

SUMMARY OF PRODUCT CHARACTERISTICS

1 NAME OF THE MEDICINAL PRODUCT

Maxtrex Tablets 2.5 mg.

2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Each tablet contains methotrexate 2.5 mg.

Excipient with known effect:

Each tablet contains 42.0mg lactose monohydrate.

For the full list of excipients, see section 6.1.

3 PHARMACEUTICAL FORM

Round, uncoated, convex deep yellow tablets marked with 'M2.5' on one side.

4. Clinical Particulars

4.1. Therapeutic indications

Methotrexate is a folic acid antagonist and is classified as an antimetabolite cytotoxic agent.

Methotrexate is used in the treatment of adults with severe, active, classical or definite rheumatoid arthritis who are unresponsive or intolerant to conventional therapy.

Methotrexate has also been used in the treatment of severe, uncontrolled psoriasis, which is not responsive to other therapy.

Methotrexate has been used to produce regression in a wide range of neoplastic conditions including acute leukaemias, non-Hodgkin's lymphoma, soft-tissue and osteogenic sarcomas, and solid tumours particularly breast, lung, head and neck, bladder, cervical, ovarian, and testicular carcinoma.

4.2 Posology and method of administration

Posology

Methotrexate should only be prescribed by physicians with expertise in the use of methotrexate and a full understanding of the risks of methotrexate therapy.

The prescriber should ensure that patients or their carers will be able to comply with the once weekly regimen.

Dosage for Cancer Treatment

Warning

The dose must be adjusted carefully depending on the body surface area if methotrexate is used for the treatment of neoplastic diseases.

Fatal cases of intoxication have been reported after administration of incorrectly calculated doses. Health care professionals and patients should be fully informed about toxic effects.

Oral administration

A test dose of 5 - 10 mg parenterally is recommended, one week prior to therapy to detect idiosyncratic adverse events. Low doses not exceeding 30 mg/m² on five successive days. Thereafter an interval of at least two weeks is recommended to allow the bone marrow to recover.

Doses in excess of 100 mg are usually given parenterally, when the injectable preparation should be used. Doses in excess of 70 mg/m² should not be administered without leucovorin rescue (folinic acid rescue) or assay of serum methotrexate levels 24 - 48 hours after dosing.

If methotrexate is administered in combination chemotherapy regimens, the dosage should be reduced, taking into consideration any overlapping toxicity of the other drug components.

Dosage for Psoriasis and Rheumatoid arthritis

Important warning about the dosage of Maxtrex Tablets (methotrexate)

In the treatment of psoriasis and Rheumatoid arthritis, Maxtrex Tablets (methotrexate) **must only be used once a week**. Dosage errors in the use of Maxtrex Tablets (methotrexate) can result in serious adverse reactions, including death. Please read this section of the summary of product characteristics very carefully.

The prescriber should specify the day of intake on the prescription.

Psoriasis

Before starting treatment it is advisable to give the patient a test dose of 2.5–5.0 mg to exclude unexpected toxic effects. If, one week later, appropriate laboratory tests are normal, treatment may be initiated.

The usual dose is 7.5 – 15 mg once a week. For the treatment of severe psoriasis, the total weekly dosage can be raised to 20 - 25 mg administered orally as necessary.

Dosage should be adjusted according to the patient's response and the haematological toxicity.

Rheumatoid Arthritis

In adults with severe, active, classical or definite rheumatoid arthritis who are unresponsive or intolerant to conventional therapy, Maxtrex should be taken as 7.5-15 mg once a week. The total weekly dosage can be raised to 20-25 mg as necessary. Dosage should be adjusted according to the patient's response and the haematological toxicity.

Paediatric population

Treatment should follow currently valid protocols for children. Safety and effectiveness in children have not been established, other than in cancer chemotherapy.

Use in Elderly:

Methotrexate should be used with extreme caution in elderly patients. A reduction in dosage should be considered due to reduced liver and kidney function as well as lower folate reserves, which occur with increased age.

Use in patients with renal impairment – dose adjustments:

Methotrexate is excreted to a significant extent by the kidneys, and therefore should be used with caution in patients with impaired renal function (see sections 4.3 and 4.4). The health care provider may need to adjust the dose to prevent accumulation of drug. The table below provided recommended starting doses in renally impaired patients; dosing may need further adjustment due to wide intersubject pK variability.

Table 3 a. Dose adjustments for methotrexate doses <math><100 \text{ mg/m}^2</math> in patients with renal impairment

<u>Creatinine Clearance (ml/min)</u>	<u>% of dose to Administer</u>
<u>>60</u>	<u>100</u>
<u>30-59</u>	<u>50</u>
<u><30</u>	<u>Methotrexate must not be administered.</u>

Table 3 b. Dose adjustments for methotrexate doses >math>>100 \text{ mg/m}^2</math> in patients with renal impairment

<u>Creatinine Clearance (ml/min)</u>	<u>% of dose to Administer</u>
<u>>80</u>	<u>100</u>
<u>= ~80</u>	<u>75</u>
<u>= ~60</u>	<u>63</u>
<u><60</u>	<u>Methotrexate must not be administered.</u>

Patients with hepatic impairment

Methotrexate should be administered with great caution, if at all, to patients with significant current or previous liver disease, especially if due to alcohol (see sections 4.3 and 4.4).

Use in a patient with a third distribution space (pleural effusions, ascites)

As the half-life of Methotrexate can be prolonged to 4 times the normal length in patients who possess a third distribution space dose reduction or, in some cases, discontinuation of methotrexate administration may be required.

Special note

If changing the oral application to parenteral administration a reduction of the dose may be required due to the variable bioavailability of methotrexate after oral administration.

Method of Administration

Oral.

4.3. Contra-indications

- Significantly impaired hepatic function
- Significantly impaired renal function (creatinine clearance less than 30 ml/min) for methotrexate doses <100 mg/m², and moderate renal impairment (creatinine clearance less than 60 ml/min) for methotrexate doses >100 mg/m² (see section 4.2)
- Pre-existing blood dyscrasias, such as bone marrow hypoplasia, leukopenia, thrombocytopenia or significant anaemia
- Alcoholism
- Severe acute or chronic infections and immunodeficiency syndrome
- Stomatitis, ulcers of the oral cavity and known active gastrointestinal ulcer disease
- Pregnancy and breast-feeding (see section 4.6)
- Hypersensitivity to methotrexate or to any of the excipients listed in section 6.1
- During methotrexate therapy concurrent vaccination with live vaccines must not be carried out
- Maxtrex should not be used concomitantly with drugs with antifolate properties (e.g. co-trimoxazole) (see section 4.5).

4.4 Special warnings and precautions for use

Methotrexate must be used only by physicians experienced in antimetabolite chemotherapy.

Patients must be appropriately monitored during treatment so that signs of possible toxic effects or adverse reactions can be detected and evaluated with minimal delay.

Especially strict monitoring of the patient is indicated following prior radiotherapy (especially of the pelvis), functional impairment of the haematopoietic system (e.g., following prior radio- or chemotherapy), impaired general condition as well as advanced age and in very young children.

Because of the possibility of severe or even fatal toxic reactions, patients should be extensively informed by the treating doctor of the risks involved (including early signs and symptoms of toxicity) and the recommended safety measures. Patients should be informed that they must notify the doctor immediately if any symptoms of an overdose occur and that the symptoms of the overdose need to be monitored (including regular laboratory tests).

Doses exceeding 20 mg week can be associated with a substantial increase in toxicity, especially bone marrow depression.

Because of the delayed excretion of methotrexate in patients with impaired kidney function, they should be treated with particular caution and only with low doses of methotrexate (see sections 4.2 and 4.3).

Methotrexate should be used only with great caution, if at all, in patients who have a significant liver disease, particularly if this is/was alcohol-related (see sections 4.2 and 4.3).

Skin and mucosal contact with methotrexate injection solution is to be avoided.

Concomitant use of hepatotoxic or haematotoxic DMARDs (disease-modifying antirheumatic drugs, e.g. leflunomide) is not advisable.

Acute or chronic interstitial pneumonitis, often associated with blood eosinophilia, may occur and deaths have been reported. Symptoms typically include dyspnoea, cough (especially a dry non-productive cough) and fever for which patients should be monitored at each follow-up visit. Patients should be informed of the risk of pneumonitis and advised to contact their doctor immediately should they develop persistent cough or dyspnoea. Methotrexate should be withdrawn from patients with pulmonary symptoms and a thorough investigation (including chest X-ray) undertaken to exclude infection and tumours. If methotrexate induced lung disease is suspected, treatment with corticosteroids should be initiated and treatment with methotrexate should not be restarted.

Methotrexate-induced lung diseases such as pneumonitis can occur acutely and at any time during treatment, are not always completely reversible and have already been observed at all doses (including low doses of 7.5 mg/week).

For the treatment of psoriasis, methotrexate should be restricted to severe recalcitrant, disabling psoriasis which is not adequately responsive to other forms of therapy, but only when diagnosis has been established by biopsy and/or after dermatological consultation.

Deaths have been reported in association with the use of methotrexate in the treatment of psoriasis.

Methotrexate should be used with extreme caution in the presence/history of infection, peptic ulcer, ulcerative colitis, debility, and in extreme youth and old age. Use in patients with active gastrointestinal ulcer disease is contraindicated. If profound leukopenia occurs during therapy, bacterial infection may occur or become a threat. Cessation of the drug and appropriate antibiotic therapy is usually indicated. In severe bone marrow depression blood or platelet transfusions may be necessary.

Diarrhoea and ulcerative stomatitis are frequent toxic effects and require interruption of therapy, otherwise haemorrhagic enteritis and death from intestinal perforation may occur.

Following the occurrence of haematemesis, black coloured stools or blood in the stools, treatment must be discontinued.

In addition other conditions leading to dehydration such as emesis, can increase the toxicity of methotrexate due to elevated levels of the active substance. In these cases use of methotrexate should be interrupted until symptoms cease. It is important to determine any increase in active substance levels within 48 hours of therapy, otherwise irreversible methotrexate toxicity may occur.

Because of the possibility of severe and even life-threatening toxic reactions the patient should be fully informed by the attending physician of the risks involved before onset of methotrexate treatment. The patient should be closely monitored throughout the treatment.

Patients should be informed of the signs and symptoms of toxicity, of the need to see their physician promptly if they occur, and the need for close follow-up, including regular laboratory tests for monitoring toxicity.

It should be emphasized to the patient treated for psoriasis that the recommended dose must be taken only once a week. The prescriber should specify the day of intake on the prescription. Patients should be instructed on the importance of adhering to the once-weekly intakes, and that mistaken daily use of the recommended dose has led to fatal toxicity (see Sections 4.2 and 4.9).

Most adverse reactions are reversible if detected early. When adverse reactions do occur, the drug should be reduced in dosage or discontinued and appropriate corrective measures should be taken. If necessary, this includes the use of calcium folinate and/or acute, intermittent haemodialysis with high-flux dialyzer.

Methotrexate should be used with extreme caution in patients with psychiatric disorders. Patients with pleural effusions and ascites should be drained prior to initiation of methotrexate therapy or treatment should be withdrawn.

Before beginning Methotrexate therapy or reinstating Methotrexate after a rest period, a chest x-ray, assessment of renal function, liver function and blood elements should be made by history, physical examination and laboratory tests. This will include a routine examination of lymph nodes and patients should report any unusual swelling to the doctor.

Patients receiving low-dose methotrexate should:

- Have a full blood count and renal and liver function tests before starting treatment. These should be repeated weekly until therapy is stabilised, thereafter patients should be monitored every 2-3 months throughout treatment.

- Patients should report all symptoms and signs suggestive of infection, especially sore throat. Any infections should be attended to, before initiation of methotrexate therapy.

Haematopoietic suppression caused by Methotrexate may occur abruptly and with apparently safe dosages. Full blood counts should be closely monitored before, during and after treatment. If a clinically significant drop in white cell or platelet count develops, methotrexate therapy should be withdrawn immediately and appropriate supportive therapy given (see section 4.8). Patients should be advised to report all symptoms or signs suggestive of infection. Any infections should be attended before initiation of methotrexate therapy.

Methotrexate may be hepatotoxic, particularly at high doses or with prolonged therapy. Liver atrophy, necrosis, cirrhosis, fatty changes and periportal fibrosis have been reported. Risk factors for severe liver damage are e.g. previous liver disease, repeatedly abnormal liver function tests and alcohol consumption. Additional hepatotoxic medicinal products should not be taken during the treatment with methotrexate unless clearly necessary and the consumption of alcohol should be avoided or clearly reduced (see section 4.5).

Diabetic patients who are treated with insulin have increased risk for liver toxicity.

Liver function tests

Treatment should not be initiated or should be discontinued if there are persistent or significant abnormalities in liver function tests, other non-invasive investigations of hepatic fibrosis, or liver biopsies.

Temporary increases in transaminases to two or three times the upper limit of normal have been reported in patients at a frequency of 13-20 %. Persistent elevation of liver enzymes and/or decrease in serum albumin may be indicative for severe hepatotoxicity. In the event of a persistent increase in liver enzymes, consideration should be given to reducing the dose or discontinuing therapy.

Histological changes, fibrosis and more rarely liver cirrhosis may not be preceded by abnormal liver function tests. There are instances in cirrhosis where transaminases are normal. Therefore, non-invasive diagnostic methods for monitoring of liver condition should be considered, in addition to liver function tests. Liver biopsy should be considered on an individual basis taking into account the patient's comorbidities, medical history and the risks related to biopsy. Risk factors for hepatotoxicity include excessive prior alcohol consumption, persistent elevation of liver enzymes, history of liver disease, family history of hereditary liver disorders, diabetes mellitus, obesity and previous contact with hepatotoxic drugs or chemicals and prolonged methotrexate treatment.

Additional hepatotoxic medicinal products should not be given during treatment with methotrexate unless clearly necessary. Alcohol consumption should be avoided (see sections 4.3 and 4.5). Closer monitoring of liver enzymes should be undertaken in patients concomitantly taking other hepatotoxic medicinal products.

Increased caution should be exercised in patients with insulin-dependent diabetes mellitus, as during methotrexate therapy, liver cirrhosis developed in isolated cases without any elevation of transaminases.

Kidneys

Methotrexate therapy in patients with impaired renal function should be undertaken with extreme caution because impairment of renal function will decrease methotrexate elimination. Impaired renal function may result in methotrexate accumulation in toxic amount or even in additional renal damage. In patients with renal impairment the dose of methotrexate should be reduced.

Renal function should be monitored by renal function tests and urinalyses. If serum creatinine levels are increased, the dose should be reduced. If creatinine clearance is less than 30 ml/min, treatment with methotrexate should not be given. If creatinine clearance is less than 60 ml/min, methotrexate doses >100 mg/m² not be given (see section 4.2 and 4.3).

Treatment with methotrexate doses of >100 mg/m² should not be initiated at urinary pH values of less than 7.0. Alkalinisation of the urine must be tested by repeated pH monitoring (value greater than or equal to 6.8) for at least the first 24 hours after the administration of methotrexate is started.

Renal lesions may develop if the urinary flow is impeded and urinary pH is low, especially if large doses have been administered.

Methotrexate may cause renal damage that may lead to acute renal failure. Close attention to renal function including adequate hydration, urine alkalinization by oral or intravenous administration of sodium bicarbonate (5 x 625mg tablets every three hours) or acetazolamide (500 mg orally four times a day), and measurement of serum methotrexate and renal function are recommended.

As methotrexate is eliminated mainly via the kidneys, increased concentrations are to be expected in the presence of renal impairment, which may result in severe adverse reactions.

If there is the possibility of renal impairment (e.g. in elderly subjects), monitoring should take place at shorter intervals. This applies in particular when medicinal products that affect the elimination of methotrexate, or that cause kidney damage (e.g. NSAIDs) or that can potentially lead to impairment of haematopoiesis, are administered concomitantly.

If risk factors such as renal function disorders, including mild renal impairment, are present, combined administration with NSAIDs is not recommended. Dehydration may also intensify the toxicity of methotrexate.

Concomitant use of proton pump inhibitors (PPIs) and high dose methotrexate should be avoided, especially in patients with renal impairment.

Immune system

Methotrexate has some immunosuppressive activity and immunological responses to concurrent vaccination may be decreased. Vaccination with live vaccines is contraindicated during the therapy.

The immunosuppressive effect of methotrexate should be taken into account when immune responses of patients are important or essential. Special attention should be paid in cases of inactive chronic infections (e.g. herpes zoster, tuberculosis, hepatitis B or C) because of their potential activation.

Methotrexate may trigger tumour lysis syndrome in patients with rapidly growing tumour.

Malignant lymphomas may occur in patients receiving low dose methotrexate, in which case therapy must be discontinued. Failure of the lymphoma to show signs of spontaneous regression requires the initiation of cytotoxic therapy.

Since cases of encephalopathy/ leukoencephalopathy have occurred in cancer patients treated with methotrexate, this cannot be ruled out either for patients with non-cancer indications.

Cases of progressive multifocal leukoencephalopathy (PML) have been reported in patients receiving methotrexate, mostly in combination with other immunosuppressive medication. PML can be fatal and should be considered in the differential diagnosis in immunosuppressed patients with new onset or worsening neurological symptoms.

The disappearance of methotrexate from plasma should be monitored, if possible. This is recommended in particular when high, or very high doses are administered in order to permit calculation of an adequate dose of leucovorin (folinic acid) rescue.

Methotrexate given concomitantly with radiotherapy may increase the risk of soft tissue necrosis and osteonecrosis.

In the treatment of rheumatoid arthritis, acetylsalicylic acid, nonsteroidal anti-inflammatory (NSAID) agents, and/or low dose steroids can be continued, although concomitant use of NSAIDs and methotrexate may be associated with an increased risk of toxicity. Steroids may be gradually reduced in patients responsive to methotrexate.

The interactions of methotrexate and other antirheumatic drugs such as gold, penicillamine, hydroxychloroquine, sulfasalazine or cytotoxic agents have not been studied comprehensively, and concurrent use may increase the incidence of adverse reactions.

Concomitant administration of folate antagonists such as trimethoprim/sulfamethoxazole has been reported to cause an acute megaloblastic pancytopenia in rare instances.

In addition, pulmonary alveolar haemorrhage has been reported with methotrexate used in rheumatologic and related indications. This event may also be associated with vasculitis and other comorbidities. Prompt investigations should be considered when pulmonary alveolar haemorrhage is suspected to confirm the diagnosis.

If acute methotrexate toxicity occurs, patients may require treatment with folinic acid. In patients with rheumatoid arthritis or psoriasis, folic acid or folinic acid supplementation may reduce methotrexate toxicity, such as gastrointestinal symptoms, stomatitis, alopecia and elevated liver enzymes.

It is recommended to check levels of vitamin B12 prior to initiating folic acid supplementation, particularly in adults aged over 50 years, as folic acid intake may mask a vitamin B12 deficiency.

Methotrexate may cause adverse urinary tract reactions, such as cystitis and haematuria.

Methotrexate has been shown to be teratogenic – reproductive risk; it causes embryotoxicity, abortion and foetal malformations in humans.

Therefore, the possible effects on reproduction, pregnancy loss and congenital malformations should be discussed with female patients of childbearing age (see section 4.6).

In non-oncologic indications, the absence of pregnancy must be confirmed before Maxtrex tablet is used. If women of a sexually mature age are treated, effective contraception must be used during treatment and for at least six months after.

For contraception advice for men see section 4.6.

If this drug is used during pregnancy for antineoplastic indications, or if the patient becomes pregnant while taking this drug, the patient should be appraised of the potential hazard to the foetus.

Methotrexate has been reported to cause impairment of fertility, oligospermia, menstrual dysfunction and amenorrhoea in humans during and for a short period after the discontinuation of treatment, affecting spermatogenesis and oogenesis during the period of its administration - effects that appear to be reversible on discontinuing therapy.

Radiation induced dermatitis and sun-burn can reappear under methotrexate therapy (recall reaction). Psoriatic lesions can exacerbate during UV-irradiation and simultaneous administration of methotrexate.

Photosensitivity: Photosensitivity manifested by an exaggerated sunburn reaction has been observed in some individuals taking methotrexate (see section 4.8). Exposure to intense sunlight or UV rays should be avoided unless medically indicated. Patients should use adequate sun-protection to protect themselves from intense sunlight.

Severe, occasionally fatal, dermatologic reactions, including toxic epidermal necrolysis (Lyell's syndrome) or Stevens-Johnson syndrome have been reported after single or multiple doses of methotrexate.

Maxtrex 2.5mg Tablets contain lactose and patients with rare hereditary problems of galactose intolerance, total lactase deficiency or glucose-galactose malabsorption should not take this medicine.

4.5 Interaction with other medicinal products and other forms of interaction

Methotrexate is extensively protein bound and may displace, or be displaced by, other acidic drugs. The concurrent administration of agents such as diphenylhydantoin, acidic anti-inflammatory agents, salicylates, phenylbutazone, phenytoin, barbiturates, tranquilisers, oral contraceptives, amidopyrine derivatives, p-aminobenzoic acid, thiazide diuretics, oral hypoglycaemics, doxorubicin., tetracyclines, probenidol or sulfinpyrazone or oral hypoglycaemics will decrease the methotrexate transport function of renal tubules, thereby reducing excretion and almost certainly increasing methotrexate toxicity.

Since probenecid and weak organic acids, such as “loop-diuretics” as well as pyrazols reduce tubular secretion, great caution should be exercised when these medicinal products are co-administered with methotrexate.

Concurrent use of other, potentially nephro- hemato or hepatotoxic agents (e.g. sulphasalazine, leflunomide and alcohol) should be avoided. Special caution should be exercised when observing patients receiving methotrexate therapy in combination with azathioprine or retinoids.

Methotrexate in combination with leflunomide can increase the risk for pancytopenia.

Enhancement of nephrotoxicity may be seen if high-dose methotrexate is administered in combination with a potentially nephrotoxic chemotherapeutic agent (e.g. cisplatin).

Antibiotics, like penicillin, glycopeptides, sulfonamides, ciprofloxacin and cefalotin can, in individual cases, reduce the renal clearance of methotrexate, so that increased serum concentrations of methotrexate with simultaneous haematological and gastro-intestinal toxicity may occur.

Oral antibiotics such as tetracyclines, chloramphenicol and non-absorbable broad-spectrum antibiotics may reduce intestinal methotrexate absorption or interfere with the enterohepatic circulation, due to inhibition of the intestinal flora or suppression of bacterial metabolism.

Methotrexate dosage should be monitored if concomitant treatment with aspirin, ibuprofen or indomethacin (NSAID's) is commenced, as concomitant use of NSAID's has been associated with fatal methotrexate toxicity.

Hepatic, hematotoxic and nephrotoxic drugs should be avoided.

Vitamin preparations or other products containing folic acid or its derivatives may impair methotrexate efficacy.

Under (pre-) treatment with substances that may have adverse effects on the bone marrow (e.g. sulfonamides, trimethoprim-sulfamethoxazole, chloramphenicol, pyrimethamine), the possibility of marked haematopoietic disorders should be considered.

Co-administration of medicinal products which cause folate deficiency (e.g. sulfonamides, trimethoprim-sulfamethoxazole) can lead to increased methotrexate toxicity. Particular caution should therefore also be exercised in the presence of existing folate deficiency.

Acitretin (a treatment for psoriasis) is metabolised to etretinate. Methotrexate levels may be increased by etretinate and severe hepatitis has been reported following concomitant use.

Bone marrow suppression and decreased folate levels have been described in the concomitant administration of triamterene and methotrexate.

Administration of additional haematotoxic medicinal products (e.g. metamizole) increases the probability of severe haematotoxic effects of methotrexate.

There is evidence that co-administration of methotrexate and omeprazole prolongs the elimination of methotrexate via kidneys. Co-administration of proton pump inhibitors such as omeprazole or pantoprazole can cause interactions. In combination with pantoprazole, inhibited renal elimination of the 7-hydroxymethotrexate metabolite, with myalgia and shivering, was reported in one case.

Methotrexate may decrease the clearance of theophylline; theophylline levels should be monitored when used concurrently with methotrexate. Excessive consumption of beverages containing caffeine or theophylline (coffee, soft drinks containing caffeine, black tea) should be avoided during methotrexate therapy since the efficacy of methotrexate may be reduced due to possible interaction between methotrexate and methylxanthines at adenosine receptors.

One should be aware of pharmacokinetic interactions between methotrexate, anticonvulsant medicinal products (reduced methotrexate blood levels), and 5-fluorouracil (increased $t_{1/2}$ of 5-fluorouracil).

The use of nitrous oxide potentiates the effect of methotrexate on folate metabolism, yielding increased toxicity such as severe, unpredictable myelosuppression and stomatitis. Whilst this effect can be reduced by administering calcium folinate, the concomitant use of nitrous oxide and methotrexate should be avoided.

Concurrent administration of metamizole and methotrexate can increase the haematotoxic effect of methotrexate, especially in elderly patients. Therefore, coadministration should be avoided.

Colestyramine can increase the non-renal elimination of methotrexate by interrupting the enterohepatic circulation.

Delayed methotrexate clearance should be considered in combination with other cytostatic medicinal products.

The application of procarbazine during high-dose methotrexate therapy increases the risk of impairment or renal function.

Radiotherapy during use of methotrexate can increase the risk of soft tissue or bone necrosis.

Methotrexate increases plasma levels of mercaptopurine. Combinations of methotrexate and mercaptopurine may therefore require dose adjustment.

Vaccination with a live vaccine in patients receiving chemotherapeutic agents may result in severe and fatal infections (see section 4.3). On account of its possible effect on the immune system, methotrexate can falsify vaccinal and test results (immunological procedures to record the immune reaction). During methotrexate therapy concurrent vaccination with live vaccines must not be carried out (see sections 4.3 and 4.4).

Cytotoxic agents may impair absorption of phenytoin, which may decrease efficacy of phenytoin and increase the risk for exacerbation of convulsions. Risk of toxicity enhancement or loss of efficacy of the cytotoxic drug due to increased hepatic metabolism by phenytoin is possible.

Ciclosporin may potentiate methotrexate efficacy and toxicity. There is a risk of excessive immunosuppression with risk of lymphoproliferation when the combination is used.

Particularly in the case of orthopaedic surgery where susceptibility to infection is high, a combination of methotrexate with immune-modulating medicinal products must be used with caution.

Concomitant administration of levetiracetam and methotrexate has been reported to decrease methotrexate clearance, resulting in increased/prolonged blood methotrexate concentration to potentially toxic levels. Blood methotrexate and levetiracetam levels should be carefully monitored in patients treated concomitantly with the two drugs.

4.6 Fertility, pregnancy and lactation

Pregnancy

Methotrexate is contra-indicated during pregnancy in non-oncological indications (see section 4.3).

If pregnancy occurs during treatment with methotrexate and up to six months thereafter, medical advice should be given regarding the risk of harmful effects on the child associated with treatment and ultrasonography examinations should be performed to confirm normal foetal development.

In animal studies, methotrexate has shown reproductive toxicity, especially during the first trimester (see section 5.3). Methotrexate has been shown to be teratogenic to humans; it has been reported to cause foetal death, miscarriages and/or congenital abnormalities (e.g. craniofacial, cardiovascular, central nervous system and extremity-related).

Methotrexate is a powerful human teratogen, with an increased risk of spontaneous abortions, intrauterine growth restriction and congenital malformations in case of exposure during pregnancy.

Spontaneous abortions have been reported in 42.5% of pregnant women exposed to low-dose methotrexate treatment (less than 30 mg/week), compared to a reported rate of 22.5% in disease-matched patients treated with drugs other than methotrexate.

Major birth defects occurred in 6.6% of live births in women exposed to low-dose methotrexate treatment (less than 30 mg/week) during pregnancy, compared to approximately 4% of live births in disease-matched patients treated with drugs other than methotrexate.

Insufficient data is available for methotrexate exposure during pregnancy higher than 30 mg/week, but higher rates of spontaneous abortions and congenital malformations are expected, in particular at doses commonly used in oncologic indications.

When methotrexate was discontinued prior to conception, normal pregnancies have been reported.

When used in oncological indications, methotrexate should not be administered during pregnancy in particular during the first trimester of pregnancy. In each individual case the benefit of treatment must be weighed up against the possible risk to the foetus. If the drug is used during pregnancy or if the patient becomes pregnant while taking methotrexate, the patient should be informed of the potential risk to the foetus.

Breast-feeding

Patients should not breast feed whilst taking methotrexate.

Fertility

Methotrexate affects spermatogenesis and oogenesis and may decrease fertility. In humans, Methotrexate has been reported to cause oligospermia, menstrual dysfunction and amenorrhoea. These effects appear to be reversible after discontinuation of therapy in most cases.

In oncologic indications, women who are planning to become pregnant are advised to consult a genetic counselling centre, if possible, prior to therapy and men should seek advice about the possibility of sperm preservation before starting therapy as methotrexate can be genotoxic at higher doses (see section 4.4).

Women of childbearing potential/Contraception in females

Women must not get pregnant during methotrexate therapy, and effective contraception must be used during treatment with methotrexate and at least 6 months thereafter (see section 4.4). Prior to initiating therapy, women of childbearing potential must be informed of the risk of malformations associated with methotrexate and any existing pregnancy must be excluded with certainty by taking appropriate measures, e.g. a pregnancy test. During treatment pregnancy tests should be repeated as clinically required (e.g. after any gap of contraception). Female patients of reproductive potential must be counselled regarding pregnancy prevention and planning.

Contraception in males

It is not known if methotrexate is present in semen. Methotrexate has been shown to be genotoxic in animal studies, such that the risk of genotoxic effects on sperm cells cannot completely be excluded. Limited clinical evidence does not indicate an increased risk of malformations or miscarriage following paternal exposure to low-dose methotrexate (less than 30 mg/week). For higher doses, there is insufficient data to estimate the risks of malformations or miscarriage following paternal exposure.

As precautionary measures, sexually active male patients or their female partners are recommended to use reliable contraception during treatment of the male patient and for at least 3 months after cessation of methotrexate. Men should not donate semen during therapy or for 3 months following discontinuation of methotrexate.

4.7 Effects on ability to drive and use machines

Central nervous system symptoms, such as fatigue and dizziness, can occur during treatment with methotrexate which may have minor or moderate influence on the ability to drive and use machines.

4.8 Undesirable effects

In general, the incidence and severity of side effects are considered to be related to the dose, the dosing frequency, the method of administration and the duration of exposure.

Most adverse reactions are reversible if detected early. When adverse reactions do occur, the drug should be reduced in dosage or discontinued and appropriate corrective measures should be taken. This includes the use of calcium folinate (see sections 4.2 and 4.4). Methotrexate therapy should only be resumed with particular caution, after careful consideration of the need for treatment and with increased vigilance for the possible recurrence of toxicity.

Most serious adverse reactions of methotrexate include bone marrow suppression, pulmonary toxicity, hepatotoxicity, renal toxicity, neurotoxicity, thromboembolic events, anaphylactic shock and Stevens-Johnson syndrome.

Most frequently observed adverse reactions of methotrexate include gastrointestinal disorders (e.g. stomatitis, dyspepsia, abdominal pain, nausea, loss of appetite) and abnormal liver function tests (e.g. increased Alanine aminotransferase (ALAT), Aspartate aminotransferase (ASAT), bilirubin, alkaline phosphatase). Other frequently occurring adverse reactions are leukopenia, anaemia, thrombocytopenia, headache, tiredness, drowsiness, pneumonia, interstitial alveolitis/pneumonitis often associated with eosinophilia, oral ulcers, diarrhoea, exanthema, erythema and pruritus.

The most relevant adverse reaction is suppression of the haematopoietic system and gastrointestinal disorders.

In the antineoplastic treatment, myelosuppression and mucositis are the predominant dose-limiting toxic effects of methotrexate. The severity of these reactions depends on the dose, mode and duration of application of methotrexate. Mucositis generally appears about 3 to 7 days after methotrexate application, leucopenia and thrombocytopenia follow a few days later. In patients with unimpaired elimination mechanisms, myelosuppression and mucositis are generally reversible within 14 to 28 days.

Adverse reactions for the various systems are as follows:

Skin and subcutaneous tissue disorders:

Exanthema, Stevens-Johnson Syndrome, toxic epidermal necrolysis, erythematous rashes, pruritus, urticaria, photosensitivity reactions (frequency uncommon), pigmentary changes, erythema multiforme, onycholysis, increased pigmentation, petechia, allergic vasculitis, hidradenitis, alopecia, depigmentation, ecchymosis, telangiectasia, acne, furunculosis, painful damage to psoriatic lesions, skin ulceration, herpetiform eruptions of the skin, hyperpigmentation of the nails and acute paronychia. Skin exfoliation and dermatitis exfoliative (frequency not known). The recall phenomenon has been reported in both radiation and solar damaged skin. Lesions of psoriasis may worsen with concomitant UV therapy. Radiation dermatitis and sunburn may be "recalled".

Blood and the lymphatic system disorders:

Megaloblastic anaemia, haematopoietic disorders, eosinophilia, lymphoproliferative disorder (partly reversible), lymphadenopathy, bone marrow depression (especially at

high-dose of methotrexate) is most frequently manifested by thrombocytopenia (which are usually reversible), neutropenia, leukopenia, pancytopenia, agranulocytosis, anaemia, aplastic anaemia, immunosuppression, lymphoproliferative disorders (frequency very rare) or any combination may occur. Infection or hypogammaglobulinaemia, haemorrhage from various sites. Bone marrow depression may lead to decreased resistance to infection and sepsis.

Gastrointestinal disorder:

Mucositis, stomatitis, gingivitis, hematemesis, melena, pancreatitis, enteritis, gastrointestinal ulceration (including oral ulcers) and bleeding, malabsorption, toxic mega-colon, dyspepsia, abdominal pain, anorexia, nausea, vomiting, diarrhoea.

Gastrointestinal disorders frequently require dosage adjustment. Ulcerative stomatitis and diarrhoea require interruption of therapy; otherwise hemorrhagic enteritis and death from intestinal perforation may occur.

Hepatobiliary disorders:

Hepatic toxicity resulting in increase of transaminases (ASAT, ALAT), alkaline phosphatase and bilirubin, decrease in serum albumin, acute hepatitis, periportal fibrosis or hepatic cirrhosis, hepatic failure, fatty degeneration of liver, reactivation of chronic hepatitis or death.

Renal and urinary disorders:

Renal failure, uraemia, ulceration of the urinary bladder, disturbed micturition, oliguria, haematuria, dysuria, anuria, proteinuria, electrolyte disturbance, nephropathy.

Respiratory, thoracic and mediastinal disorders:

Pneumonia, acute or chronic interstitial alveolitis/pneumonia which can be fatal and is often associated with eosinophilia, acute pulmonary oedema, interstitial/pulmonary fibrosis, chronic interstitial obstructive pulmonary disease, pharyngitis, pleurisy, non-productive cough, thoracic pain, dyspnoea, pleural effusion, bronchial asthma, respiratory paralysis.

In the treatment of rheumatoid arthritis, Methotrexate induced lung disease is a potentially serious adverse drug reaction which may occur acutely at any time during therapy. It is not always fully reversible

Epistaxis (frequency not known) has been reported. Pulmonary alveolar haemorrhage (frequency not known) has been reported for methotrexate used in rheumatologic and related indications.

Nervous system disorders:

Headaches, fatigue, drowsiness, dizziness, vertigo, lethargy, aphasia, irritability, hemiparesis, paresis, convulsions, encephalopathy/leukoencephalopathy.

Leukoencephalopathy has been reported especially following intravenous Methotrexate in high doses, or low doses following cranial-spinal radiation.

Cerebral oedema, transient subtle cognitive dysfunction, dysarthria, unusual cranial sensations.

Pain, muscular asthenia, changes in sense of taste (metallic taste), meningism, acute aseptic meningitis, paralysis.

Paraesthesia, hypoaesthesia (frequency very rare).

Psychiatric disorders:

Depression, confusion, mood alterations, insomnia, psychoses.

Cardiac disorder:

Pericardial effusion, pericarditis, pericardial tamponade.

Vascular disorders:

Thromboembolic events (arterial thrombosis, cerebral thrombosis, deep vein thrombosis, retinal vein thrombosis, thrombophlebitis, pulmonary embolus), vasculitis, hypotension.

Eye disorders:

Conjunctivitis, blurred/impaird vision, retinopathy.

Neoplasms benign, malignant and unspecified (including cysts and polyps):

Lymphoma, which can be reversible, Methotrexate may trigger tumour lysis syndrome in patients with rapidly growing tumour.

Reproductive system and breast disorder:

Gynecomastia, decreased libido/impotence, defective oogenesis or spermatogenesis, transient oligospermia, infertility, menstrual dysfunction, vaginal bleeding, vaginal ulceration, inflammation of the vagina, vaginal discharge.

Infections and infestations:

Respiratory or cutaneous bacterial infections, herpes zoster infections, opportunistic infections, *Pneumocystis carinii/jiroveci* pneumonia and other lung infection, reactivation of inactive chronic infection.

Musculoskeletal, connective tissue and bone disorders:

Osteoporosis, stress fractures, arthralgia/myalgia, increased rheumatic nodules. Osteonecrosis of jaw (frequency not known) (secondary to lymphoproliferative disorders).

Endocrine disorders:

Diabetes mellitus.

Immune system disorders:

Allergic reaction, anaphylactic reaction, anaphylactic shock.

Ear and labyrinth disorders:

Tinnitus.

General disorders and administration site conditions:

Fever, chills, wound healing impairment, asthenia. Oedema (frequency not known).

Other

Increased risk of toxic reactions in radiotherapy (soft tissue necrosis, osteonecrosis).

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 or search for MHRA Yellow Card in the Google Play or Apple App Store.

4.9 Overdose

Cases of overdose, sometimes fatal, due to erroneous daily intake instead of weekly intake of oral methotrexate have been reported. In these cases, symptoms that have been commonly reported are haematological and gastrointestinal reactions.

The toxicity of methotrexate affects mainly the haematopoietic organs. Calcium folinate neutralises effectively the immediate toxic effects of methotrexate. Parenteral calcium folinate therapy should be started within one hour after the administration of methotrexate. The dose of calcium folinate should be at least as high as the dose of methotrexate received by the patient.

Symptoms of an overdose are mainly the same as the undesirable effects, but stronger.

Leucovorin is a specific antidote for methotrexate and, following accidental overdosage, should be administered within one hour at a dosage equal to, or greater than, the methotrexate dose. It may be administered by i.v. bolus or infusion. Further doses may be required. The patient should be observed carefully and blood transfusions, renal dialysis and reverse barrier nursing may be necessary.

In post-marketing experience, overdose with methotrexate has generally occurred with oral and intrathecal administration, although intravenous and intramuscular overdose has also been reported.

Cases of overdose have been reported, sometimes fatal, due to erroneous daily intake instead of weekly intake of oral methotrexate. In these cases, symptoms that have been commonly reported are hematological and gastrointestinal reactions. For example, leukopenia, thrombocytopenia, anemia, pancytopenia, bone marrow suppression, mucositis, stomatitis, oral ulceration, nausea, vomiting, gastrointestinal ulceration, gastrointestinal bleeding. In some cases, no symptoms were reported. There have been reports of death following chronic overdose in the self-administered dosage for rheumatoid arthritis and psoriasis (see Sections 4.2 and 4.4). In these cases, events such as sepsis or septic shock, renal failure, and aplastic anaemia were also reported.

In cases of massive overdose, hydration and urinary alkalinisation may be necessary to prevent precipitation of methotrexate and/or its metabolites in the renal tubules. Neither haemodialysis nor peritoneal dialysis has been shown to improve methotrexate elimination. Effective clearance of methotrexate has been reported with acute, intermittent haemodialysis using a high flux dialysator. Observation of serum methotrexate concentrations is relevant in determining the right dose of calcium folinate and the duration of the therapy.

Treatment measures for methotrexate overdosage can be discontinued when the serum methotrexate level has fallen below the level of 5×10^{-8} M (10) (see section 4.4).

5. PHARMACOLOGICAL PROPERTIES

5.1. Pharmacodynamic properties

Pharmacotherapeutic group: Immunosuppressive agents

ATC code: L04AX03.

Mechanism of action

Methotrexate is a folic acid antagonist and its major site of action is the enzyme dihydrofolate reductase. Its main effect is inhibition of DNA synthesis but it also acts directly both on RNA and protein synthesis. Methotrexate is a phase specific substance, the main effect being directed during the S-phase of cell division.

The inhibition of dihydrofolate reductase can be circumvented by the use of leucovorin (folinic acid; citrovorum factor) and protection of normal tissues can be carried out by properly timed administration of leucovorin calcium.

5.2. Pharmacokinetic properties

Absorption

Orally administered, the absorption of methotrexate seems to be dose-dependent. Peak serum levels are reached within 1 to 2 hours. Generally, at doses of 30 mg/m² or less, methotrexate is absorbed rapidly and completely. The bioavailability of orally administered methotrexate is high (80–100 %) at doses of 30 mg/m² or less. Saturation of the absorption starts at doses above 30 mg/m² and absorption of doses exceeding 80 mg/m² is incomplete. After parenteral injection, peak serum levels are seen in about one half this period. After intramuscular injection, peak serum concentrations occur in 30 to 60 minutes.

About one half of absorbed methotrexate is reversibly bound to serum protein but is readily distributed in tissues. Excretion takes place mainly via the kidneys. Approximately 41 % of the dose is excreted unchanged in the urine within the first six hours, 90 % within 24 hours. A minor part of the dose is excreted in the bile of which there is pronounced enterohepatic circulation.

The half-life is approximately 3–10 hours following low dose treatment and 8–15 hours following high dose treatment. If the renal function is impaired, the concentration of methotrexate in serum and in tissues may increase rapidly.

Methotrexate does not enter the cerebrospinal fluid at oral or parenteral therapeutic doses. However, cytotoxic concentrations (>10⁻⁷ M) can be achieved in the CSF with high doses (>500 mg/m²). When high drug concentrations are indicated, direct intrathecal administration should be used.

5.3. Preclinical safety data

Chronic toxicity studies in mice, rats and dogs showed toxic effects in the form of gastrointestinal lesions, myelosuppression and hepatotoxicity. Animal studies show that methotrexate impairs fertility and is embryo- and foetotoxic. Teratogenic effects have been identified in four species (rats, mice, rabbits, cats). In rhesus monkeys no malformations occurred. Methotrexate is mutagenic *in vivo* and *in vitro*. There is evidence that methotrexate causes chromosomal aberrations in animal cells and in

human bone marrow cells, but the clinical significance of these findings has not been established. Rodent carcinogenicity studies do not indicate an increased incidence of tumours.

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Maize starch
Lactose monohydrate
Pregelatinised starch
Polysorbate 80
Microcrystalline cellulose
Magnesium stearate
Purified water

6.2 Incompatibilities

None stated.

6.3 Shelf life

5 years (HDPE container)
3 years (PVC/Al blisters)

6.4 Special precautions for storage

Bottles:
None.

Blister:
Keep the blister in the outer carton in order to protect from light.

6.5 Nature and contents of container

White high density polyethylene container with high density polyethylene screw closure. Pack size: 100 tablets

Polyvinylchloride (PVC)/Aluminium foil blisters containing 2 blisters with 12 tablets in each.

6.6 Special precautions for disposal and other handling

Women who are pregnant, planning to be or breast-feeding should not handle methotrexate.

Parents, care givers and patients should be advised to keep methotrexate out of the reach of children, preferably in a locked cupboard.

Accidental ingestion can be lethal for children.

Anyone handling methotrexate should wash their hands after administering a dose. To decrease the risk of exposure, parents and care givers should wear disposable gloves when handling methotrexate.

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

Pfizer Limited
Ramsgate Road
Sandwich
Kent CT13 9NJ
United Kingdom

8 MARKETING AUTHORISATION NUMBER(S)

PL 00057/1010

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

10/12/2008

10 DATE OF REVISION OF THE TEXT

01/10/2024