SUMMARY OF PRODUCT CHARACTERISTICS

1 NAME OF THE MEDICINAL PRODUCT
Mefenamic Acid Suspension 50mg/5ml

2 QUALITATIVE AND QUANTITATIVE COMPOSITION
Mefenamic acid 50mg in each 5ml.
For a full list of excipients, see section 6.1.

3 PHARMACEUTICAL FORM
An off-white suspension with typical aroma and taste

4 CLINICAL PARTICULARS
4.1 Therapeutic indications
Mefenamic acid is a non-steroidal anti-inflammatory agent with analgesic properties, and a demonstratable antipyretic effect. It has been shown to inhibit prostaglandin activity.

Indications
1. As an anti-inflammatory analgesic for the symptomatic relief of rheumatoid arthritis (including Still’s Disease), osteoarthritis, and pain including muscular, traumatic and dental pain, headaches of most aetiology, post-operative and post-partum pain, pyrexia in children.
2. Primary dysmenorrhoea in older children

4.2 Posology and method of administration
For oral administration
Undesirable effects may be minimised by using the lowest effective dose for the shortest duration necessary to control symptoms (see section 4.4).

Children
It is recommended that children under 12 years of age should be given Mefenamic Acid Suspension (50mg/5ml) in the following dosage regime:
- Infants over 6 months – 25mg/kg of bodyweight daily in divided doses,
- 6 months to under 2 years – one 5 ml spoonful
- 2 years to under 5 years – two 5 ml spoonfuls
- 5 years to under 9 years – three 5 ml spoonfuls
- 9 years to 12 years – four 5 ml spoonfuls
Doses may be repeated as necessary, up to three times daily

Mefenamic acid suspension should be taken preferably with or after food.

Apart from the treatment of Still’s Disease, therapy should not be continued for longer than 7 days in children.

Although mefenamic acid suspension is not indicated to be used by the elderly, if used in elderly patients, these patients are at increased risk of the serious consequences of adverse reactions. If an NSAID is considered necessary, the lowest effective dose should be used and for the shortest possible duration. The patient should be monitored regularly for GI bleeding during NSAID therapy

*Do not exceed the stated dose.*

### 4.3 Contraindications

Hypersensitivity to mefenamic acid or any of the other ingredients.

Inflammatory bowel disease

History of gastrointestinal bleeding or perforation, related to previous NSAIDs therapy.

Active, or history of recurrent peptic ulcer/haemorrhage (two or more distinct episodes of proven ulceration or bleeding).

Severe heart failure, hepatic failure and renal failure (see section 4.4).

Because the potential exists for cross-sensitivity to aspirin, ibuprofen, or other non-steroidal anti-inflammatory drugs, mefenamic acid must not be given to patients who have previously shown hypersensitivity reaction (e.g. asthma, bronchospasm, rhinitis, angioedema or urticaria) to these medicines.

During the last trimester of pregnancy (see section 4.6).

Treatment of pain after coronary artery bypass graft (CABG) surgery.

### 4.4 Special warnings and precautions for use

Undesirable effects may be minimised by using the lowest effective dose for the shortest duration necessary to control symptoms (see section 4.2, and GI and cardiovascular risks below).

Patients on prolonged therapy should be kept under regular surveillance with particular attention to liver dysfunction, rash, blood dyscrasias or development of diarrhoea. Appearance of any of these symptoms should be regarded as an indication to stop therapy immediately (see section 4.8)
Use with concomitant NSAIDs including cyclooxygenase 2 specific inhibitors (see section 4.5).

Prolonged use of any type of painkiller for headaches can make them worse. If this situation is experienced or suspected, medical advice should be obtained and treatment should be discontinued. The diagnosis of 'Medication Overuse Headache' should be suspected in patients who have frequent or daily headaches despite (or because of) the regular use of headache medications. Patients suffering from dehydration and renal disease particularly the elderly when mefenamic acid suspension has been considered appropriate in this age group.

**Elderly:** If used by the elderly, such patients have an increased frequency of adverse reactions to NSAIDs especially gastrointestinal bleeding and perforation which may be fatal (see section 4.2).

**Respiratory disorders:** Caution is required if administered to patients suffering from, or with a previous history of, bronchial asthma since NSAIDs have been reported to precipitate bronchospasm in such patients.

**Cardiovascular, Renal and Hepatic impairment:** The administration of an NSAID may cause a dose dependant reduction in prostaglandin formation and precipitate renal failure. Patients at greatest risk of this reaction are those with impaired renal function, cardiac impairment, liver dysfunction, those taking diuretics and the elderly. Renal function should be monitored in these patients (see also section 4.3).

**Cardiovascular and cerebrovascular effects:** Appropriate monitoring and advice are required for patients with a history of hypertension and/or mild to moderate congestive heart failure as fluid retention and oedema have been reported in association with NSAID therapy.

Clinical trial and epidemiological data suggest that use of some NSAIDs (particularly at high doses and in long term treatment) may be associated with a small increased risk of arterial thrombotic events (for example myocardial infarction or stroke). There are insufficient data to exclude such a risk for mefenamic acid.

Patients with uncontrolled hypertension, congestive heart failure, established ischaemic heart disease, peripheral arterial disease, and/or cerebrovascular disease should only be treated with mefenamic acid after careful consideration. Similar consideration should be made before initiating longer-term treatment of patients with risk factors for cardiovascular disease (e.g. hypertension, hyperlipidaemia, diabetes mellitus, smoking).

As NSAIDs can interfere with platelet function, they should be used in caution in patients with intracranial haemorrhage and bleeding diathesis.

**Gastrointestinal bleeding, ulceration and perforation:** GI bleeding, ulceration or perforation, which can be fatal, has been reported with all NSAIDs at any time during treatment, with or without warning symptoms or a previous history of serious GI events. Smoking and alcohol use are added risk factors.

The risk of GI bleeding, ulceration or perforation is higher with increasing NSAID doses, in patients with a history of ulcer, particularly if complicated with haemorrhage or perforation (see section 4.3), and in the elderly. Combination therapy with protective agents (e.g. misoprostol or proton pump
inhibitors) should be considered for patients at risk of GI bleeding such as the elderly, and also for patients requiring concomitant low dose aspirin, or other drugs likely to increase gastrointestinal risk (see below and section 4.5).

Patients with a history of GI toxicity, particularly when elderly, should report any unusual abdominal symptoms (especially GI bleeding) particularly in the initial stages of treatment.

Caution should be advised in patients receiving concomitant medications which could increase the risk of ulceration or bleeding such as oral corticosteroids, anticoagulants such as warfarin, selective serotonin reuptake inhibitors or anti-platelet agents such as aspirin (see section 4.5).

When GI bleeding or ulceration occurs in patients receiving mefenamic acid the treatment should be withdrawn.

**SLE and mixed connective tissue disease:** In patients with systemic lupus erythematosus (SLE) and mixed connective tissue disorders there may be an increased risk of aseptic meningitis (see section 4.8).

**Skin reactions:** Serious skin reactions, some of them fatal, including exfoliative dermatitis, Stevens-Johnson syndrome, and toxic epidermal necrolysis, have been reported in association with use of NSAIDs (see section 4.8). Patients appear to be at highest risk of these reactions early in the course of therapy, the onset of the reaction occurring in the majority of cases within the first month of treatment. Mefenamic acid should be stopped at the first appearance of skin rash, mucosal lesions or any other sign of hypersensitivity.

**Female fertility:** The use of mefenamic acid may impair female fertility and is not recommended in female patients who may be attempting to conceive. In female patients who may experience difficulties in conceiving or who are undergoing investigations of infertility withdrawal of mefenamic acid should be considered.

In dysmenorrhoea lack of response should alert the physician to investigate other causes.

**Epilepsy:** Caution should be exercised when treating patients suffering from epilepsy.

Patients with rare hereditary problems of fructose intolerance, glucose-galactose malabsorption or sucrase-isomaltase insufficiency should not take this medicine.

In patients who are known or suspected to be poor CYP2C9 metabolisers based on previous history/experience with other CYP2C9 substrates, mefenamic acid should be administered with caution as they may have abnormally high plasma levels due to reduced metabolic clearance (see section 5.2).

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

Concurrent therapy with other plasma protein binding drugs may necessitate a modification in dosage.
**Anti-coagulants:** NSAIDs may enhance the effects of anti-coagulants, such as warfarin (see section 4.4). Concurrent administration of mefenamic acid with oral anti-coagulant drugs requires careful prothrombin time monitoring. It is considered unsafe to take NSAIDs in combination with Warfarin or Heparin unless under direct medical supervision.

**Lithium:** a reduction in renal lithium clearance and elevation of plasma lithium levels. Patients should be observed carefully for signs of lithium toxicity.

The following interactions have been reported with NSAIDs but have not necessarily been associated with Mefenamic Acid Capsules:

**Other analgesics including cyclooxygenase-2 selective inhibitors:** avoid concomitant use of two or more NSAIDs (including aspirin) as this may increase the risk of adverse effects (see section 4.4).

**Antidepressants:** selective serotonin reuptake inhibitors (SSRIs): increased risk of gastrointestinal bleeding (see section 4.4).

**Antihypertensives and diuretics:** a reduction in antihypertensive and diuretic effect has been observed. Diuretics can increase the nephrotoxicity of NSAIDs.

**ACE inhibitors and angiotensin-II-receptor antagonists:** a reduction in antihypertensive effect and an increased risk of renal impairment especially in elderly patients. Patients should be adequately hydrated and the renal function assessed in the beginning and during concomitant therapy.

**Aminoglycosides:** reduction in renal function in susceptible individuals, decreased elimination of aminoglycoside and increased plasma concentrations.

**Anti-platelet agents:** increased risk of gastrointestinal ulceration or bleeding (see section 4.4).

**Acetylsalicylic Acid:** experimental data implies that mefenamic acid interferes with the anti-platelet effect of low-dose aspirin when given concomitantly, and thus may interfere with aspirin’s prophylactic treatment of cardiovascular disease. However, the limitations of this experimental data and the uncertainties regarding extrapolation of ex vivo data to the clinical situation imply that no firm conclusions can be made for regular mefenamic acid use.

**Cardiac glycosides:** NSAIDs may exacerbate cardiac failure, reduce GFR and increase plasma cardiac glycoside levels.

**Ciclosporin:** the risk of nephrotoxicity of ciclosporin may be increased with NSAIDs.

**Corticosteroids:** concomitant use may increase the risk of gastrointestinal ulceration or bleeding (see section 4.4).

**Oral hypoglycaemic agents:** inhibition of metabolism of sulfonylurea drugs, prolonged half-life and increased risk of hypoglycaemia.

**Methotrexate:** elimination of the drug can be reduced, resulting in increased plasma levels.

**Mifepristone:** NSAIDs should not be taken for 8-12 days after mifepristone administration, NSAIDs can reduce the effects of mifepristone.

**Probenecid:** reduction in metabolism and elimination of NSAIDs and metabolites.

**Quinolone antibiotics:** animal data indicates that NSAIDs can increase the risk of convulsions associated with quinolone antibiotics. Patients taking NSAIDs and quinolones may have an increased risk of developing convulsions.
**Tacrolimus:** possible increased risk of nephrotoxicity when NSAIDS are given with tacrolimus.

**Zidovudine:** increased risk of haematological toxicity when NSAIDs are given with zidovudine. There is evidence of an increased risk of haemarthroses and haematoma in HIV(+) haematophiliacs receiving concurrent treatment with zidovudine and ibuprofen.

### 4.6 Pregnancy and lactation

In the event of mefenamic acid suspension being used in older children and women of child bearing potential, the following should be noted.

**Pregnancy:** Congenital abnormalities have been reported in association with NSAID administration in man; however, these are low in frequency and do not appear to follow any discernible pattern. In view of the known effects of NSAIDs on the foetal cardiovascular system (risk of closure of the ductus arteriosus), use in the last trimester of pregnancy is contraindicated. The onset of labour may be delayed and the duration increased with an increased bleeding tendency in both mother and child (See section 4.3 Contraindications). NSAIDs should not be used during the first two trimesters of pregnancy or labour unless the potential benefit to the patient outweighs the potential risk to the foetus.

**Lactation** Trace amounts of mefenamic acid may be present in breast milk and transmitted to the nursing infant. Therefore, mefenamic acid should not be taken by nursing mothers.

See section 4.4 Special warnings and precautions for use regarding female fertility.

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

Undesirable effects such as dizziness, drowsiness, fatigue and visual disturbances are possible after taking NSAIDs. If affected, patients should not drive or operate machinery.

### 4.8 Undesirable effects

The most frequently reported side effects associated with mefenamic acid involve the gastrointestinal tract.

Diarrhoea occasionally occurs following the use of mefenamic acid. Although this may occur soon after starting treatment, it may also occur after several months of continuous use. The diarrhoea has been investigated in some patients who have continued this drug in spite of its continued presence. These patients were found to have associated proctocolitis. If diarrhoea does develop the drug should be withdrawn immediately and this patient should not receive mefenamic acid again.

Frequencies are not known for the following adverse reactions:
Blood and the lymphatic system disorders

Haemolytic anaemia*, anaemia, hypoplasia bone marrow, haematocrit decreased, thrombocytopenic purpura, temporary lowering of the white blood cell count (leukopenia) with a risk of infection, sepsis, and disseminated intravascular coagulation.

Agranulocytosis, aplastic anaemia, eosinophilia, neutropenia, pancytopenia, thrombocytopenia.

*reversible when mefenamic acid is stopped

Immune system disorders

Hypersensitivity reactions have been reported following treatment with NSAIDs. These may consist of (a) non-specific allergic reactions and anaphylaxis (b) respiratory tract reactivity comprising asthma, aggravated asthma, bronchospasm, or dyspnoea or (c) assorted skin disorders including rashes of various types, pruritus, urticaria, purpura, angioedema, and more rarely exfoliative or bullous dermatoses (including epidermal necrolysis and erythema multiforme).

Metabolism and nutritional disorders

Glucose intolerance in diabetic patients, hyponatraemia.

Psychiatric disorders

Confusion, depression, hallucinations, nervousness.

Nervous system disorders

Optic neuritis, headaches, paraesthesia, dizziness, drowsiness, reports of aseptic meningitis (especially in patients with existing auto-immune disorders, such as systemic lupus erythematosus, mixed connective tissue disease), with symptoms such as stiff neck, headache, nausea, vomiting, fever or disorientation (see section 4.4).

Blurred vision, convulsions, insomnia.

Eye disorders

Eye irritation, reversible loss of colour vision, visual disturbances.

Ear and labyrinth disorders

Ear pain, tinnitus, vertigo.

Cardiac / Vascular disorders

Oedema, hypertension and cardiac failure have been reported in association with NSAID treatment.

Clinical trial and epidemiological data suggest that use of some NSAIDs (particularly at high doses and in long term treatment) may be associated with an increased risk of arterial thrombotic events (for example myocardial infarction or stroke) (see section 4.4).

Palpitations.

Hypotension.

Respiratory, thoracic and mediastinal disorders

Asthma, dyspnoea.

Gastrointestinal disorders

The most commonly observed adverse events are gastrointestinal in nature. Peptic ulcers, perforation or GI bleeding, sometimes fatal, particularly in the elderly, may
occur (see section 4.4). Nausea, vomiting, diarrhoea, flatulence, constipation, dyspepsia, abdominal pain, melaena, haematemesis, ulcerative stomatitis, exacerbation of colitis and Crohn’s disease have been reported following administration. Less frequently, gastritis has been observed.

Elderly or debilitated patients seem to tolerate gastrointestinal ulceration or bleeding less well than other individuals and most spontaneous reports of fatal GI events are in this population.

Anorexia, colitis, enterocolitis, gastric ulceration with or without haemorrhage, pancreatitis, steatorrhea.

Hepato-biliary disorders
Borderline elevations of one or more liver function tests, cholestatic jaundice.

Mild hepatotoxicity, hepatitis, hepatorenal syndrome.

Skin and subcutaneous tissue disorders
Angioedema, laryngeal oedema, erythema multiforme, face oedema, bullous reactions including Lyell’s syndrome (toxic epidermal necrolysis) and Stevens-Johnson syndrome, perspiration, rash, photosensitivity reaction, pruritus and urticaria.

Renal and urinary disorders
Allergic glomerulonephritis, acute interstitial nephritis, dysuria, haematuria, nephrotic syndrome, non-oliguric renal failure (particularly in dehydration), proteinuria, renal failure including renal papillary necrosis.

General disorders
Fatigue, malaise, multi-organ failure, pyrexia.

Investigations
A positive reaction in certain tests for bile in the urine of patients receiving Mefenamic acid has been demonstrated to be due to the presence of the drug and its metabolites and not to the presence of bile.

**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 the Yellow Card Scheme at: www.mhra.gov.uk/yellowcard.

### 4.9 Overdose

(a) Symptoms

Symptoms include headache, nausea, vomiting epigastric pain, gastrointestinal bleeding, rarely diarrhoea, disorientation, excitation, coma, drowsiness, tinnitus, fainting, occasionally convulsions. [Mefenamic acid has a tendency to induce tonic-clonic (grand mal) convulsions in overdose]. In cases of significant poisoning acute renal failure and liver damage are possible.

(b) therapeutic measure
Patients should be treated symptomatically as required
Within one hour of ingestion of a potentially toxic amount activated charcoal should be considered. Alternatively, in adults gastric lavage should be considered within one hour of ingestion of a potentially life-threatening overdose.
Good urine output should be ensured
Renal and liver function should be closely monitored.
Patients should be observed for at least four hours after ingestion of potentially toxic amounts
Frequent or prolonged convulsions should be treated with intravenous diazepam.
Other measures may be indicated by the patient’s clinical condition.

Haemodialysis is of little value since mefenamic acid and its metabolites are firmly bound to plasma proteins.

5 PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

ANIMAL MODELS

Mefenamic acid is a non-steroidal anti-inflammatory drug (NSAID) with anti-inflammatory, analgesic and antipyretic properties.

Its anti-inflammatory effect was first established in the UV erythema model of inflammation. Further studies included inhibition of granulation tissue growth into subcutaneous cotton pellets in rats and carrageenin induced rat paw oedema tests.

Antipyretic activity was demonstrated in yeast-induced pyresis in rats. In this model its antipyretic activity was roughly equal to that of phenylbutazone and flufenamic acid, but less than that of indomethacin.

Analgesic activity was demonstrated in tests involving pain sensitivity of rats paws inflamed by brewers yeast. Mefenamic acid was less potent than flufenamic acid in this model.

Prostaglandins are implicated in a number of disease processes including inflammation, modulation of the pain response, dysmenorrhoea, menorrhagia and pyrexia.

In common with most NSAIDs mefenamic acid inhibits the action of prostaglandin synthetase (cyclo oxygenase). This results in a reduction in the rate of prostaglandin synthesis and reduced prostaglandin levels.
The anti-inflammatory activity of NSAIDs in the rat paw oedema test has been correlated with their ability to inhibit prostaglandin synthetase. When mefenamic acid is ranked in both these tests it falls between indomethacin and phenylbutazone and it is probable that inhibition of prostaglandin synthesis contributes to the pharmacological activity and clinical efficacy of mefenamic acid.

There is also considerable evidence that the fenamates inhibit the action of prostaglandins after they have been formed. They therefore both inhibit the synthesis and response to prostaglandins. This double blockade may well be important in their mode of action.

5.2 Pharmacokinetic properties

Absorption and Distribution

Mefenamic acid is absorbed from the gastrointestinal tract. Peak levels of 10 mg/l occur two hours after the administration of a 1g oral dose to adults.

Metabolism

Mefenamic acid is predominantly metabolised by cytochrome P450 enzyme CYP2C9 in the liver, first to a 3 hydroxymethyl derivative (metabolite I) and then a 3 carboxyl derivative (metabolite II). Both metabolites undergo secondary conjugation to form glucuronides.

Therefore in patients who are known or suspected to be poor CYP2C9 metabolisers based on previous history/experience with other CYP2C9 substrates, mefenamic acid should be administered with caution as they may have abnormally high plasma levels due to reduced metabolic clearance.

Elimination

Fifty two percent of a dose is recovered from the urine, 6% as mefenamic acid, 25% as metabolite I and 21% as metabolite II. Assay of stools over a 3 day period accounted for 10-20 % of the dose chiefly as unconjugated metabolite II.

The plasma levels of unconjugated mefenamic acid decline with a half life of approximately two hours.

5.3 Preclinical safety data

Pre-clinical safety data does not add anything of further significance to the prescriber.
6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients
SUSPENSION:
Sorbitol solution, aluminium magnesium silicate, sodium carboxymethylcellulose, ethanol 96%, sodium benzoate, hydrochloric acid, saccharin sodium, sodium hydroxide, glucono delta lactone, purified water, povidone 25, sugar mineral water, banana flavour (75420-33), chocolate flavouring (85/20508), pure anise mint 108 IFF.

6.2 Incompatibilities
None known

6.3 Shelf life
36 months.

6.4 Special precautions for storage
Store at a temperature not exceeding 30°C.

6.5 Nature and contents of container
Clear amber glass bottle (type III glass) with metal roll-on-pilfer-proof cap or plastic or metal screw cap with a melinex film wad. Pack sizes 30 and 125ml.

6.6 Special precautions for disposal
Not applicable.

7 MARKETING AUTHORISATION HOLDER
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Chemidex House
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