartan and hydrochlorothiazide tablet is not recommended.

Hepatic impairment. No dosage adjustment is necessary in patients with hepatic impairment.

Add-On Therapy

In patients not controlled on monotherapy with Irbesartan and hydrochlorothiazide tablet, the recommended doses of Irbesartan and hydrochlorothiazide tablet, in order of increasing mean effect, are (irbesartan-hydrochlorothiazide) 150/12.5 mg, 300/12.5 mg, and 300/25 mg. The largest incremental effect will likely be in the transition from monotherapy to 150/12.5 mg.

Replacement Therapy

Irbesartan and hydrochlorothiazide tablet may be substituted for the titrated components.

Initial Therapy

The usual starting dose is Irbesartan and hydrochlorothiazide tablet 150/12.5 mg once daily. The dosage can be increased after 1 to 2 weeks of therapy to a maximum of 300/25 mg once daily as needed to control blood pressure. Irbesartan and hydrochlorothiazide tablet is not recommended as initial therapy in patients with intravascular volume depletion.

4.3 Contraindications

Irbesartan and hydrochlorothiazide tablet is contraindicated in patients who are hypersensitive to any component of this product.

Because of the hydrochlorothiazide component, this product is contraindicated in patients with anuria or hypersensitivity to other sulfonamide-derived drugs.

Do not coadminister aliskiren with Irbesartan and hydrochlorothiazide tablet in patients with diabetes.

4.4 Special warnings and precautions for use

Fetal Toxicity

Pregnancy Category D

Use of drugs that act on the renin-angiotensin system during the second and third trimesters of pregnancy reduces fetal renal function and increases fetal and neonatal morbidity and death. Resulting oligohydramnios can be associated with fetal lung hypoplasia and skeletal deformations. Potential neonatal adverse effects include skull hypoplasia, anuria, hypotension, renal failure, and death. When pregnancy is detected, discontinue Irbesartan and hydrochlorothiazide tablet as soon as possible.

Thiazides cross the placenta, and use of thiazides during pregnancy is associated with a risk of fetal or neonatal jaundice, thrombocytopenia, and possibly other adverse reactions that have occurred in adults.

Hypotension in Volume- or Salt-Depleted Patients

Excessive reduction of blood pressure was rarely seen in patients with uncomplicated hypertension treated with irbesartan alone (<0.1%) or with irbesartan-hydrochlorothiazide (approximately 1%). Initiation of antihypertensive therapy may cause symptomatic hypotension in patients with intravascular volume- or sodium-depletion, e.g., in patients treated vigorously with diuretics or in patients on dialysis. Such volume depletion should be corrected prior to administration of antihypertensive therapy.

If hypotension occurs, the patient should be placed in the supine position and, if necessary, given an intravenous infusion of normal saline. A transient hypotensive response is not a contraindication to further treatment, which usually can be continued without difficulty once the blood pressure has stabilized.

Hypersensitivity Reaction

Hydrochlorothiazide

Hypersensitivity reactions to hydrochlorothiazide may occur in patients with or without a history of allergy or bronchial asthma, but are more likely in patients with such a history.

Systemic Lupus Erythematosus

Hydrochlorothiazide

Thiazide diuretics have been reported to cause exacerbation or activation of systemic lupus erythematosus.

Lithium Interaction

Hydrochlorothiazide

Lithium generally should not be given with thiazides.

Electrolyte and Metabolic Imbalances

Irbesartan-Hydrochlorothiazide

In double-blind clinical trials of various doses of irbesartan and hydrochlorothiazide, the incidence of hypertensive patients who developed hypokalemia (serum potassium <3.5 mEq/L) was 7.5% versus 6.0% for placebo; the incidence of hyperkalemia (serum potassium >5.7

mEq/L) was <1.0% versus 1.7% for placebo. No patient discontinued due to increases or decreases in serum potassium. On average, the combination of irbesartan and hydrochlorothiazide had no effect on serum potassium. Higher doses of irbesartan ameliorated the hypokalemic response to hydrochlorothiazide.

Based on experience with the use of other drugs that affect the renin-angiotensin system, concomitant use of potassium-sparing diuretics, potassium supplements, or salt substitutes containing potassium may lead to increases in serum potassium. Concurrent therapy with hydrochlorothiazide may reduce the frequency of this effect.

Hydrochlorothiazide

Hydrochlorothiazide can cause hypokalemia and hyponatremia. Hypomagnesemia can result in hypokalemia which appears difficult to treat despite potassium repletion. Drugs that inhibit the renin-angiotensin system can cause hyperkalemia. Monitor serum electrolytes periodically.

Hyperuricemia may occur or frank gout may be precipitated in certain patients receiving thiazide therapy.

Hydrochlorothiazide may alter glucose tolerance and raise serum levels of cholesterol and triglycerides.

The antihypertensive effects of the drug may be enhanced in the post-sympathectomy patient.

Thiazides may decrease urinary calcium excretion. Thiazides may cause intermittent and slight elevation of serum calcium in the absence of known disorders of calcium metabolism. Marked hypercalcemia may be evidence of hidden hyperparathyroidism. Thiazides should be discontinued before carrying out tests for parathyroid function.

Hepatic Impairment

Hydrochlorothiazide

Thiazides should be used with caution in patients with impaired hepatic function or progressive liver disease, since minor alterations of fluid and electrolyte balance may precipitate hepatic coma.

Impaired Renal Function

As a consequence of inhibiting the renin-angiotensin-aldosterone system, changes in renal function may be anticipated in susceptible individuals. In patients whose renal function may depend on the activity of the renin-angiotensin-aldosterone system (e.g., patients with severe congestive heart failure), treatment with ACE inhibitors has been associated with oliguria and/or progressive azotemia and (rarely) with acute renal failure and/or death. Irbesartan would be

expected to behave similarly. In studies of ACE inhibitors in patients with unilateral or bilateral renal artery stenosis, increases in serum creatinine or BUN have been reported. There has been no known use of irbesartan in patients with unilateral or bilateral renal artery stenosis, but a similar effect should be anticipated.

Thiazides should be used with caution in severe renal disease. In patients with renal disease, thiazides may precipitate azotemia. Cumulative effects of the drug may develop in patients with impaired renal function.

Acute Myopia and Secondary Angle-Closure Glaucoma

Sulfonamide or sulfonamide derivative drugs, such as hydrochlorothiazide, can cause an idiosyncratic reaction, resulting in transient myopia and acute angle-closure glaucoma. Cases of acute angle-closure glaucoma have been reported with hydrochlorothiazide. Symptoms include acute onset of decreased visual acuity or ocular pain and typically occur within hours to weeks of drug initiation. Untreated acute angle-closure glaucoma can lead to permanent vision loss. The primary treatment is to discontinue drug intake as rapidly as possible. Prompt medical or surgical treatments may need to be considered if the intraocular pressure remains uncontrolled. Risk factors for developing acute angle-closure glaucoma may include a history of sulfonamide or penicillin allergy.

4.5 Interaction with other medicinal products and other forms of interaction

Irbesartan

No significant drug-drug interactions have been found in interaction studies with hydrochlorothiazide, digoxin, warfarin, and nifedipine.

Non-Steroidal Anti-Inflammatory Agents Including Selective Cyclooxygenase-2 Inhibitors (COX-2 Inhibitors)

In patients who are elderly, volume-depleted (including those on diuretic therapy), or with compromised renal function, coadministration of NSAIDs, including selective COX-2 inhibitors, with angiotensin II receptor antagonists, including irbesartan, may result in deterioration of renal function, including possible acute renal failure. These effects are usually reversible. Monitor renal function periodically in patients receiving irbesartan and NSAID therapy.

The antihypertensive effect of angiotensin II receptor antagonists, including irbesartan, may be attenuated by NSAIDs including selective COX-2 inhibitors.

Dual Blockade of the Renin-Angiotensin System (RAS)

Dual blockade of the RAS with angiotensin-receptor blockers, ACE inhibitors, or aliskiren is associated with increased risks of hypotension, hyperkalemia, and changes in renal function (including acute renal failure) compared to monotherapy. Closely monitor blood pressure, renal function, and electrolytes in patients on Irbesartan and hydrochlorothiazide tablet and other agents that affect the RAS.

Do not coadminister aliskiren with Irbesartan and hydrochlorothiazide tablet in patients with diabetes. Avoid use of aliskiren with Irbesartan and hydrochlorothiazide tablet in patients with renal impairment (GFR <60 mL/min).

Hydrochlorothiazide

When administered concurrently the following drugs may interact with thiazide diuretics:

Alcohol, Barbiturates, or Narcotics: potentiation of orthostatic hypotension may occur.

Antidiabetic Drugs (oral agents and insulin): dosage adjustment of the antidiabetic drug may be required.

Other Antihypertensive Drugs: additive effect or potentiation.

Cholestyramine and Colestipol Resins: absorption of hydrochlorothiazide is impaired in the presence of anionic exchange resins. Single doses of either cholestyramine or colestipol resins bind the hydrochlorothiazide and reduce its absorption from the gastrointestinal tract by up to 85% and 43%, respectively. Irbesartan and hydrochlorothiazide tablet should be taken at least one hour before or four hours after these medications.

Corticosteroids, ACTH: intensified electrolyte depletion, particularly hypokalemia.

Pressor Amines (e.g., Norepinephrine): possible decreased response to pressor amines but not sufficient to preclude their use.

Skeletal Muscle Relaxants, Nondepolarizing (e.g., Tubocurarine): possible increased responsiveness to the muscle relaxant.

Lithium: should not generally be given with diuretics. Diuretic agents reduce the renal clearance of lithium and add a high risk of lithium toxicity. Refer to the package insert for lithium preparations before use of such preparations with Irbesartan and hydrochlorothiazide tablet.

Non-steroidal Anti-inflammatory Drugs: in some patients, the administration of a non-steroidal anti-inflammatory agent can reduce the diuretic, natriuretic, and antihypertensive effects of loop, potassium-sparing, and thiazide diuretics. Therefore, when Irbesartan and hydrochlorothiazide tablet (irbesartan-hydrochlorothiazide) Tablets and non-steroidal anti-inflammatory agents are

used concomitantly, the patient should be observed closely to determine if the desired effect of the diuretic is obtained.

Carbamazepine: concomitant use of carbamazepine and hydrochlorothiazide has been associated with the risk of symptomatic hyponatremia. Electrolytes should be monitored during concomitant use.

4.6 Fertility, pregnancy and lactation

8.1 Pregnancy

Pregnancy Category D

Use of drugs that act on the renin-angiotensin system during the second and third trimesters of pregnancy reduces fetal renal function and increases fetal and neonatal morbidity and death. Resulting oligohydramnios can be associated with fetal lung hypoplasia and skeletal deformations. Potential neonatal adverse effects include skull hypoplasia, anuria, hypotension, renal failure, and death. When pregnancy is detected, discontinue Irbesartan and hydrochlorothiazide tablet as soon as possible. These adverse outcomes are usually associated with use of these drugs in the second and third trimester of pregnancy. Most epidemiologic studies examining fetal abnormalities after exposure to antihypertensive use in the first trimester have not distinguished drugs affecting the renin-angiotensin system from other antihypertensive agents. Appropriate management of maternal hypertension during pregnancy is important to optimize outcomes for both mother and fetus.

In the unusual case that there is no appropriate alternative to therapy with drugs affecting the renin-angiotensin system for a particular patient, apprise the mother of the potential risk to the fetus. Perform serial ultrasound examinations to assess the intra-amniotic environment. If oligohydramnios is observed, discontinue Irbesartan and hydrochlorothiazide tablet, unless it is considered lifesaving for the mother. Fetal testing may be appropriate, based on the week of pregnancy. Patients and physicians should be aware, however, that oligohydramnios may not appear until after the fetus has sustained irreversible injury. Closely observe infants with histories of *in utero* exposure to Irbesartan and hydrochlorothiazide tablet for hypotension, oliguria, and hyperkalemia.

Irbesartan crosses the placenta in rats and rabbits. In pregnant rats given irbesartan at doses greater than the maximum recommended human dose (MRHD), fetuses showed increased incidences of renal pelvic cavitation, hydroureter and/or absence of renal papilla. Subcutaneous

edema also occurred in fetuses at doses about 4 times the MRHD (based on body surface area). These anomalies occurred when pregnant rats received irbesartan through Day 20 of gestation but not when drug was stopped on gestation Day 15. The observed effects are believed to be late gestational effects of the drug. Pregnant rabbits given oral doses of irbesartan equivalent to 1.5 times the MRHD experienced a high rate of maternal mortality and abortion. Surviving females had a slight increase in early resorptions and a corresponding decrease in live fetuses.

Radioactivity was present in the rat and rabbit fetus during late gestation and in rat milk following oral doses of radiolabeled irbesartan.

When pregnant mice and rats were given hydrochlorothiazide at doses up to 3000 and 1000 mg/kg/day, respectively (about 600 and 400 times the MRHD) during their respective periods of major organogenesis, there was no evidence of fetal harm.

A development toxicity study was performed in rats with doses of 50/50 mg/kg/day and 150/150 mg/kg/day irbesartan-hydrochlorothiazide. Although the high dose combination appeared to be more toxic to the dams than either drug alone, there did not appear to be an increase in toxicity to the developing embryos.

Nursing Mothers

It is not known whether irbesartan is excreted in human milk, but irbesartan or some metabolite of irbesartan is secreted at low concentration in the milk of lactating rats.

Thiazides appear in human milk. Because of the potential for adverse effects on the nursing infant, a decision should be made whether to discontinue nursing or discontinue the drug, taking into account the importance of the drug to the mother.

8.4 Pediatric Use

Neonates with a history of *in utero* exposure to Irbesartan and hydrochlorothiazide tablet:

If oliguria or hypotension occurs, direct attention toward support of blood pressure and renal perfusion. Exchange transfusions or dialysis may be required as a means of reversing hypotension and/or substituting for disordered renal function.

Safety and effectiveness in pediatric patients have not been established.

Geriatric Use

Of 1694 patients receiving Irbesartan and hydrochlorothiazide tablet in controlled clinical studies of hypertension, 264 (15.6%) were 65 years and over, while 45 (2.7%) were 75 years and over. No overall differences in safety or effectiveness were observed between these patients and younger patients, but greater sensitivity of some older individuals cannot be ruled out.

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. Based on its pharmacodynamic properties, Irbesartan/ Hydrochlorothiazide is unlikely to affect this ability. When driving vehicles or operating machines, it should be taken into account that occasionally dizziness or weariness may occur during treatment of hypertension.

4.8 Undesirable effects

Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice. The adverse reaction information from clinical trials does, however, provide a basis for identifying the adverse events that appear to be related to drug use and for approximating rates.

Irbesartan-Hydrochlorothiazide

Irbesartan and hydrochlorothiazide Tablets have been evaluated for safety in 1694 patients treated for essential hypertension in 6 clinical trials. In Studies I through IV with Irbesartan and hydrochlorothiazide tablet, no adverse events peculiar to this combination drug product have been observed. Adverse events have been limited to those that were reported previously with irbesartan or hydrochlorothiazide (HCTZ). The overall incidence of adverse events was similar with the combination and placebo. In general, treatment with Irbesartan and hydrochlorothiazide tablet was well tolerated.

For the most part, adverse events have been mild and transient in nature and have not required discontinuation of therapy. In controlled clinical trials, discontinuation of Irbesartan and hydrochlorothiazide tablet therapy due to clinical adverse events was required in only 3.6%. This incidence was significantly less (p=0.023) than the 6.8% of patients treated with placebo who discontinued therapy.

In these double-blind controlled clinical trials, the following adverse events reported with Irbesartan and hydrochlorothiazide tablet occurred in ≥1% of patients, and more often on the irbesartan-hydrochlorothiazide combination than on placebo, regardless of drug relationship:

	Irbesartan/HCTZ (n=898) (%)	**Placebo (n=236) (%)**	**Irbesartan (n=400) (%)**	**HCTZ (n=380) (%)**
Body as a Whole				

Chest Pain	2	1	2	2
Fatigue	6	3	4	3
Influenza	3	1	2	2
Cardiovascular				
Edema	3	3	2	2
Tachycardia	1	0	1	1
Gastrointestinal				
Abdominal Pain	2	1	2	2
Dyspepsia/heartburn	2	1	0	2
Nausea/vomiting	3	0	2	2
Immunology				
Allergy	1	0	1	1
Musculoskeletal				
Musculoskeletal Pain	6	5	6	10
Nervous System				
Dizziness	8	4	6	5
Dizziness Orthostatic	1	0	1	1
Renal/Genitourinary				
Abnormality Urination	2	1	1	2

The following adverse events were also reported at a rate of 1% or greater, but were as, or more, common in the placebo group: headache, sinus abnormality, cough, URI, pharyngitis, diarrhea, rhinitis, urinary tract infection, rash, anxiety/nervousness, and muscle cramp.

Adverse events occurred at about the same rates in men and women, older and younger patients, and black and non-black patients.

Adverse events in Studies V and VI were similar to those described above in Studies I through IV.

Irbesartan

Other adverse events that have been reported with irbesartan, without regard to causality, are listed below:

Body as a Whole: fever, chills, orthostatic effects, facial edema, upper extremity edema

Cardiovascular: flushing, hypertension, cardiac murmur, myocardial infarction, angina pectoris, hypotension, syncope, arrhythmic/conduction disorder, cardiorespiratory arrest, heart failure, hypertensive crisis

Dermatologic: pruritus, dermatitis, ecchymosis, erythema face, urticarial

Endocrine/Metabolic/Electrolyte Imbalances: sexual dysfunction, libido change, gout

Gastrointestinal: diarrhea, constipation, gastroenteritis, flatulence, abdominal distention

Musculoskeletal/Connective Tissue: musculoskeletal trauma, extremity swelling, muscle cramp, arthritis, muscle ache, musculoskeletal chest pain, joint stiffness, bursitis, muscle weakness

Nervous System: anxiety/nervousness, sleep disturbance, numbness, somnolence, vertigo, emotional disturbance, depression, paresthesia, tremor, transient ischemic attack, cerebrovascular accident Renal/Genitourinary: prostate disorder

Respiratory: cough, upper respiratory infection, epistaxis, tracheobronchitis, congestion, pulmonary congestion, dyspnea, wheezing

Special Senses: vision disturbance, hearing abnormality, ear infection, ear pain, conjunctivitis

Hydrochlorothiazide

Other adverse events that have been reported with hydrochlorothiazide, without regard to causality, are listed below:

Body as a Whole: weakness

Digestive: pancreatitis, jaundice (intrahepatic cholestatic jaundice), sialadenitis, cramping, gastric irritation

Hematologic: aplastic anemia, agranulocytosis, leukopenia, hemolytic anemia, thrombocytopenia

Hypersensitivity: purpura, photosensitivity, urticaria, necrotizing angiitis (vasculitis and cutaneous vasculitis), fever, respiratory distress including pneumonitis and pulmonary edema, anaphylactic reactions

Metabolic: hyperglycemia, glycosuria, hyperuricemia

Musculoskeletal: muscle spasm

Nervous System/Psychiatric: restlessness

Renal: renal failure, renal dysfunction, interstitial nephritis

Skin: erythema multiforme including Stevens-Johnson syndrome, exfoliative dermatitis including toxic epidermal necrolysis

Special Senses: transient blurred vision, xanthopsia

Initial Therapy

In the moderate hypertension Study V (mean SeDBP between 90 and 110 mmHg), the types and incidences of adverse events reported for patients treated with Irbesartan and hydrochlorothiazide tablet were similar to the adverse event profile in patients on initial irbesartan or HCTZ monotherapy. There were no reported events of syncope in the Irbesartan and hydrochlorothiazide tablet treatment group and there was one reported event in the HCTZ treatment group. The incidences of pre-specified adverse events on Irbesartan and

hydrochlorothiazide tablet, irbesartan, and HCTZ, respectively, were: 0.9%, 0%, and 0% for hypotension; 3.0%, 3.8%, and 1.0% for dizziness; 5.5%, 3.8%, and 4.8% for headache; 1.2%, 0%, and 1.0% for hyperkalemia; and 0.9%, 0%, and 0% for hypokalemia. The rates of discontinuation due to adverse events on Irbesartan and hydrochlorothiazide tablet, irbesartan alone, and HCTZ alone were 6.7%, 3.8%, and 4.8%.

In the severe hypertension (SeDBP ≥110 mmHg) Study VI, the overall pattern of adverse events reported through 7 weeks of follow-up was similar in patients treated with Irbesartan and hydrochlorothiazide tablet as initial therapy and in patients treated with irbesartan as initial therapy. The incidences of the pre-specified adverse events on Irbesartan and hydrochlorothiazide tablet and irbesartan, respectively, were: 0% and 0% for syncope; 0.6% and 0% for hypotension; 3.6% and 4.0% for dizziness; 4.3% and 6.6% for headache; 0.2% and 0% for hyperkalemia; and 0.6% and 0.4% for hypokalemia. The rates of discontinuation due to adverse events

Post-Marketing Experience

The following adverse reactions have been identified during post-approval use of Irbesartan and hydrochlorothiazide tablet. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure. Decisions to include these reactions in labeling are typically based on one or more of the following factors: (1) seriousness of the reaction, (2) frequency of reporting, or (3) strength of causal connection to Irbesartan and hydrochlorothiazide tablet.

The following have been very rarely reported: urticaria, angioedema (involving swelling of the face, lips, pharynx, and/or tongue), and hepatitis. Hyperkalemia has been rarely reported.

Very rare cases of jaundice have been reported with irbesartan.

Impaired renal function, including cases of renal failure in patients at risk, has been reported with irbesartan and Irbesartan and hydrochlorothiazide tablet.

Cases of increased CPK and rhabdomyolysis have been reported in patients receiving angiotensin II receptor blockers.

Laboratory Abnormalities

In controlled clinical trials, clinically important changes in standard laboratory parameters were rarely associated with administration of Irbesartan and hydrochlorothiazide tablet.

Creatinine, Blood Urea Nitrogen: Minor increases in blood urea nitrogen (BUN) or serum creatinine were observed in 2.3% and 1.1%, respectively, of patients with essential hypertension

treated with Irbesartan and hydrochlorothiazide tablet alone. No patient discontinued taking Irbesartan and hydrochlorothiazide tablet due to increased BUN. One patient discontinued taking Irbesartan and hydrochlorothiazide tablet due to a minor increase in serum creatinine.

Liver Function Tests: Occasional elevations of liver enzymes and/or serum bilirubin have occurred. In patients with essential hypertension treated with Irbesartan and hydrochlorothiazide tablet alone, one patient was discontinued due to elevated liver enzymes.

Serum Electrolytes: [refer Warnings and Precautions (4.4).]

4.9 Overdose

Irbesartan

No data are available in regard to overdosage in humans. However, daily doses of 900 mg for 8 weeks were well tolerated. The most likely manifestations of overdosage are expected to be hypotension and tachycardia; bradycardia might also occur from overdose. Irbesartan is not removed by hemodialysis.

To obtain up-to-date information about the treatment of overdosage, a good resource is a certified regional Poison Control Center. Telephone numbers of certified Poison Control Centers are listed in the *Physicians' Desk Reference* (PDR). In managing overdose, consider the possibilities of multiple-drug interactions, drug-drug interactions, and unusual drug kinetics in the patient.

Laboratory determinations of serum levels of irbesartan are not widely available, and such determinations have, in any event, no established role in the management of irbesartan overdose.

Acute oral toxicity studies with irbesartan in mice and rats indicated acute lethal doses were in excess of 2000 mg/kg, about 25- and 50-fold the MRHD (300 mg) on a mg/m basis, respectively.

Hydrochlorothiazide

The most common signs and symptoms of overdose observed in humans are those caused by electrolyte depletion (hypokalemia, hypochloremia, hyponatremia) and dehydration resulting from excessive diuresis. If digitalis has also been administered, hypokalemia may accentuate cardiac arrhythmias. The degree to which hydrochlorothiazide is removed by hemodialysis has not been established. The oral LD of hydrochlorothiazide is greater than 10 g/kg in both mice and rats.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Irbesartan

In healthy subjects, single oral irbesartan doses of up to 300 mg produced dose-dependent inhibition of the pressor effect of angiotensin II infusions. Inhibition was complete (100%) 4 hours following oral doses of 150 mg or 300 mg and partial inhibition was sustained for 24 hours (60% and 40% at 300 mg and 150 mg, respectively).

In hypertensive patients, angiotensin II receptor inhibition following chronic administration of irbesartan causes a 1.5- to 2-fold rise in angiotensin II plasma concentration and a 2- to 3-fold increase in plasma renin levels. Aldosterone plasma concentrations generally decline following irbesartan administration, but serum potassium levels are not significantly affected at recommended doses.

In hypertensive patients, chronic oral doses of irbesartan (up to 300 mg) had no effect on glomerular filtration rate, renal plasma flow or filtration fraction. In multiple dose studies in hypertensive patients, there were no clinically important effects on fasting triglycerides, total cholesterol, HDL-cholesterol, or fasting glucose concentrations. There was no effect on serum uric acid during chronic oral administration and no uricosuric effect.

Hydrochlorothiazide

After oral administration of hydrochlorothiazide, diuresis begins within 2 hours, peaks in about 4 hours and lasts about 6 to 12 hours.

5.2 Pharmacokinetic properties

Irbesartan

Irbesartan is an orally active agent that does not require biotransformation into an active form. The oral absorption of irbesartan is rapid and complete with an average absolute bioavailability of 60% to 80%. Following oral administration of irbesartan, peak plasma concentrations of irbesartan are attained at 1.5 to 2 hours after dosing. Food does not affect the bioavailability of irbesartan.

Irbesartan exhibits linear pharmacokinetics over the therapeutic dose range.

The terminal elimination half-life of irbesartan averaged 11 to 15 hours. Steady-state concentrations are achieved within 3 days. Limited accumulation of irbesartan (<20%) is observed in plasma upon repeated once-daily dosing.

Hydrochlorothiazide

When plasma levels have been followed for at least 24 hours, the plasma half-life has been observed to vary between 5.6 and 14.8 hours.

Metabolism and Elimination

Irbesartan

Irbesartan is metabolized via glucuronide conjugation and oxidation. Following oral or intravenous administration of C-labeled irbesartan, more than 80% of the circulating plasma radioactivity is attributable to unchanged irbesartan. The primary circulating metabolite is the inactive irbesartan glucuronide conjugate (approximately 6%). The remaining oxidative metabolites do not add appreciably to irbesartan's pharmacologic activity.

Irbesartan and its metabolites are excreted by both biliary and renal routes. Following either oral or intravenous administration of C-labeled irbesartan, about 20% of radioactivity is recovered in the urine and the remainder in the feces, as irbesartan or irbesartan glucuronide.

In vitro studies of irbesartan oxidation by cytochrome P450 isoenzymes indicated irbesartan was oxidized primarily by 2C9; metabolism by 3A4 was negligible. Irbesartan was neither metabolized by, nor did it substantially induce or inhibit, isoenzymes commonly associated with drug metabolism (1A1, 1A2, 2A6, 2B6, 2D6, 2E1). There was no induction or inhibition of 3A4.

Hydrochlorothiazide

Hydrochlorothiazide is not metabolized but is eliminated rapidly by the kidney. At least 61% of the oral dose is eliminated unchanged within 24 hours.

Distribution

Irbesartan

Irbesartan is 90% bound to serum proteins (primarily albumin and α -acid glycoprotein) with negligible binding to cellular components of blood. The average volume of distribution is 53 to 93 liters. Total plasma and renal clearances are in the range of 157 to 176 mL/min and 3.0 to 3.5 mL/min, respectively. With repetitive dosing, irbesartan accumulates to no clinically relevant extent.

Studies in animals indicate that radiolabeled irbesartan weakly crosses the blood-brain barrier and placenta. Irbesartan is excreted in the milk of lactating rats.

Hydrochlorothiazide

Hydrochlorothiazide crosses the placental but not the blood-brain barrier and is excreted in breast milk.

Pediatric

Irbesartan-hydrochlorothiazide pharmacokinetics have not been investigated in patients <18 years of age.

Gender

No gender-related differences in pharmacokinetics were observed in healthy elderly (age 65 to 80 years) or in healthy young (age 18 to 40 years) subjects. In studies of hypertensive patients, there was no gender difference in half-life or accumulation, but somewhat higher plasma concentrations of irbesartan were observed in females (11% to 44%). No gender-related dosage adjustment is necessary.

Geriatric

In elderly subjects (age 65 to 80 years), irbesartan elimination half-life was not significantly altered, but AUC and C values were about 20% to 50% greater than those of young subjects (age 18 to 40 years). No dosage adjustment is necessary in the elderly.

Race

In healthy black subjects, irbesartan AUC values were approximately 25% greater than whites; there were no differences in C values.

Renal Insufficiency

The pharmacokinetics of irbesartan were not altered in patients with renal impairment or in patients on hemodialysis. Irbesartan is not removed by hemodialysis. No dosage adjustment is necessary in patients with mild to severe renal impairment unless a patient with renal impairment is also volume depleted.

Hepatic Insufficiency

The pharmacokinetics of irbesartan following repeated oral administration were not significantly affected in patients with mild to moderate cirrhosis of the liver. No dosage adjustment is necessary in patients with hepatic insufficiency.

Drug-Drug Interactions

No significant drug-drug pharmacokinetic (or pharmacodynamic) interactions have been found in interaction studies with hydrochlorothiazide, digoxin, warfarin, and nifedipine.

In vitro studies show significant inhibition of the formation of oxidized irbesartan metabolites with the known cytochrome CYP 2C9 substrates/inhibitors sulphenazole, tolbutamide, and nifedipine. However, in clinical studies the consequences of concomitant irbesartan on the pharmacodynamics of warfarin were negligible. Concomitant nifedipine or hydrochlorothiazide had no effect on irbesartan pharmacokinetics. Based on *in vitro* data, no interaction would be expected with drugs whose metabolism is dependent upon cytochrome P450 isoenzymes 1A1, 1A2, 2A6, 2B6, 2D6, 2E1, or 3A4.

In separate studies of patients receiving maintenance doses of warfarin, hydrochlorothiazide, or digoxin, irbesartan administration for 7 days had no effect on the pharmacodynamics of warfarin (prothrombin time) or the pharmacokinetics of digoxin. The pharmacokinetics of irbesartan were not affected by coadministration of nifedipine or hydrochlorothiazide.

5.3 Preclinical safety data

Carcinogenesis, Mutagenesis , Impairment of Fertility

Irbesartan-Hydrochlorothiazide

No carcinogenicity studies have been conducted with the irbesartan-hydrochlorothiazide combination.

Irbesartan-hydrochlorothiazide was not mutagenic in standard *in vitro* tests (Ames microbial test and Chinese hamster mammalian-cell forward gene-mutation assay). Irbesartan-hydrochlorothiazide was negative in tests for induction of chromosomal aberrations (*in vitro*—human lymphocyte assay; *in vivo*—mouse micronucleus study).

The combination of irbesartan and hydrochlorothiazide has not been evaluated in definitive studies of fertility.

Irbesartan

No evidence of carcinogenicity was observed when irbesartan was administered at doses of up to 500/1000 mg/kg/day (males/females, respectively) in rats and 1000 mg/kg/day in mice for up to 2 years. For male and female rats, 500 mg/kg/day provided an average systemic exposure to irbesartan (AUC, bound plus unbound) about 3 and 11 times, respectively, the average systemic exposure in humans receiving the maximum recommended dose (MRD) of 300 mg irbesartan/day, whereas 1000 mg/kg/day (administered to females only) provided an average systemic exposure about 21 times that reported for humans at the MRD. For male and female

mice, 1000 mg/kg/day provided an exposure to irbesartan about 3 and 5 times, respectively, the human exposure at 300 mg/day.

Irbesartan was not mutagenic in a battery of *in vitro* tests (Ames microbial test, rat hepatocyte DNA repair test, V79 mammalian-cell forward gene-mutation assay). Irbesartan was negative in several tests for induction of chromosomal aberrations (*in vitro*—human lymphocyte assay; *in vivo*—mouse micronucleus study).

Irbesartan had no adverse effects on fertility or mating of male or female rats at oral doses ≤650 mg/kg/day, the highest dose providing a systemic exposure to irbesartan (AUC, bound plus unbound) about 5 times that found in humans receiving the MRD of 300 mg/day.

Hydrochlorothiazide

Two-year feeding studies in mice and rats conducted under the auspices of the National Toxicology

Program (NTP) uncovered no evidence of a carcinogenic potential of hydrochlorothiazide in female mice (at doses of up to approximately 600 mg/kg/day) or in male and female rats (at doses of up to approximately 100 mg/kg/day). The NTP, however, found equivocal evidence for hepatocarcinogenicity in male mice.

Hydrochlorothiazide was not genotoxic *in vitro* in the Ames mutagenicity assay of *Salmonella typhimurium* strains TA 98, TA 100, TA 1535, TA 1537, and TA 1538 and in the Chinese Hamster

Ovary (CHO) test for chromosomal aberrations, or *in vivo* in assays using mouse germinal cell chromosomes, Chinese hamster bone marrow chromosomes, and the *Drosophila* sex-linked lethal trait gene. Positive test results were obtained only in the *in vitro* CHO Sister Chromatid Exchange (clastogenicity) and in the Mouse Lymphoma Cell (mutagenicity) assays, using concentrations of hydrochlorothiazide from 43 to 1300 μg/mL, and in the *Aspergillus nidulans* non-disjunction assay at an unspecified concentration.

Hydrochlorothiazide had no adverse effects on the fertility of mice and rats of either sex in studies wherein these species were exposed, via their diet, to doses of up to 100 and 4 mg/kg, respectively, prior to mating and throughout gestation.

Animal Toxicology and/or Pharmacology

Reproductive Toxicology Studies

When pregnant rats were treated with irbesartan from Day 0 to Day 20 of gestation (oral doses of 50, 180, and 650 mg/kg/day), increased incidences of renal pelvic cavitation, hydroureter, and/or

absence of renal papilla were observed in fetuses at doses ≥50 mg/kg/day (approximately equivalent to the MRHD, 300 mg/day, on a body surface area basis). Subcutaneous edema was observed in fetuses at doses ≥180 mg/kg/day (about 4 times the MRHD on a body surface area basis). As these anomalies were not observed in rats in which irbesartan exposure (oral doses of 50, 150, and 450 mg/kg/day) was limited to gestation days 6 to 15, they appear to reflect late gestational effects of the drug. In pregnant rabbits, oral doses of 30 mg irbesartan/kg/day were associated with maternal mortality and abortion. Surviving females receiving this dose (about 1.5 times the MRHD on a body surface area basis) had a slight increase in early resorptions and a corresponding decrease in live fetuses. Irbesartan was found to cross the placental barrier in rats and rabbits.

6. Pharmaceutical particulars

6.1 List of excipients

Cellulose, Microcrystalline (Avicel PH 101), Carmellose Calcium(Calcium CMC) (ECG-505), Povidone K-30 (Kollidon-30), Purified Water, Silica, Colloidal Anhydrous (Aerosil-200), Calcium Stearate (Synpro VG) and Opadry II Pink 32F84768

6.2 Incompatibilities

Not applicable.

6.3 Shelf life

<3 Years>

6.4 Special precautions for storage

Store below 30°C and protect from moisture

6.5 Nature and contents of container

Blister pack: 10's pack – 25 microns Al.foil, 250 microns white opaque PVC/ PVdC film

10's pack – 25 microns Al.foil, 250 microns white opaque PVC/25 microns PE/40 GSM PVdC

6.6 Special precautions for disposal

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

7. Marketing Authorisation Holder and Manufacturing Site Addresses

Marketing authorization Holder:

Name: **Hetero Labs Limited**

Business Address: 7-2-A2, Hetero Corporate, Industrial Estates, Sanath Nagar, Hyderabad-500 018, Telangana. India

Telephone : +91-40-23704923/24/25

Telefax : +91-40-23704035/23813359

E-Mail : contact@heterodrugs.com

Manufacturing site :

(Company) Name : Hetero Labs Limited (Unit-V)

Address : TSIIC Formulation SEZ, S.No 439, 440, 441 & 458 Polepally village, Jadcherla Mandal, Mahaboob Nagar (Dist) – 509301, Telangana, India

Telephone : +91 08542-238400

Telefax : + 91 08542 238404

E-Mail : drkepi@heterodrugs.com

8. Marketing authorization number

9. Date of first registration/renewal of the registration

10. Date of revision of the text