

**ANNEX I**  
**SUMMARY OF PRODUCT CHARACTERISTICS**

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

Arava 10 mg film-coated tablets

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

Each tablet contains 10 mg of leflunomide.

### Excipients with known effect

Each tablet contains 78 mg of lactose monohydrate.

For the full list of excipients, see section 6.1.

## **3. PHARMACEUTICAL FORM**

Film-coated tablet.

White to almost white, round film-coated tablet, imprinted with ZBN on one side.

## **4. CLINICAL PARTICULARS**

### **4.1 Therapeutic indications**

Leflunomide is indicated for the treatment of adult patients with:

- active rheumatoid arthritis as a "disease-modifying antirheumatic drug" (DMARD),
- active psoriatic arthritis.

Recent or concurrent treatment with hepatotoxic or haematotoxic DMARDs (e.g. methotrexate) may result in an increased risk of serious adverse reactions; therefore, the initiation of leflunomide treatment has to be carefully considered regarding these benefit/risk aspects.

Moreover, switching from leflunomide to another DMARD without following the washout procedure (see section 4.4) may also increase the risk of serious adverse reactions even for a long time after the switching.

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

The treatment should be initiated and supervised by specialists experienced in the treatment of rheumatoid arthritis and psoriatic arthritis.

Alanine aminotransferase (ALT) or serum glutamopyruvate transferase (SGPT) and a complete blood cell count, including a differential white blood cell count and a platelet count, must be checked simultaneously and with the same frequency:

- before initiation of leflunomide,
- every two weeks during the first six months of treatment, and
- every 8 weeks thereafter (see section 4.4).

### Posology

- In rheumatoid arthritis: leflunomide therapy is usually started with a loading dose of 100 mg once daily for 3 days. Omission of the loading dose may decrease the risk of adverse events (see section 5.1).

The recommended maintenance dose is leflunomide 10 mg to 20 mg once daily depending on the severity (activity) of the disease.

- In psoriatic arthritis: leflunomide therapy is started with a loading dose of 100 mg once daily for 3 days.

The recommended maintenance dose is leflunomide 20 mg once daily (see section 5.1).

The therapeutic effect usually starts after 4 to 6 weeks and may further improve up to 4 to 6 months.

There is no dose adjustment recommended in patients with mild renal insufficiency.

No dose adjustment is required in patients above 65 years of age.

#### *Paediatric population*

Arava is not recommended for use in patients below 18 years since efficacy and safety in juvenile rheumatoid arthritis (JRA) have not been established (see sections 5.1 and 5.2).

#### Method of administration

Arava tablets are for oral use. The tablets should be swallowed whole with sufficient amounts of liquid. The extent of leflunomide absorption is not affected if it is taken with food.

### **4.3 Contraindications**

- Hypersensitivity (especially previous Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme) to the active substance, to the principal active metabolite teriflunomide or to any of the excipients listed in section 6.1.
- Patients with impairment of liver function.
- Patients with severe immunodeficiency states, e.g. AIDS.
- Patients with significantly impaired bone marrow function or significant anaemia, leucopenia, neutropenia or thrombocytopenia due to causes other than rheumatoid or psoriatic arthritis.
- Patients with serious infections (see section 4.4).
- Patients with moderate to severe renal insufficiency, because insufficient clinical experience is available in this patient group.
- Patients with severe hypoproteinaemia, e.g. in nephrotic syndrome.
- Pregnant women, or women of childbearing potential who are not using reliable contraception during treatment with leflunomide and thereafter as long as the plasma levels of the active metabolite are above 0.02 mg/L (see section 4.6). Pregnancy must be excluded before start of treatment with leflunomide.
- Breast-feeding women (see section 4.6).

### **4.4 Special warnings and precautions for use**

Concomitant administration of hepatotoxic or haematotoxic DMARDs (e.g. methotrexate) is not advisable.

The active metabolite of leflunomide, A771726, has a long half-life, usually 1 to 4 weeks. Serious undesirable effects might occur (e.g. hepatotoxicity, haematotoxicity or allergic reactions, see below),

even if the treatment with leflunomide has been stopped. Therefore, when such toxicities occur or if for any other reason A771726 needs to be cleared rapidly from the body, the washout procedure has to be followed. The procedure may be repeated as clinically necessary.

For washout procedures and other recommended actions in case of desired or unintended pregnancy, see section 4.6.

### Liver reactions

Rare cases of severe liver injury, including cases with fatal outcome, have been reported during treatment with leflunomide. Most of the cases occurred within the first 6 months of treatment. Co-treatment with other hepatotoxic medicinal products was frequently present. It is considered essential that monitoring recommendations are strictly adhered to.

ALT (SGPT) must be checked before initiation of leflunomide and at the same frequency as the complete blood cell count (every two weeks) during the first six months of treatment and every 8 weeks thereafter.

For ALT (SGPT) elevations between 2- and 3-fold the upper limit of normal, dose reduction from 20 mg to 10 mg may be considered and monitoring must be performed weekly. If ALT (SGPT) elevations of more than 2-fold the upper limit of normal persist or if ALT elevations of more than 3-fold the upper limit of normal are present, leflunomide must be discontinued and wash-out procedures initiated. It is recommended that monitoring of liver enzymes be maintained after discontinuation of leflunomide treatment, until liver enzyme levels have normalised.

Due to a potential for additive hepatotoxic effects, it is recommended that alcohol consumption be avoided during treatment with leflunomide.

Since the active metabolite of leflunomide, A771726, is highly protein bound and cleared via hepatic metabolism and biliary secretion, plasma levels of A771726 are expected to be increased in patients with hypoproteinaemia. Arava is contraindicated in patients with severe hypoproteinaemia or impairment of liver function (see section 4.3).

### Haematological reactions

Together with ALT, a complete blood cell count, including differential white blood cell count and platelets, must be performed before start of leflunomide treatment as well as every 2 weeks for the first 6 months of treatment and every 8 weeks thereafter.

In patients with pre-existing anaemia, leucopenia, and/or thrombocytopenia as well as in patients with impaired bone marrow function or those at risk of bone marrow suppression, the risk of haematological disorders is increased. If such effects occur, a washout (see below) to reduce plasma levels of A771726 should be considered.

In case of severe haematological reactions, including pancytopenia, Arava and any concomitant myelosuppressive treatment must be discontinued and a leflunomide washout procedure initiated.

### Combinations with other treatments

The use of leflunomide with antimalarials used in rheumatic diseases (e.g. chloroquine and hydroxychloroquine), intramuscular or oral gold, D-penicillamine, azathioprine and other immunosuppressive agents including Tumour Necrosis Factor alpha-Inhibitors has not been adequately studied up to now in randomised trials (with the exception of methotrexate, see section 4.5). The risk associated with combination therapy, in particular in long-term treatment, is unknown. Since such therapy can lead to additive or even synergistic toxicity (e.g. hepato- or haematotoxicity), combination with another DMARD (e.g. methotrexate) is not advisable.

Co-administration of teriflunomide with leflunomide is not recommended, as leflunomide is the parent compound of teriflunomide.

### Switching to other treatments

As leflunomide has a long persistence in the body, a switching to another DMARD (e.g. methotrexate) without performing the washout procedure (see below) may raise the possibility of additive risks even for a long time after the switching (i.e. kinetic interaction, organ toxicity).

Similarly, recent treatment with hepatotoxic or haematotoxic medicinal products (e.g. methotrexate) may result in increased side effects; therefore, the initiation of leflunomide treatment has to carefully be considered regarding these benefit/risk aspects and closer monitoring is recommended in the initial phase after switching.

### Skin reactions

In case of ulcerative stomatitis, leflunomide administration should be discontinued.

Very rare cases of Stevens Johnson syndrome or toxic epidermal necrolysis and Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) have been reported in patients treated with leflunomide. As soon as skin and/or mucosal reactions are observed which raise the suspicion of such severe reactions, Arava and any other possibly associated treatment must be discontinued, and a leflunomide washout procedure initiated immediately. A complete washout is essential in such cases. In such cases re-exposure to leflunomide is contraindicated (see section 4.3).

Pustular psoriasis and worsening of psoriasis have been reported after the use of leflunomide. Treatment withdrawal may be considered taking into account patient's disease and past history.

### Infections

It is known that medicinal products with immunosuppressive properties - like leflunomide - may cause patients to be more susceptible to infections, including opportunistic infections. Infections may be more severe in nature and may, therefore, require early and vigorous treatment. In the event that severe, uncontrolled infections occur, it may be necessary to interrupt leflunomide treatment and administer a washout procedure as described below.

Rare cases of Progressive Multifocal Leukoencephalopathy (PML) have been reported in patients receiving leflunomide among other immunosuppressants.

Before starting treatment, all patients should be evaluated for active and inactive ("latent") tuberculosis, as per local recommendations. This can include medical history, possible previous contact with tuberculosis, and/or appropriate screening such as lung x-ray, tuberculin test and/or interferon-gamma release assay, as applicable. Prescribers are reminded of the risk of false negative tuberculin skin test results, especially in patients who are severely ill or immunocompromised. Patients with a history of tuberculosis should be carefully monitored because of the possibility of reactivation of the infection.

### Respiratory reactions

Interstitial lung disease, as well as rare cases of pulmonary hypertension have been reported during treatment with leflunomide (see section 4.8). The risk of their occurrence can be increased in patients with a history of interstitial lung disease. Interstitial lung disease is a potentially fatal disorder, which may occur acutely during therapy. Pulmonary symptoms, such as cough and dyspnoea, may be a reason for discontinuation of the therapy and for further investigation, as appropriate.

### Peripheral neuropathy

Cases of peripheral neuropathy have been reported in patients receiving Arava. Most patients improved after discontinuation of Arava. However there was a wide variability in final outcome, i.e. in some patients the neuropathy resolved and some patients had persistent symptoms. Age older than 60 years, concomitant neurotoxic medications, and diabetes may increase the risk for peripheral neuropathy. If a patient taking Arava develops a peripheral neuropathy, consider discontinuing Arava therapy and performing the drug elimination procedure (see section 4.4).

### Colitis

Colitis, including microscopic colitis has been reported in patients treated with leflunomide. In patients on leflunomide treatment presenting unexplained chronic diarrhoea appropriate diagnostic procedures should be performed.

### Blood pressure

Blood pressure must be checked before the start of leflunomide treatment and periodically thereafter.

### Procreation (recommendations for men)

Male patients should be aware of the possible male-mediated foetal toxicity. Reliable contraception during treatment with leflunomide should also be guaranteed.

There are no specific data on the risk of male-mediated foetal toxicity. However, animal studies to evaluate this specific risk have not been conducted. To minimise any possible risk, men wishing to father a child should consider discontinuing use of leflunomide and taking colestyramine 8 g 3 times daily for 11 days or 50 g of activated powdered charcoal 4 times daily for 11 days.

In either case the A771726 plasma concentration is then measured for the first time. Thereafter, the A771726 plasma concentration must be determined again after an interval of at least 14 days. If both plasma concentrations are below 0.02 mg/L, and after a waiting period of at least 3 months, the risk of foetal toxicity is very low.

### Washout procedure

Colestyramine 8 g is administered 3 times daily. Alternatively, 50 g of activated powdered charcoal is administered 4 times daily. Duration of a complete washout is usually 11 days. The duration may be modified depending on clinical or laboratory variables.

### Lactose

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

### Interference with determination of ionised calcium levels

The measurement of ionised calcium levels might show falsely decreased values under treatment with leflunomide and/or teriflunomide (the active metabolite of leflunomide) depending on the type of ionised calcium analyser used (e.g. blood gas analyser). Therefore, the plausibility of observed decreased ionised calcium levels needs to be questioned in patients under treatment with leflunomide or teriflunomide. In case of doubtful measurements, it is recommended to determine the total albumin adjusted serum calcium concentration.

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

Interactions studies have only been performed in adults.

Increased side effects may occur in case of recent or concomitant use of hepatotoxic or haematotoxic medicinal products or when leflunomide treatment is followed by such medicinal products without a washout period (see also guidance concerning combination with other treatments, section 4.4). Therefore, closer monitoring of liver enzymes and haematological parameters is recommended in the initial phase after switching.

### Methotrexate

In a small (n=30) study with co-administration of leflunomide (10 to 20 mg per day) with methotrexate (10 to 25 mg per week) a 2- to 3-fold elevation in liver enzymes was seen on 5 of 30 patients. All elevations resolved, 2 with continuation of both medicinal products and 3 after discontinuation of leflunomide. A more than 3-fold increase was seen in another 5 patients. All of these also resolved, 2 with continuation of both medicinal products and 3 after discontinuation of leflunomide.

In patients with rheumatoid arthritis, no pharmacokinetic interaction between the leflunomide (10 to 20 mg per day) and methotrexate (10 to 25 mg per week) was demonstrated.

### Vaccinations

No clinical data are available on the efficacy and safety of vaccinations under leflunomide treatment. Vaccination with live attenuated vaccines is, however, not recommended. The long half-life of leflunomide should be considered when contemplating administration of a live attenuated vaccine after stopping Arava.

### Warfarin and other coumarine anticoagulants

There have been case reports of increased prothrombin time, when leflunomide and warfarin were co-administered. A pharmacodynamics interaction with warfarin was observed with A771726 in a clinical pharmacology study (see below). Therefore, when warfarin or another coumarin anticoagulant is co-administered, close international normalised ratio (INR) follow-up and monitoring is recommended.

### NSAIDs/Corticosteroids

If the patient is already receiving nonsteroidal anti-inflammatory drugs (NSAIDs) and/or corticosteroids, these may be continued after starting leflunomide.

### Effect of other medicinal products on leflunomide:

#### *Cholestyramine or activated charcoal*

It is recommended that patients receiving leflunomide are not treated with colestyramine or activated powdered charcoal because this leads to a rapid and significant decrease in plasma A771726 (the active metabolite of leflunomide; see also section 5) concentration. The mechanism is thought to be by interruption of enterohepatic recycling and/or gastrointestinal dialysis of A771726.

#### *CYP450 inhibitors and inducers*

*In vitro* inhibition studies in human liver microsomes suggest that cytochrome P450 (CYP) 1A2, 2C19 and 3A4 are involved in leflunomide metabolism. An *in vivo* interaction study with leflunomide and cimetidine (non-specific weak cytochrome P450 (CYP) inhibitor) has demonstrated a lack of a

significant impact on A771726 exposure. Following concomitant administration of a single dose of leflunomide to subjects receiving multiple doses of rifampicin (non-specific cytochrome P450 inducer) A771726 peak levels were increased by approximately 40%, whereas the AUC was not significantly changed. The mechanism of this effect is unclear.

#### Effect of leflunomide on other medicinal products:

##### *Oral contraceptives*

In a study in which leflunomide was given concomitantly with a triphasic oral contraceptive pill containing 30 µg ethinyloestradiol to healthy female volunteers, there was no reduction in contraceptive activity of the pill, and A771726 pharmacokinetics were within predicted ranges. A pharmacokinetic interaction with oral contraceptives was observed with A771726 (see below).

The following pharmacokinetic and pharmacodynamic interaction studies were conducted with A771726 (principal active metabolite of leflunomide). As similar drug-drug interactions cannot be excluded for leflunomide at recommended doses, the following study results and recommendations should be considered in patients treated with leflunomide:

##### Effect on repaglinide (CYP2C8 substrate)

There was an increase in mean repaglinide  $C_{max}$  and AUC (1.7- and 2.4-fold, respectively), following repeated doses of A771726, suggesting that A771726 is an inhibitor of CYP2C8 *in vivo*. Therefore, monitoring patients with concomitant use of medicinal products metabolised by CYP2C8, such as repaglinide, paclitaxel, pioglitazone or rosiglitazone, is recommended as they may have higher exposure.

##### Effect on caffeine (CYP1A2 substrate)

Repeated doses of A771726 decreased mean  $C_{max}$  and AUC of caffeine (CYP1A2 substrate) by 18% and 55%, respectively, suggesting that A771726 may be a weak inducer of CYP1A2 *in vivo*. Therefore, medicinal products metabolised by CYP1A2 (such as duloxetine, alosetron, theophylline and tizanidine) should be used with caution during treatment, as it could lead to the reduction of the efficacy of these products.

##### Effect on organic anion transporter 3 (OAT3) substrates

There was an increase in mean cefaclor  $C_{max}$  and AUC (1.43- and 1.54-fold, respectively), following repeated doses of A771726, suggesting that A771726 is an inhibitor of OAT3 *in vivo*. Therefore, when co-administered with substrates of OAT3, such as cefaclor, benzylpenicillin, ciprofloxacin, indomethacin, ketoprofen, furosemide, cimetidine, methotrexate, zidovudine, caution is recommended.

##### Effect on BCRP (Breast Cancer Resistance Protein) and /or organic anion transporting polypeptide B1 and B3 (OATP1B1/B3) substrates

There was an increase in mean rosuvastatin  $C_{max}$  and AUC (2.65- and 2.51-fold, respectively), following repeated doses of A771726. However, there was no apparent impact of this increase in plasma rosuvastatin exposure on the HMG-CoA reductase activity. If used together, the dose of rosuvastatin should not exceed 10 mg once daily. For other substrates of BCRP (e.g., methotrexate, topotecan, sulfasalazine, daunorubicin, doxorubicin) and the OATP family especially HMG-CoA reductase inhibitors (e.g., simvastatin, atorvastatin, pravastatin, methotrexate, nateglinide, repaglinide, rifampicin) concomitant administration should also be undertaken with caution. Patients should be closely monitored for signs and symptoms of excessive exposure to the medicinal products and reduction of the dose of these medicinal products should be considered.

##### Effect on oral contraceptive (0.03 mg ethinylestradiol and 0.15 mg levonorgestrel)

There was an increase in mean ethinylestradiol  $C_{max}$  and AUC<sub>0-24</sub> (1.58- and 1.54-fold, respectively) and levonorgestrel  $C_{max}$  and AUC<sub>0-24</sub> (1.33- and 1.41-fold, respectively) following repeated doses of



A771726. While this interaction is not expected to adversely impact the efficacy of oral contraceptives, consideration should be given to the type of oral contraceptive treatment.

#### Effect on warfarin (CYP2C9 substrate)

Repeated doses of A771726 had no effect on the pharmacokinetics of S-warfarin, indicating that A771726 is not an inhibitor or an inducer of CYP2C9. However, a 25% decrease in peak international normalised ratio (INR) was observed when A771726 was co-administered with warfarin as compared with warfarin alone. Therefore, when warfarin is co-administered, close INR follow-up and monitoring is recommended.

## 4.6 Fertility, pregnancy and lactation

### Pregnancy

The active metabolite of leflunomide, A771726 is suspected to cause serious birth defects when administered during pregnancy. Arava is contraindicated in pregnancy (see section 4.3).

Women of childbearing potential have to use effective contraception during and up to 2 years after treatment (see “waiting period” below) or up to 11 days after treatment (see abbreviated “washout period” below).

The patient must be advised that if there is any delay in onset of menses or any other reason to suspect pregnancy, they must notify the physician immediately for pregnancy testing, and if positive, the physician and patient must discuss the risk to the pregnancy. It is possible that rapidly lowering the blood level of the active metabolite, by instituting the drug elimination procedure described below, at the first delay of menses may decrease the risk to the foetus from leflunomide.

In a small prospective study in women (n=64) who became inadvertently pregnant while taking leflunomide for no more than three weeks after conception and followed by a drug elimination procedure, no significant differences (p=0.13) were observed in the overall rate of major structural defects (5.4%) compared to either of the comparison groups (4.2% in the disease matched group [n=108] and 4.2% in healthy pregnant women [n=78]).

For women receiving leflunomide treatment and who wish to become pregnant, one of the following procedures is recommended in order to ascertain that the foetus is not exposed to toxic concentrations of A771726 (target concentration below 0.02 mg/L):

#### *Waiting period*

A771726 plasma levels can be expected to be above 0.02 mg/L for a prolonged period. The concentration may be expected to decrease below 0.02 mg/L about 2 years after stopping the treatment with leflunomide.

After a 2-year waiting period, the A771726 plasma concentration is measured for the first time. Thereafter, the A771726 plasma concentration must be determined again after an interval of at least 14 days. If both plasma concentrations are below 0.02 mg/L no teratogenic risk is to be expected.

For further information on the sample testing please contact the Marketing Authorisation Holder or its local representative (see section 7).

#### *Washout procedure*

After stopping treatment with leflunomide:

- colestyramine 8 g is administered 3 times daily for a period of 11 days,

- alternatively, 50 g of activated powdered charcoal is administered 4 times daily for a period of 11 days.

However, also following either of the washout procedures, verification by 2 separate tests at an interval of at least 14 days and a waiting period of one-and-a-half months between the first occurrence of a plasma concentration below 0.02 mg/L and fertilisation is required.

Women of childbearing potential should be told that a waiting period of 2 years after treatment discontinuation is required before they may become pregnant. If a waiting period of up to approximately 2 years under reliable contraception is considered unpractical, prophylactic institution of a washout procedure may be advisable.

Both colestyramine and activated powdered charcoal may influence the absorption of oestrogens and progestogens such that reliable contraception with oral contraceptives may not be guaranteed during the washout procedure with colestyramine or activated powdered charcoal. Use of alternative contraceptive methods is recommended.

#### Breast-feeding

Animal studies indicate that leflunomide or its metabolites pass into breast milk. Breast-feeding women must, therefore, not receive leflunomide.

#### Fertility

Results of animal fertility studies have shown no effect on male and female fertility, but adverse effects on male reproductive organs were observed in repeated dose toxicity studies (see section 5.3).

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

In the case of side effects such as dizziness the patient's ability to concentrate and to react properly may be impaired. In such cases patients should refrain from driving cars and using machines.

### **4.8 Undesirable effects**

#### Summary of the safety profile

The most frequently reported adverse effects with leflunomide are: mild increase in blood pressure, leucopenia, paraesthesia, headache, dizziness, diarrhoea, nausea, vomiting, oral mucosal disorders (e.g. aphthous stomatitis, mouth ulceration), abdominal pain, increased hair loss, eczema, rash (including maculo-papular rash), pruritus, dry skin, tenosynovitis, CPK increased, anorexia, weight loss (usually insignificant), asthenia, mild allergic reactions and elevation of liver parameters (transaminases (especially ALT), less often gamma-GT, alkaline phosphatase, bilirubin)).

Classification of expected frequencies:

Very common ( $\geq 1/10$ ); common ( $\geq 1/100$  to  $< 1/10$ ); uncommon ( $\geq 1/1,000$  to  $< 1/100$ ); rare ( $\geq 1/10,000$  to  $< 1/1,000$ ); very rare ( $< 1/10,000$ ), not known (cannot be estimated from the available data).

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

#### *Infections and infestations*

Rare: severe infections, including sepsis which may be fatal

Like other agents with immunosuppressive potential, leflunomide may increase susceptibility to infections, including opportunistic infections (see also section 4.4). Thus, the overall incidence of infections can increase (in particular of rhinitis, bronchitis and pneumonia).

*Neoplasms benign, malignant and unspecified (incl. cysts and polyps)*

The risk of malignancy, particularly lymphoproliferative disorders, is increased with use of some immunosuppressive agents.

*Blood and lymphatic system disorders*

- Common: leucopenia (leucocytes >2 G/L)
- Uncommon: anaemia, mild thrombocytopenia (platelets <100 G/L)
- Rare: pancytopenia (probably by antiproliferative mechanism), leucopenia (leucocytes <2 G/L), eosinophilia
- Very rare: agranulocytosis

Recent, concomitant or consecutive use of potentially myelotoxic agents may be associated with a higher risk of haematological effects.

*Immune system disorders*

- Common: mild allergic reactions
- Very rare: severe anaphylactic/anaphylactoid reactions, vasculitis, including cutaneous necrotizing vasculitis

*Metabolism and nutrition disorders*

- Common: CPK increased
- Uncommon: hypokalaemia, hyperlipidemia, hypophosphataemia
- Rare: LDH increased
- Not known: hypouricemia

*Psychiatric disorders*

- Uncommon: anxiety

*Nervous system disorders*

- Common: paraesthesia, headache, dizziness, peripheral neuropathy

*Cardiac disorders*

- Common: mild increase in blood pressure
- Rare: severe increase in blood pressure

*Respiratory, thoracic and mediastinal disorders*

- Rare: interstitial lung disease (including interstitial pneumonitis), which may be fatal
- Not known: pulmonary hypertension

*Gastrointestinal disorders*

- Common: colitis including microscopic colitis such as lymphocytic colitis, collagenous colitis, diarrhoea, nausea, vomiting, oral mucosal disorders (e.g., aphthous stomatitis, mouth ulceration), abdominal pain
- Uncommon: taste disturbances
- Very rare: pancreatitis

*Hepatobiliary disorders*

- Common: elevation of liver parameters (transaminases [especially ALT], less often gamma-GT, alkaline phosphatase, bilirubin)
- Rare: hepatitis, jaundice/cholestasis
- Very rare: severe liver injury such as hepatic failure and acute hepatic necrosis that may be fatal

*Skin and subcutaneous tissue disorders*

- Common: increased hair loss, eczema, rash (including maculopapular rash), pruritus, dry skin
- Uncommon: urticaria
- Very rare: toxic epidermal necrolysis, Stevens-Johnson syndrome, erythema multiforme

Not known: cutaneous lupus erythematosus, pustular psoriasis or worsening psoriasis, Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)

#### *Musculoskeletal and connective tissue disorders*

Common: tenosynovitis

Uncommon: tendon rupture

#### *Renal and urinary disorders*

Not known: renal failure

#### *Reproductive system and breast disorders*

Not known: marginal (reversible) decreases in sperm concentration, total sperm count and rapid progressive motility

#### *General disorders and administration site conditions*

Common: anorexia, weight loss (usually insignificant), asthenia

#### 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 national reporting system listed in [Appendix V](#)**.

## **4.9 Overdose**

### Symptoms

There have been reports of chronic overdose in patients taking Arava at daily doses up to five times the recommended daily dose, and reports of acute overdose in adults and children. There were no adverse events reported in the majority of case reports of overdose. Adverse events consistent with the safety profile for leflunomide were: abdominal pain, nausea, diarrhoea, elevated liver enzymes, anaemia, leucopenia, pruritus and rash.

### Management

In the event of an overdose or toxicity, colestyramine or charcoal is recommended to accelerate elimination. Colestyramine given orally at a dose of 8 g three times a day for 24 hours to three healthy volunteers decreased plasma levels of A771726 by approximately 40% in 24 hours and by 49% to 65% in 48 hours.

Administration of activated charcoal (powder made into a suspension) orally or via nasogastric tube (50 g every 6 hours for 24 hours) has been shown to reduce plasma concentrations of the active metabolite A771726 by 37% in 24 hours and by 48% in 48 hours.

These washout procedures may be repeated if clinically necessary.

Studies with both hemodialysis and CAPD (chronic ambulatory peritoneal dialysis) indicate that A771726, the primary metabolite of leflunomide, is not dialysable.

## **5. PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: selective immunosuppressants, ATC code: L04AA13.

#### Human pharmacology

Leflunomide is a disease-modifying anti-rheumatic agent with antiproliferative properties.

### Animal pharmacology

Leflunomide is effective in animal models of arthritis and of other autoimmune diseases and transplantation, mainly if administered during the sensitisation phase. It has immunomodulating/ immunosuppressive characteristics, acts as an antiproliferative agent, and displays anti-inflammatory properties. Leflunomide exhibits the best protective effects on animal models of autoimmune diseases when administered in the early phase of the disease progression.

*In vivo*, it is rapidly and almost completely metabolised to A771726 which is active *in vitro*, and is presumed to be responsible for the therapeutic effect.

### Mechanism of action

A771726, the active metabolite of leflunomide, inhibits the human enzyme dihydroorotate dehydrogenase (DHODH) and exhibits antiproliferative activity.

### Clinical efficacy and safety

#### *Rheumatoid arthritis*

The efficacy of Arava in the treatment of rheumatoid arthritis was demonstrated in 4 controlled trials (1 in phase II and 3 in phase III). The phase II trial, study YU203, randomised 402 subjects with active rheumatoid arthritis to placebo (n=102), leflunomide 5 mg (n=95), 10 mg (n=101) or 25 mg/day (n=104). The treatment duration was 6 months.

All leflunomide patients in the phase III trials used an initial dose of 100 mg for 3 days.

Study MN301 randomised 358 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=133), sulphasalazine 2 g/day (n=133), or placebo (n=92). Treatment duration was 6 months.

Study MN303 was an optional 6-month blinded continuation of MN301 without the placebo arm, resulting in a 12-month comparison of leflunomide and sulphasalazine.

Study MN302 randomised 999 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=501) or methotrexate at 7.5 mg/week increasing to 15 mg/week (n=498). Folate supplementation was optional and only used in 10% of patients. Treatment duration was 12-months.

Study US301 randomised 482 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=182), methotrexate 7.5 mg/week increasing to 15 mg/week (n=182), or placebo (n=118). All patients received folate 1 mg bid. Treatment duration was 12 months.

Leflunomide at a daily dose of at least 10 mg (10 to 25 mg in study YU203, 20 mg in studies MN301 and US301) was statistically significantly superior to placebo in reducing the signs and symptoms of rheumatoid arthritis in all 3 placebo-controlled trials. The ACR (American College of Rheumatology) response rates in study YU203 were 27.7% for placebo, 31.9% for 5 mg, 50.5% for 10 mg and 54.5% for 25 mg/day. In the phase III trials, the ACR response rates for leflunomide 20 mg/day versus placebo were 54.6% versus 28.6% (study MN301), and 49.4% versus 26.3% (study US301). After 12 months with active treatment, the ACR response rates in leflunomide patients were 52.3% (studies MN301/303), 50.5% (study MN302) and 49.4% (study US301), compared to 53.8% (studies MN301/303) in sulphasalazine patients, 64.8% (study MN302), and 43.9% (study US301) in methotrexate patients. In study MN302 leflunomide was significantly less effective than methotrexate. However, in study US301 no significant differences were observed between leflunomide and methotrexate in the primary efficacy parameters. No difference was observed between leflunomide and sulphasalazine (study MN301). The leflunomide treatment effect was evident by 1 month, stabilised by 3 to 6 months and continued throughout the course of treatment.

A randomised, double-blind, parallel-group non-inferiority study compared the relative efficacy of two different daily maintenance doses of leflunomide, 10 mg and 20 mg. From the results it can be concluded that efficacy results of the 20 mg maintenance dose were more favourable, on the other hand, the safety results favoured the 10 mg daily maintenance dose.

### *Paediatric population*

Leflunomide was studied in a single multicenter, randomized, double-blind, active-controlled trial in 94 patients (47 per arm) with polyarticular course juvenile rheumatoid arthritis. Patients were 3–17 years of age with active polyarticular course JRA regardless of onset type and naive to methotrexate or leflunomide. In this trial, the loading dose and maintenance dose of leflunomide was based on three weight categories: <20 kg, 20-40 kg, and >40 kg. After 16 weeks treatment, the difference in response rates was statistically significant in favour of methotrexate for the JRA Definition of Improvement (DOI)  $\geq 30\%$  ( $p=0.02$ ). In responders, this response was maintained during 48 weeks (see section 4.2). The pattern of adverse events of leflunomide and methotrexate seems to be similar, but the dose used in lighter subjects resulted in a relatively low exposure (see section 5.2). These data do not allow an effective and safe dose recommendation.

### *Psoriatic arthritis*

The efficacy of Arava was demonstrated in one controlled, randomised, double blind study 3L01 in 188 patients with psoriatic arthritis, treated at 20 mg/day. Treatment duration was 6 months.

Leflunomide 20 mg/day was significantly superior to placebo in reducing the symptoms of arthritis in patients with psoriatic arthritis: the PsARC (Psoriatic Arthritis treatment Response Criteria) responders were 59% in the leflunomide group and 29.7% in the placebo group by 6 months ( $p<0.0001$ ). The effect of leflunomide on improvement of function and on reduction of skin lesions was modest.

### *Postmarketing studies*

A randomised study assessed the clinical efficacy response rate in DMARD-naïve patients ( $n=121$ ) with early RA, who received either 20 mg or 100 mg of leflunomide in two parallel groups during the initial three day double blind period. The initial period was followed by an open label maintenance period of three months, during which both groups received leflunomide 20 mg daily. No incremental overall benefit was observed in the studied population with the use of a loading dose regimen. The safety data obtained from both treatment groups were consistent with the known safety profile of leflunomide, however, the incidence of gastrointestinal adverse events and of elevated liver enzymes tended to be higher in the patients receiving the loading dose of 100 mg leflunomide.

## **5.2 Pharmacokinetic properties**

Leflunomide is rapidly converted to the active metabolite, A771726, by first-pass metabolism (ring opening) in gut wall and liver. In a study with radiolabelled  $^{14}\text{C}$ -leflunomide in three healthy volunteers, no unchanged leflunomide was detected in plasma, urine or faeces. In other studies, unchanged leflunomide levels in plasma have rarely been detected, however, at ng/ml plasma levels. The only plasma-radiolabelled metabolite detected was A771726. This metabolite is responsible for essentially all the *in vivo* activity of Arava.

## Absorption

Excretion data from the <sup>14</sup>C study indicated that at least about 82 to 95% of the dose is absorbed. The time to peak plasma concentrations of A771726 is very variable; peak plasma levels can occur between 1 hour and 24 hours after single administration. Leflunomide can be administered with food, since the extent of absorption is comparable in the fed and fasting state. Due to the very long half-life of A771726 (approximately 2 weeks), a loading dose of 100 mg for 3 days was used in clinical studies to facilitate the rapid attainment of steady-state levels of A771726. Without a loading dose, it is estimated that attainment of steady-state plasma concentrations would require nearly two months of dosing. In multiple dose studies in patients with rheumatoid arthritis, the pharmacokinetic parameters of A771726 were linear over the dose range of 5 to 25 mg. In these studies, the clinical effect was closely related to the plasma concentration of A771726 and to the daily dose of leflunomide. At a dose level of 20 mg/day, average plasma concentration of A771726 at steady state is approximately 35 µg/ml. At steady state plasma levels accumulate about 33- to 35-fold compared with single dose.

## Distribution

In human plasma, A771726 is extensively bound to protein (albumin). The unbound fraction of A771726 is about 0.62%. Binding of A771726 is linear in the therapeutic concentration range. Binding of A771726 appeared slightly reduced and more variable in plasma from patients with rheumatoid arthritis or chronic renal insufficiency. The extensive protein binding of A771726 could lead to displacement of other highly-bound drugs. *In vitro* plasma protein binding interaction studies with warfarin at clinically relevant concentrations, however, showed no interaction. Similar studies showed that ibuprofen and diclofenac did not displace A771726, whereas the unbound fraction of A771726 is increased 2- to 3-fold in the presence of tolbutamide. A771726 displaced ibuprofen, diclofenac and tolbutamide but the unbound fraction of these medicinal products is only increased by 10% to 50%. There is no indication that these effects are of clinical relevance. Consistent with extensive protein binding A771726 has a low apparent volume of distribution (approximately 11 litres). There is no preferential uptake in erythrocytes.

## Biotransformation

Leflunomide is metabolised to one primary (A771726) and many minor metabolites including TFMA (4-trifluoromethylaniline). The metabolic biotransformation of leflunomide to A771726 and subsequent metabolism of A771726 is not controlled by a single enzyme and has been shown to occur in microsomal and cytosolic cellular fractions. Interaction studies with cimetidine (non-specific cytochrome P450 inhibitor) and rifampicin (non-specific cytochrome P450 inducer), indicate that *in vivo* CYP enzymes are involved in the metabolism of leflunomide only to a small extent.

## Elimination

Elimination of A771726 is slow and characterised by an apparent clearance of about 31 ml/hr. The elimination half-life in patients is approximately 2 weeks. After administration of a radiolabelled dose of leflunomide, radioactivity was equally excreted in faeces, probably by biliary elimination, and in urine. A771726 was still detectable in urine and faeces 36 days after a single administration. The principal urinary metabolites were glucuronide products derived from leflunomide (mainly in 0 to 24 hour samples) and an oxanilic acid derivative of A771726. The principal faecal component was A771726.

It has been shown in man that administration of an oral suspension of activated powdered charcoal or colestyramine leads to a rapid and significant increase in A771726 elimination rate and decline in plasma concentrations (see section 4.9). This is thought to be achieved by a gastrointestinal dialysis mechanism and/or by interrupting enterohepatic recycling.

### Renal impairment

Leflunomide was administered as a single oral 100 mg dose to 3 haemodialysis patients and 3 patients on continuous peritoneal dialysis (CAPD). The pharmacokinetics of A771726 in CAPD subjects appeared to be similar to healthy volunteers. A more rapid elimination of A771726 was observed in haemodialysis subjects which was not due to extraction of medicinal product in the dialysate.

### Hepatic impairment

No data are available regarding treatment of patients with hepatic impairment. The active metabolite A771726 is extensively protein bound and cleared via hepatic metabolism and biliary secretion. These processes may be affected by hepatic dysfunction.

### Paediatric population

The pharmacokinetics of A771726 following oral administration of leflunomide have been investigated in 73 paediatric patients with polyarticular course Juvenile Rheumatoid Arthritis (JRA) who ranged in age from 3 to 17 years. The results of a population pharmacokinetic analysis of these trials have demonstrated that paediatric patients with body weights  $\leq 40$  kg have a reduced systemic exposure (measured by  $C_{ss}$ ) of A771726 relative to adult rheumatoid arthritis patients (see section 4.2).

### Elderly

Pharmacokinetic data in elderly (>65 years) are limited but consistent with pharmacokinetics in younger adults.

## **5.3 Preclinical safety data**

Leflunomide, administered orally and intraperitoneally, has been studied in acute toxicity studies in mice and rats. Repeated oral administration of leflunomide to mice for up to 3 months, to rats and dogs for up to 6 months and to monkeys for up to 1 month's duration revealed that the major target organs for toxicity were bone marrow, blood, gastrointestinal tract, skin, spleen, thymus and lymph nodes. The main effects were anaemia, leucopenia, decreased platelet counts and panmyelopathy and reflect the basic mode of action of the compound (inhibition of DNA synthesis). In rats and dogs, Heinz bodies and/or Howell-Jolly bodies were found. Other effects found on heart, liver, cornea and respiratory tract could be explained as infections due to immunosuppression. Toxicity in animals was found at doses equivalent to human therapeutic doses.

Leflunomide was not mutagenic. However, the minor metabolite TFMA (4-trifluoromethylaniline) caused clastogenicity and point mutations *in vitro*, whilst insufficient information was available on its potential to exert this effect *in vivo*.

In a carcinogenicity study in rats, leflunomide did not show carcinogenic potential. In a carcinogenicity study in mice an increased incidence of malignant lymphoma occurred in males of the highest dose group, considered to be due to the immunosuppressive activity of leflunomide. In female mice an increased incidence, dose-dependent, of bronchiolo-alveolar adenomas and carcinomas of the lung was noted. The relevance of the findings in mice relative to the clinical use of leflunomide is uncertain.

Leflunomide was not antigenic in animal models.

Leflunomide was embryotoxic and teratogenic in rats and rabbits at doses in the human therapeutic range and exerted adverse effects on male reproductive organs in repeated dose toxicity studies. Fertility was not reduced.



## **6. PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

*Tablet core:*

Maize starch  
Povidone (E1201)  
Crospovidone (E1202)  
Silica colloidal anhydrous  
Magnesium stearate (E470b)  
Lactose monohydrate

*Film-coating:*

Talc (E553b)  
Hypromellose (E464)  
Titanium dioxide (E171)  
Macrogol 8000

### **6.2 Incompatibilities**

Not applicable.

### **6.3 Shelf life**

3 years.

### **6.4 Special precautions for storage**

Blister: Store in the original package.  
Bottle: Keep the bottle tightly closed.

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

Blister: Aluminium / Aluminium blister. Pack sizes: 30 and 100 film-coated tablets.  
Bottle: 100 ml HDPE-wide-necked bottle, with screw cap with integrated desiccant container, containing either 30 or 100 film-coated tablets.

Not all pack sizes may be marketed.

### **6.6 Special precautions for disposal**

No special requirements for disposal.

## **7. MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

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

EU/1/99/118/001-004

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

Date of first authorisation: 02 September 1999

Date of latest renewal: 02 September 2009

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

Detailed information on this medicinal product is available on the website of the European Medicines Agency <http://www.ema.europa.eu/>.

## 1. NAME OF THE MEDICINAL PRODUCT

Arava 20 mg film-coated tablets

## 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each tablet contains 20 mg of leflunomide.

### Excipients with known effect

Each tablet contains 72 mg of lactose monohydrate.

For the full list of excipients, see section 6.1.

## 3. PHARMACEUTICAL FORM

Film-coated tablet.

Yellowish to ochre and triangular film-coated tablet, imprinted with ZBO on one side.

## 4. CLINICAL PARTICULARS

### 4.1 Therapeutic indications

Leflunomide is indicated for the treatment of adult patients with:

- active rheumatoid arthritis as a "disease-modifying antirheumatic drug" (DMARD),
- active psoriatic arthritis.

Recent or concurrent treatment with hepatotoxic or haematotoxic DMARDs (e.g. methotrexate) may result in an increased risk of serious adverse reactions; therefore, the initiation of leflunomide treatment has to be carefully considered regarding these benefit/risk aspects.

Moreover, switching from leflunomide to another DMARD without following the washout procedure (see section 4.4) may also increase the risk of serious adverse reactions even for a long time after the switching.

### 4.2 Posology and method of administration

The treatment should be initiated and supervised by specialists experienced in the treatment of rheumatoid arthritis and psoriatic arthritis.

Alanine aminotransferase (ALT) or serum glutamopyruvate transferase (SGPT) and a complete blood cell count, including a differential white blood cell count and a platelet count, must be checked simultaneously and with the same frequency:

- before initiation of leflunomide,
- every two weeks during the first six months of treatment, and
- every 8 weeks thereafter (see section 4.4).

### Posology

- In rheumatoid arthritis: leflunomide therapy is usually started with a loading dose of 100 mg once daily for 3 days. Omission of the loading dose may decrease the risk of adverse events (see section 5.1).

The recommended maintenance dose is leflunomide 10 mg to 20 mg once daily depending on the severity (activity) of the disease.

- In psoriatic arthritis: leflunomide therapy is started with a loading dose of 100 mg once daily for 3 days.

The recommended maintenance dose is leflunomide 20 mg once daily (see section 5.1).

The therapeutic effect usually starts after 4 to 6 weeks and may further improve up to 4 to 6 months.

There is no dose adjustment recommended in patients with mild renal insufficiency.

No dose adjustment is required in patients above 65 years of age.

#### *Paediatric population*

Arava is not recommended for use in patients below 18 years since efficacy and safety in juvenile rheumatoid arthritis (JRA) have not been established (see sections 5.1 and 5.2).

#### Method of administration

Arava tablets are for oral use. The tablets should be swallowed whole with sufficient amounts of liquid. The extent of leflunomide absorption is not affected if it is taken with food.

### **4.3 Contraindications**

- Hypersensitivity (especially previous Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme) to the active substance, to the principal active metabolite teriflunomide or to any of the excipients listed in section 6.1.
- Patients with impairment of liver function.
- Patients with severe immunodeficiency states, e.g. AIDS.
- Patients with significantly impaired bone marrow function or significant anaemia, leucopenia, neutropenia or thrombocytopenia due to causes other than rheumatoid or psoriatic arthritis.
- Patients with serious infections (see section 4.4).
- Patients with moderate to severe renal insufficiency, because insufficient clinical experience is available in this patient group.
- Patients with severe hypoproteinaemia, e.g. in nephrotic syndrome.
- Pregnant women, or women of childbearing potential who are not using reliable contraception during treatment with leflunomide and thereafter as long as the plasma levels of the active metabolite are above 0.02 mg/L (see section 4.6). Pregnancy must be excluded before start of treatment with leflunomide.
- Breast-feeding women (see section 4.6).

### **4.4 Special warnings and precautions for use**

Concomitant administration of hepatotoxic or haematotoxic DMARDs (e.g. methotrexate) is not advisable.

The active metabolite of leflunomide, A771726, has a long half-life, usually 1 to 4 weeks. Serious effects might occur (e.g. hepatotoxicity, haematotoxicity or allergic reactions, see below), even if the treatment with leflunomide has been stopped. Therefore, when such toxicities occur or if for any

other reason A771726 needs to be cleared rapidly from the body, the washout procedure has to be followed. The procedure may be repeated as clinically necessary.

For washout procedures and other recommended actions in case of desired or unintended pregnancy, see section 4.6.

#### Liver reactions

Rare cases of severe liver injury, including cases with fatal outcome, have been reported during treatment with leflunomide. Most of the cases occurred within the first 6 months of treatment. Co-treatment with other hepatotoxic medicinal products was frequently present. It is considered essential that monitoring recommendations are strictly adhered to.

ALT (SGPT) must be checked before initiation of leflunomide and at the same frequency as the complete blood cell count (every two weeks) during the first six months of treatment and every 8 weeks thereafter.

For ALT (SGPT) elevations between 2- and 3-fold the upper limit of normal, dose reduction from 20 mg to 10 mg may be considered and monitoring must be performed weekly. If ALT (SGPT) elevations of more than 2-fold the upper limit of normal persist or if ALT elevations of more than 3-fold the upper limit of normal are present, leflunomide must be discontinued and wash-out procedures initiated. It is recommended that monitoring of liver enzymes be maintained after discontinuation of leflunomide treatment, until liver enzyme levels have normalised.

Due to a potential for additive hepatotoxic effects, it is recommended that alcohol consumption be avoided during treatment with leflunomide.

Since the active metabolite of leflunomide, A771726, is highly protein bound and cleared via hepatic metabolism and biliary secretion, plasma levels of A771726 are expected to be increased in patients with hypoproteinaemia. Arava is contraindicated in patients with severe hypoproteinaemia or impairment of liver function (see section 4.3).

#### Haematological reactions

Together with ALT, a complete blood cell count, including differential white blood cell count and platelets, must be performed before start of leflunomide treatment as well as every 2 weeks for the first 6 months of treatment and every 8 weeks thereafter.

In patients with pre-existing anaemia, leucopenia, and/or thrombocytopenia as well as in patients with impaired bone marrow function or those at risk of bone marrow suppression, the risk of haematological disorders is increased. If such effects occur, a washout (see below) to reduce plasma levels of A771726 should be considered.

In case of severe haematological reactions, including pancytopenia, Arava and any concomitant myelosuppressive treatment must be discontinued and a leflunomide washout procedure initiated.

#### Combinations with other treatments

The use of leflunomide with antimalarials used in rheumatic diseases (e.g. chloroquine and hydroxychloroquine), intramuscular or oral gold, D-penicillamine, azathioprine and other immunosuppressive agents including Tumour Necrosis Factor alpha-Inhibitors has not been adequately studied up to now in randomised trials (with the exception of methotrexate, see section 4.5). The risk associated with combination therapy, in particular in long-term treatment, is unknown. Since such therapy can lead to additive or even synergistic toxicity (e.g. hepato- or haematotoxicity), combination with another DMARD (e.g. methotrexate) is not advisable.

Co-administration of teriflunomide with leflunomide is not recommended, as leflunomide is the parent compound of teriflunomide.

### Switching to other treatments

As leflunomide has a long persistence in the body, a switching to another DMARD (e.g. methotrexate) without performing the washout procedure (see below) may raise the possibility of additive risks even for a long time after the switching (i.e. kinetic interaction, organ toxicity).

Similarly, recent treatment with hepatotoxic or haematotoxic medicinal products (e.g. methotrexate) may result in increased side effects; therefore, the initiation of leflunomide treatment has to carefully be considered regarding these benefit/risk aspects and closer monitoring is recommended in the initial phase after switching.

### Skin reactions

In case of ulcerative stomatitis, leflunomide administration should be discontinued.

Very rare cases of Stevens Johnson syndrome or toxic epidermal necrolysis and Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) have been reported in patients treated with leflunomide. As soon as skin and/or mucosal reactions are observed which raise the suspicion of such severe reactions, Arava and any other possibly associated treatment must be discontinued, and a leflunomide washout procedure initiated immediately. A complete washout is essential in such cases. In such cases re-exposure to leflunomide is contraindicated (see section 4.3).

Pustular psoriasis and worsening of psoriasis have been reported after the use of leflunomide. Treatment withdrawal may be considered taking into account patient's disease and past history.

### Infections

It is known that medicinal products with immunosuppressive properties - like leflunomide - may cause patients to be more susceptible to infections, including opportunistic infections. Infections may be more severe in nature and may, therefore, require early and vigorous treatment. In the event that severe, uncontrolled infections occur, it may be necessary to interrupt leflunomide treatment and administer a washout procedure as described below.

Rare cases of Progressive Multifocal Leukoencephalopathy (PML) have been reported in patients receiving leflunomide among other immunosuppressants.

Before starting treatment, all patients should be evaluated for active and inactive ("latent") tuberculosis, as per local recommendations. This can include medical history, possible previous contact with tuberculosis, and/or appropriate screening such as lung x-ray, tuberculin test and/or interferon-gamma release assay, as applicable. Prescribers are reminded of the risk of false negative tuberculin skin test results, especially in patients who are severely ill or immunocompromised. Patients with a history of tuberculosis should be carefully monitored because of the possibility of reactivation of the infection.

### Respiratory reactions

Interstitial lung disease, as well as rare cases of pulmonary hypertension have been reported during treatment with leflunomide (see section 4.8). The risk of their occurrence can be increased in patients with a history of interstitial lung disease. Interstitial lung disease is a potentially fatal disorder, which may occur acutely during therapy. Pulmonary symptoms, such as cough and dyspnoea, may be a reason for discontinuation of the therapy and for further investigation, as appropriate.

### Peripheral neuropathy

Cases of peripheral neuropathy have been reported in patients receiving Arava. Most patients improved after discontinuation of Arava. However there was a wide variability in final outcome, i.e. in some patients the neuropathy resolved and some patients had persistent symptoms. Age older than 60 years, concomitant neurotoxic medications, and diabetes may increase the risk for peripheral neuropathy. If a patient taking Arava develops a peripheral neuropathy, consider discontinuing Arava therapy and performing the drug elimination procedure (see section 4.4).

### Colitis

Colitis, including microscopic colitis has been reported in patients treated with leflunomide. In patients on leflunomide treatment presenting unexplained chronic diarrhoea appropriate diagnostic procedures should be performed.

### Blood pressure

Blood pressure must be checked before the start of leflunomide treatment and periodically thereafter.

### Procreation (recommendations for men)

Male patients should be aware of the possible male-mediated foetal toxicity. Reliable contraception during treatment with leflunomide should also be guaranteed.

There are no specific data on the risk of male-mediated foetal toxicity. However, animal studies to evaluate this specific risk have not been conducted. To minimise any possible risk, men wishing to father a child should consider discontinuing use of leflunomide and taking colestyramine 8 g 3 times daily for 11 days or 50 g of activated powdered charcoal 4 times daily for 11 days.

In either case the A771726 plasma concentration is then measured for the first time. Thereafter, the A771726 plasma concentration must be determined again after an interval of at least 14 days. If both plasma concentrations are below 0.02 mg/L, and after a waiting period of at least 3 months, the risk of foetal toxicity is very low.

### Washout procedure

Colestyramine 8 g is administered 3 times daily. Alternatively, 50 g of activated powdered charcoal is administered 4 times daily. Duration of a complete washout is usually 11 days. The duration may be modified depending on clinical or laboratory variables.

### Lactose

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

### Interference with determination of ionised calcium levels

The measurement of ionised calcium levels might show falsely decreased values under treatment with leflunomide and/or teriflunomide (the active metabolite of leflunomide) depending on the type of ionised calcium analyser used (e.g. blood gas analyser). Therefore, the plausibility of observed decreased ionised calcium levels needs to be questioned in patients under treatment with leflunomide or teriflunomide. In case of doubtful measurements, it is recommended to determine the total albumin adjusted serum calcium concentration.

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

Interactions studies have only been performed in adults.

Increased side effects may occur in case of recent or concomitant use of hepatotoxic or haematotoxic medicinal products or when leflunomide treatment is followed by such medicinal products without a washout period (see also guidance concerning combination with other treatments, section 4.4). Therefore, closer monitoring of liver enzymes and haematological parameters is recommended in the initial phase after switching.

### Methotrexate

In a small (n=30) study with co-administration of leflunomide (10 to 20 mg per day) with methotrexate (10 to 25 mg per week) a 2- to 3-fold elevation in liver enzymes was seen on 5 of 30 patients. All elevations resolved, 2 with continuation of both medicinal products and 3 after discontinuation of leflunomide. A more than 3-fold increase was seen in another 5 patients. All of these also resolved, 2 with continuation of both medicinal products and 3 after discontinuation of leflunomide.

In patients with rheumatoid arthritis, no pharmacokinetic interaction between the leflunomide (10 to 20 mg per day) and methotrexate (10 to 25 mg per week) was demonstrated.

### Vaccinations

No clinical data are available on the efficacy and safety of vaccinations under leflunomide treatment. Vaccination with live attenuated vaccines is, however, not recommended. The long half-life of leflunomide should be considered when contemplating administration of a live attenuated vaccine after stopping Arava.

### Warfarin and other coumarine anticoagulants

There have been case reports of increased prothrombin time, when leflunomide and warfarin were co-administered. A pharmacodynamics interaction with warfarin was observed with A771726 in a clinical pharmacology study (see below). Therefore, when warfarin or another coumarin anticoagulant is co-administered, close international normalised ratio (INR) follow-up and monitoring is recommended.

### NSAIDs/Corticosteroids

If the patient is already receiving nonsteroidal anti-inflammatory drugs (NSAIDs) and/or corticosteroids, these may be continued after starting leflunomide.

### Effect of other medicinal products on leflunomide:

#### *Cholestyramine or activated charcoal*

It is recommended that patients receiving leflunomide are not treated with colestyramine or activated powdered charcoal because this leads to a rapid and significant decrease in plasma A771726 (the active metabolite of leflunomide; see also section 5) concentration. The mechanism is thought to be by interruption of enterohepatic recycling and/or gastrointestinal dialysis of A771726.

#### *CYP450 inhibitors and inducers*

*In vitro* inhibition studies in human liver microsomes suggest that cytochrome P450 (CYP) 1A2, 2C19 and 3A4 are involved in leflunomide metabolism. An *in vivo* interaction study with leflunomide and cimetidine (non-specific weak cytochrome P450 (CYP) inhibitor) has demonstrated a lack of a



significant impact on A771726 exposure. Following concomitant administration of a single dose of leflunomide to subjects receiving multiple doses of rifampicin (non-specific cytochrome P450 inducer) A771726 peak levels were increased by approximately 40%, whereas the AUC was not significantly changed. The mechanism of this effect is unclear.

#### Effect of leflunomide on other medicinal products:

##### *Oral contraceptives*

In a study in which leflunomide was given concomitantly with a triphasic oral contraceptive pill containing 30 µg ethinylestradiol to healthy female volunteers, there was no reduction in contraceptive activity of the pill, and A771726 pharmacokinetics were within predicted ranges. A pharmacokinetic interaction with oral contraceptives was observed with A771726 (see below).

The following pharmacokinetic and pharmacodynamic interaction studies were conducted with A771726 (principal active metabolite of leflunomide). As similar drug-drug interactions cannot be excluded for leflunomide at recommended doses, the following study results and recommendations should be considered in patients treated with leflunomide:

##### Effect on repaglinide (CYP2C8 substrate)

There was an increase in mean repaglinide  $C_{max}$  and AUC (1.7- and 2.4-fold, respectively), following repeated doses of A771726, suggesting that A771726 is an inhibitor of CYP2C8 *in vivo*. Therefore, monitoring patients with concomitant use of medicinal products metabolised by CYP2C8, such as repaglinide, paclitaxel, pioglitazone or rosiglitazone, is recommended as they may have higher exposure.

##### Effect on caffeine (CYP1A2 substrate)

Repeated doses of A771726 decreased mean  $C_{max}$  and AUC of caffeine (CYP1A2 substrate) by 18% and 55%, respectively, suggesting that A771726 may be a weak inducer of CYP1A2 *in vivo*. Therefore, medicinal products metabolised by CYP1A2 (such as duloxetine, alosetron, theophylline and tizanidine) should be used with caution during treatment, as it could lead to the reduction of the efficacy of these products.

##### Effect on organic anion transporter 3 (OAT3) substrates

There was an increase in mean cefaclor  $C_{max}$  and AUC (1.43- and 1.54-fold, respectively), following repeated doses of A771726, suggesting that A771726 is an inhibitor of OAT3 *in vivo*. Therefore, when co-administered with substrates of OAT3, such as cefaclor, benzylpenicillin, ciprofloxacin, indomethacin, ketoprofen, furosemide, cimetidine, methotrexate, zidovudine, caution is recommended.

##### Effect on BCRP (Breast Cancer Resistance Protein) and /or organic anion transporting polypeptide B1 and B3 (OATP1B1/B3) substrates

There was an increase in mean rosuvastatin  $C_{max}$  and AUC (2.65- and 2.51-fold, respectively), following repeated doses of A771726. However, there was no apparent impact of this increase in plasma rosuvastatin exposure on the HMG-CoA reductase activity. If used together, the dose of rosuvastatin should not exceed 10 mg once daily. For other substrates of BCRP (e.g., methotrexate, topotecan, sulfasalazine, daunorubicin, doxorubicin) and the OATP family especially HMG-CoA reductase inhibitors (e.g., simvastatin, atorvastatin, pravastatin, methotrexate, nateglinide, repaglinide, rifampicin) concomitant administration should also be undertaken with caution. Patients should be closely monitored for signs and symptoms of excessive exposure to the medicinal products and reduction of the dose of these medicinal products should be considered.

##### Effect on oral contraceptive (0.03 mg ethinylestradiol and 0.15 mg levonorgestrel)

There was an increase in mean ethinylestradiol  $C_{max}$  and AUC<sub>0-24</sub> (1.58- and 1.54-fold, respectively) and levonorgestrel  $C_{max}$  and AUC<sub>0-24</sub> (1.33- and 1.41-fold, respectively) following repeated doses of

A771726. While this interaction is not expected to adversely impact the efficacy of oral contraceptives, consideration should be given to the type of oral contraceptive treatment.

#### Effect on warfarin (CYP2C9 substrate)

Repeated doses of A771726 had no effect on the pharmacokinetics of S-warfarin, indicating that A771726 is not an inhibitor or an inducer of CYP2C9. However, a 25% decrease in peak international normalised ratio (INR) was observed when A771726 was co-administered with warfarin as compared with warfarin alone. Therefore, when warfarin is co-administered, close INR follow-up and monitoring is recommended.

## 4.6 Fertility, pregnancy and lactation

### Pregnancy

The active metabolite of leflunomide, A771726 is suspected to cause serious birth defects when administered during pregnancy. Arava is contraindicated in pregnancy (see section 4.3).

Women of childbearing potential have to use effective contraception during and up to 2 years after treatment (see “waiting period” below) or up to 11 days after treatment (see abbreviated “washout period” below).

The patient must be advised that if there is any delay in onset of menses or any other reason to suspect pregnancy, they must notify the physician immediately for pregnancy testing, and if positive, the physician and patient must discuss the risk to the pregnancy. It is possible that rapidly lowering the blood level of the active metabolite, by instituting the drug elimination procedure described below, at the first delay of menses may decrease the risk to the foetus from leflunomide.

In a small prospective study in women (n=64) who became inadvertently pregnant while taking leflunomide for no more than three weeks after conception and followed by a drug elimination procedure, no significant differences (p=0.13) were observed in the overall rate of major structural defects (5.4%) compared to either of the comparison groups (4.2% in the disease matched group [n=108] and 4.2% in healthy pregnant women [n=78]).

For women receiving leflunomide treatment and who wish to become pregnant, one of the following procedures is recommended in order to ascertain that the foetus is not exposed to toxic concentrations of A771726 (target concentration below 0.02 mg/L):

#### *Waiting period*

A771726 plasma levels can be expected to be above 0.02 mg/L for a prolonged period. The concentration may be expected to decrease below 0.02 mg/L about 2 years after stopping the treatment with leflunomide.

After a 2-year waiting period, the A771726 plasma concentration is measured for the first time. Thereafter, the A771726 plasma concentration must be determined again after an interval of at least 14 days. If both plasma concentrations are below 0.02 mg/L no teratogenic risk is to be expected.

For further information on the sample testing please contact the Marketing Authorisation Holder or its local representative (see section 7).

### *Washout procedure*

After stopping treatment with leflunomide:

- colestyramine 8 g is administered 3 times daily for a period of 11 days,
- alternatively, 50 g of activated powdered charcoal is administered 4 times daily for a period of 11 days.

However, also following either of the washout procedures, verification by 2 separate tests at an interval of at least 14 days and a waiting period of one-and-a-half months between the first occurrence of a plasma concentration below 0.02 mg/L and fertilisation is required.

Women of childbearing potential should be told that a waiting period of 2 years after treatment discontinuation is required before they may become pregnant. If a waiting period of up to approximately 2 years under reliable contraception is considered unpractical, prophylactic institution of a washout procedure may be advisable.

Both colestyramine and activated powdered charcoal may influence the absorption of oestrogens and progestogens such that reliable contraception with oral contraceptives may not be guaranteed during the washout procedure with colestyramine or activated powdered charcoal. Use of alternative contraceptive methods is recommended.

### Breast-feeding

Animal studies indicate that leflunomide or its metabolites pass into breast milk. Breast-feeding women must, therefore, not receive leflunomide.

### Fertility

Results of animal fertility studies have shown no effect on male and female fertility, but adverse effects on male reproductive organs were observed in repeated dose toxicity studies (see section 5.3).

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

In the case of side effects such as dizziness the patient's ability to concentrate and to react properly may be impaired. In such cases patients should refrain from driving cars and using machines.

## **4.8 Undesirable effects**

### Summary of the safety profile

The most frequently reported adverse effects with leflunomide are: mild increase in blood pressure, leucopenia, paraesthesia, headache, dizziness, diarrhoea, nausea, vomiting, oral mucosal disorders (e.g. aphthous stomatitis, mouth ulceration), abdominal pain, increased hair loss, eczema, rash (including maculo-papular rash), pruritus, dry skin, tenosynovitis, CPK increased, anorexia, weight loss (usually insignificant), asthenia, mild allergic reactions and elevation of liver parameters (transaminases (especially ALT), less often gamma-GT, alkaline phosphatase, bilirubin)).

Classification of expected frequencies:

Very common ( $\geq 1/10$ ); common ( $\geq 1/100$  to  $< 1/10$ ); uncommon ( $\geq 1/1,000$  to  $< 1/100$ ); rare ( $\geq 1/10,000$  to  $< 1/1,000$ ); very rare ( $< 1/10,000$ ), not known (cannot be estimated from the available data).

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

### *Infections and infestations*

Rare: severe infections, including sepsis which may be fatal.

Like other agents with immunosuppressive potential, leflunomide may increase susceptibility to infections, including opportunistic infections (see also section 4.4). Thus, the overall incidence of infections can increase (in particular of rhinitis, bronchitis and pneumonia).

### *Neoplasms benign, malignant and unspecified (incl. cysts and polyps)*

The risk of malignancy, particularly lymphoproliferative disorders, is increased with use of some immunosuppressive agents.

### *Blood and lymphatic system disorders*

Common: leucopenia (leucocytes >2 G/L)

Uncommon: anaemia, mild thrombocytopenia (platelets <100 G/L)

Rare: pancytopenia (probably by antiproliferative mechanism), leucopenia (leucocytes <2 G/L), eosinophilia

Very rare: agranulocytosis

Recent, concomitant or consecutive use of potentially myelotoxic agents may be associated with a higher risk of haematological effects.

### *Immune system disorders*

Common: mild allergic reactions

Very rare: severe anaphylactic/anaphylactoid reactions, vasculitis, including cutaneous necrotizing vasculitis

### *Metabolism and nutrition disorders*

Common: CPK increased

Uncommon: hypokalaemia, hyperlipidemia, hypophosphataemia

Rare: LDH increased

Not known: hypouricemia

### *Psychiatric disorders*

Uncommon: anxiety

### *Nervous system disorders*

Common: paraesthesia, headache, dizziness, peripheral neuropathy

### *Cardiac disorders*

Common: mild increase in blood pressure

Rare: severe increase in blood pressure

### *Respiratory, thoracic and mediastinal disorders*

Rare: interstitial lung disease (including interstitial pneumonitis), which may be fatal.

Not known: pulmonary hypertension

### *Gastrointestinal disorders*

Common: colitis including microscopic colitis such as lymphocytic colitis, collagenous colitis, diarrhoea, nausea, vomiting, oral mucosal disorders (e.g., aphthous stomatitis, mouth ulceration), abdominal pain

Uncommon: taste disturbances

Very rare: pancreatitis

#### *Hepatobiliary disorders*

- Common: elevation of liver parameters (transaminases [especially ALT], less often gamma-GT, alkaline phosphatase, bilirubin)  
Rare: hepatitis, jaundice/cholestasis  
Very rare: severe liver injury such as hepatic failure and acute hepatic necrosis that may be fatal

#### *Skin and subcutaneous tissue disorders*

- Common: increased hair loss, eczema, rash (including maculopapular rash), pruritus, dry skin  
Uncommon: urticaria  
Very rare: toxic epidermal necrolysis, Stevens-Johnson syndrome, erythema multiforme  
Not known: cutaneous lupus erythematosus, pustular psoriasis or worsening psoriasis, Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)

#### *Musculoskeletal and connective tissue disorders*

- Common: tenosynovitis  
Uncommon: tendon rupture

#### *Renal and urinary disorders*

- Not known: renal failure

#### *Reproductive system and breast disorders*

- Not known: marginal (reversible) decreases in sperm concentration, total sperm count and rapid progressive motility

#### *General disorders and administration site conditions*

- Common: anorexia, weight loss (usually insignificant), asthenia

#### 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 national reporting system listed in [Appendix V](#).

## **4.9 Overdose**

### Symptoms

There have been reports of chronic overdose in patients taking Arava at daily doses up to five times the recommended daily dose, and reports of acute overdose in adults and children. There were no adverse events reported in the majority of case reports of overdose. Adverse events consistent with the safety profile for leflunomide were: abdominal pain, nausea, diarrhoea, elevated liver enzymes, anaemia, leucopenia, pruritus and rash.

### Management

In the event of an overdose or toxicity, colestyramine or charcoal is recommended to accelerate elimination. Colestyramine given orally at a dose of 8 g three times a day for 24 hours to three healthy volunteers decreased plasma levels of A771726 by approximately 40% in 24 hours and by 49% to 65% in 48 hours.

Administration of activated charcoal (powder made into a suspension) orally or via nasogastric tube (50 g every 6 hours for 24 hours) has been shown to reduce plasma concentrations of the active metabolite A771726 by 37% in 24 hours and by 48% in 48 hours.

These washout procedures may be repeated if clinically necessary.

Studies with both hemodialysis and CAPD (chronic ambulatory peritoneal dialysis) indicate that A771726, the primary metabolite of leflunomide, is not dialysable.

## 5. PHARMACOLOGICAL PROPERTIES

### 5.1 Pharmacodynamic properties

Pharmacotherapeutic group: selective immunosuppressants, ATC code: L04AA13.

#### Human pharmacology

Leflunomide is a disease-modifying anti-rheumatic agent with antiproliferative properties.

#### Animal pharmacology

Leflunomide is effective in animal models of arthritis and of other autoimmune diseases and transplantation, mainly if administered during the sensitisation phase. It has immunomodulating/ immunosuppressive characteristics, acts as an antiproliferative agent, and displays anti-inflammatory properties. Leflunomide exhibits the best protective effects on animal models of autoimmune diseases when administered in the early phase of the disease progression.

*In vivo*, it is rapidly and almost completely metabolised to A771726 which is active *in vitro*, and is presumed to be responsible for the therapeutic effect.

#### Mechanism of action

A771726, the active metabolite of leflunomide, inhibits the human enzyme dihydroorotate dehydrogenase (DHODH) and exhibits antiproliferative activity.

#### Clinical efficacy and safety

##### *Rheumatoid arthritis*

The efficacy of Arava in the treatment of rheumatoid arthritis was demonstrated in 4 controlled trials (1 in phase II and 3 in phase III). The phase II trial, study YU203, randomised 402 subjects with active rheumatoid arthritis to placebo (n=102), leflunomide 5 mg (n=95), 10 mg (n=101) or 25 mg/day (n=104). The treatment duration was 6 months.

All leflunomide patients in the phase III trials used an initial dose of 100 mg for 3 days.

Study MN301 randomised 358 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=133), sulphasalazine 2 g/day (n=133), or placebo (n=92). Treatment duration was 6 months.

Study MN303 was an optional 6-month blinded continuation of MN301 without the placebo arm, resulting in a 12-month comparison of leflunomide and sulphasalazine.

Study MN302 randomised 999 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=501) or methotrexate at 7.5 mg/week increasing to 15 mg/week (n=498). Folate supplementation was optional and only used in 10% of patients. Treatment duration was 12-months.

Study US301 randomised 482 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=182), methotrexate 7.5 mg/week increasing to 15 mg/week (n=182), or placebo (n=118). All patients received folate 1 mg bid. Treatment duration was 12 months.

Leflunomide at a daily dose of at least 10 mg (10 to 25 mg in study YU203, 20 mg in studies MN301 and US301) was statistically significantly superior to placebo in reducing the signs and symptoms of rheumatoid arthritis in all 3 placebo-controlled trials. The ACR (American College of Rheumatology) response rates in study YU203 were 27.7% for placebo, 31.9% for 5 mg, 50.5% for 10 mg and 54.5% for 25 mg/day. In the phase III trials, the ACR response rates for leflunomide 20 mg/day versus placebo were 54.6% versus 28.6% (study MN301), and 49.4% versus 26.3% (study US301). After 12 months with active treatment, the ACR response rates in leflunomide patients were 52.3% (studies MN301/303), 50.5% (study MN302) and 49.4% (study US301), compared to 53.8% (studies

MN301/303) in sulphasalazine patients, 64.8% (study MN302), and 43.9% (study US301) in methotrexate patients. In study MN302 leflunomide was significantly less effective than methotrexate. However, in study US301 no significant differences were observed between leflunomide and methotrexate in the primary efficacy parameters. No difference was observed between leflunomide and sulphasalazine (study MN301). The leflunomide treatment effect was evident by 1 month, stabilised by 3 to 6 months and continued throughout the course of treatment.

A randomised, double-blind, parallel-group non-inferiority study compared the relative efficacy of two different daily maintenance doses of leflunomide, 10 mg and 20 mg. From the results it can be concluded that efficacy results of the 20 mg maintenance dose were more favourable, on the other hand, the safety results favoured the 10 mg daily maintenance dose.

#### *Paediatric population*

Leflunomide was studied in a single multicenter, randomized, double-blind, active-controlled trial in 94 patients (47 per arm) with polyarticular course juvenile rheumatoid arthritis. Patients were 3–17 years of age with active polyarticular course JRA regardless of onset type and naive to methotrexate or leflunomide. In this trial, the loading dose and maintenance dose of leflunomide was based on three weight categories: <20 kg, 20-40 kg, and >40 kg. After 16 weeks treatment, the difference in response rates was statistically significant in favour of methotrexate for the JRA Definition of Improvement (DOI)  $\geq 30\%$  ( $p=0.02$ ). In responders, this response was maintained during 48 weeks (see section 4.2). The pattern of adverse events of leflunomide and methotrexate seems to be similar, but the dose used in lighter subjects resulted in a relatively low exposure (see section 5.2). These data do not allow an effective and safe dose recommendation.

#### *Psoriatic arthritis*

The efficacy of Arava was demonstrated in one controlled, randomised, double blind study 3L01 in 188 patients with psoriatic arthritis, treated at 20 mg/day. Treatment duration was 6 months.

Leflunomide 20 mg/day was significantly superior to placebo in reducing the symptoms of arthritis in patients with psoriatic arthritis: the PsARC (Psoriatic Arthritis treatment Response Criteria) responders were 59% in the leflunomide group and 29.7% in the placebo group by 6 months ( $p<0.0001$ ). The effect of leflunomide on improvement of function and on reduction of skin lesions was modest.

#### *Postmarketing studies*

A randomised study assessed the clinical efficacy response rate in DMARD-naïve patients ( $n=121$ ) with early RA, who received either 20 mg or 100 mg of leflunomide in two parallel groups during the initial three day double blind period. The initial period was followed by an open label maintenance period of three months, during which both groups received leflunomide 20 mg daily. No incremental overall benefit was observed in the studied population with the use of a loading dose regimen. The safety data obtained from both treatment groups were consistent with the known safety profile of leflunomide, however, the incidence of gastrointestinal adverse events and of elevated liver enzymes tended to be higher in the patients receiving the loading dose of 100 mg leflunomide.

## **5.2 Pharmacokinetic properties**

Leflunomide is rapidly converted to the active metabolite, A771726, by first-pass metabolism (ring opening) in gut wall and liver. In a study with radiolabelled  $^{14}\text{C}$ -leflunomide in three healthy volunteers, no unchanged leflunomide was detected in plasma, urine or faeces. In other studies, unchanged leflunomide levels in plasma have rarely been detected, however, at ng/ml plasma levels. The only plasma-radiolabelled metabolite detected was A771726. This metabolite is responsible for essentially all the *in vivo* activity of Arava.

## Absorption

Excretion data from the <sup>14</sup>C study indicated that at least about 82 to 95% of the dose is absorbed. The time to peak plasma concentrations of A771726 is very variable; peak plasma levels can occur between 1 hour and 24 hours after single administration. Leflunomide can be administered with food, since the extent of absorption is comparable in the fed and fasting state. Due to the very long half-life of A771726 (approximately 2 weeks), a loading dose of 100 mg for 3 days was used in clinical studies to facilitate the rapid attainment of steady-state levels of A771726. Without a loading dose, it is estimated that attainment of steady-state plasma concentrations would require nearly two months of dosing. In multiple dose studies in patients with rheumatoid arthritis, the pharmacokinetic parameters of A771726 were linear over the dose range of 5 to 25 mg. In these studies, the clinical effect was closely related to the plasma concentration of A771726 and to the daily dose of leflunomide. At a dose level of 20 mg/day, average plasma concentration of A771726 at steady state is approximately 35 µg/ml. At steady state plasma levels accumulate about 33- to 35-fold compared with single dose.

## Distribution

In human plasma, A771726 is extensively bound to protein (albumin). The unbound fraction of A771726 is about 0.62%. Binding of A771726 is linear in the therapeutic concentration range. Binding of A771726 appeared slightly reduced and more variable in plasma from patients with rheumatoid arthritis or chronic renal insufficiency. The extensive protein binding of A771726 could lead to displacement of other highly-bound drugs. *In vitro* plasma protein binding interaction studies with warfarin at clinically relevant concentrations, however, showed no interaction. Similar studies showed that ibuprofen and diclofenac did not displace A771726, whereas the unbound fraction of A771726 is increased 2- to 3-fold in the presence of tolbutamide. A771726 displaced ibuprofen, diclofenac and tolbutamide but the unbound fraction of these medicinal products is only increased by 10% to 50%. There is no indication that these effects are of clinical relevance. Consistent with extensive protein binding A771726 has a low apparent volume of distribution (approximately 11 litres). There is no preferential uptake in erythrocytes.

## Biotransformation

Leflunomide is metabolised to one primary (A771726) and many minor metabolites including TFMA (4-trifluoromethylaniline). The metabolic biotransformation of leflunomide to A771726 and subsequent metabolism of A771726 is not controlled by a single enzyme and has been shown to occur in microsomal and cytosolic cellular fractions. Interaction studies with cimetidine (non-specific cytochrome P450 inhibitor) and rifampicin (non-specific cytochrome P450 inducer), indicate that *in vivo* CYP enzymes are involved in the metabolism of leflunomide only to a small extent.

## Elimination

Elimination of A771726 is slow and characterised by an apparent clearance of about 31 ml/hr. The elimination half-life in patients is approximately 2 weeks. After administration of a radiolabelled dose of leflunomide, radioactivity was equally excreted in faeces, probably by biliary elimination, and in urine. A771726 was still detectable in urine and faeces 36 days after a single administration. The principal urinary metabolites were glucuronide products derived from leflunomide (mainly in 0 to 24 hour samples) and an oxanilic acid derivative of A771726. The principal faecal component was A771726.

It has been shown in man that administration of an oral suspension of activated powdered charcoal or colestyramine leads to a rapid and significant increase in A771726 elimination rate and decline in plasma concentrations (see section 4.9). This is thought to be achieved by a gastrointestinal dialysis mechanism and/or by interrupting enterohepatic recycling.



### Renal impairment

Leflunomide was administered as a single oral 100 mg dose to 3 haemodialysis patients and 3 patients on continuous peritoneal dialysis (CAPD). The pharmacokinetics of A771726 in CAPD subjects appeared to be similar to healthy volunteers. A more rapid elimination of A771726 was observed in haemodialysis subjects which was not due to extraction of medicinal product in the dialysate.

### Hepatic impairment

No data are available regarding treatment of patients with hepatic impairment. The active metabolite A771726 is extensively protein bound and cleared via hepatic metabolism and biliary secretion. These processes may be affected by hepatic dysfunction.

### Paediatric population

The pharmacokinetics of A771726 following oral administration of leflunomide have been investigated in 73 paediatric patients with polyarticular course Juvenile Rheumatoid Arthritis (JRA) who ranged in age from 3 to 17 years. The results of a population pharmacokinetic analysis of these trials have demonstrated that paediatric patients with body weights  $\leq 40$  kg have a reduced systemic exposure (measured by  $C_{ss}$ ) of A771726 relative to adult rheumatoid arthritis patients (see section 4.2).

### Elderly

Pharmacokinetic data in elderly (>65 years) are limited but consistent with pharmacokinetics in younger adults.

## **5.3 Preclinical safety data**

Leflunomide, administered orally and intraperitoneally, has been studied in acute toxicity studies in mice and rats. Repeated oral administration of leflunomide to mice for up to 3 months, to rats and dogs for up to 6 months and to monkeys for up to 1 month's duration revealed that the major target organs for toxicity were bone marrow, blood, gastrointestinal tract, skin, spleen, thymus and lymph nodes. The main effects were anaemia, leucopenia, decreased platelet counts and panmyelopathy and reflect the basic mode of action of the compound (inhibition of DNA synthesis). In rats and dogs, Heinz bodies and/or Howell-Jolly bodies were found. Other effects found on heart, liver, cornea and respiratory tract could be explained as infections due to immunosuppression. Toxicity in animals was found at doses equivalent to human therapeutic doses.

Leflunomide was not mutagenic. However, the minor metabolite TFMA (4-trifluoromethylaniline) caused clastogenicity and point mutations *in vitro*, whilst insufficient information was available on its potential to exert this effect *in vivo*.

In a carcinogenicity study in rats, leflunomide did not show carcinogenic potential. In a carcinogenicity study in mice an increased incidence of malignant lymphoma occurred in males of the highest dose group, considered to be due to the immunosuppressive activity of leflunomide. In female mice an increased incidence, dose-dependent, of bronchiolo-alveolar adenomas and carcinomas of the lung was noted. The relevance of the findings in mice relative to the clinical use of leflunomide is uncertain.

Leflunomide was not antigenic in animal models.

Leflunomide was embryotoxic and teratogenic in rats and rabbits at doses in the human therapeutic range and exerted adverse effects on male reproductive organs in repeated dose toxicity studies. Fertility was not reduced.

## **6. PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

*Tablet core:*

Maize starch  
Povidone (E1201)  
Crospovidone (E1202)  
Silica colloidal anhydrous  
Magnesium stearate (E470b)  
Lactose monohydrate

*Film-coating:*

Talc(E553b)  
Hyromellose (E464)  
Titanium dioxide (E171)  
Macrogol 8000  
Yellow ferric oxide (E172)

### **6.2 Incompatibilities**

Not applicable.

### **6.3 Shelf life**

3 years.

### **6.4 Special precautions for storage**

Blister: Store in the original package.

Bottle: Keep the bottle tightly closed.

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

Blister: Aluminium / Aluminium blister. Pack sizes: 30 and 100 film-coated tablets.

Bottle: 100 ml HDPE-wide-necked bottle, with screw cap with integrated desiccant container, containing either 30, 50 or 100 film-coated tablets.

Not all pack sizes may be marketed.

### **6.6 Special precautions for disposal**

No special requirements for disposal.

## **7. MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

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

EU/1/99/118/005-008

EU/1/99/118/010

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

Date of first authorisation: 02 September 1999

Date of latest renewal: 02 September 2009

**10. DATE OF REVISION OF THE TEXT**

Detailed information on this medicinal product is available on the website of the European Medicines Agency <http://www.ema.europa.eu/>.

## 1. NAME OF THE MEDICINAL PRODUCT

Arava 100 mg film-coated tablets

## 2. QUALITATIVE AND QUANTITATIVE COMPOSITION

Each tablet contains 100 mg of leflunomide.

### Excipients with known effect

Each tablet contains 138.42 mg of lactose monohydrate

For the full list of excipients, see section 6.1.

## 3. PHARMACEUTICAL FORM

Film-coated tablet.

White to almost white, round film-coated tablet, imprinted with ZBP on one side.

## 4. CLINICAL PARTICULARS

### 4.1 Therapeutic indications

Leflunomide is indicated for the treatment of adult patients with:

- active rheumatoid arthritis as a "disease-modifying antirheumatic drug" (DMARD),
- active psoriatic arthritis.

Recent or concurrent treatment with hepatotoxic or haematotoxic DMARDs (e.g. methotrexate) may result in an increased risk of serious adverse reactions; therefore, the initiation of leflunomide treatment has to be carefully considered regarding these benefit/risk aspects.

Moreover, switching from leflunomide to another DMARD without following the washout procedure (see section 4.4) may also increase the risk of serious adverse reactions even for a long time after the switching.

### 4.2 Posology and method of administration

The treatment should be initiated and supervised by specialists experienced in the treatment of rheumatoid arthritis and psoriatic arthritis.

Alanine Aminotransferase (ALT) or serum glutamopyruvate transferase (SGPT) and a complete blood cell count, including a differential white blood cell count and a platelet count, must be checked simultaneously and with the same frequency:

- before initiation of leflunomide
- every two weeks during the first six months of treatment, and
- every 8 weeks thereafter (see section 4.4).

### Posology

- In rheumatoid arthritis: leflunomide therapy is usually started with a loading dose of 100 mg once daily for 3 days. Omission of the loading dose may decrease the risk of adverse events (see section 5.1).

The recommended maintenance dose is leflunomide 10 mg to 20 mg once daily depending on the severity (activity) of the disease.

- In psoriatic arthritis: leflunomide therapy is started with a loading dose of 100 mg once daily for 3 days.

The recommended maintenance dose is leflunomide 20 mg once daily (see section 5.1).

The therapeutic effect usually starts after 4 to 6 weeks and may further improve up to 4 to 6 months.

There is no dose adjustment recommended in patients with mild renal insufficiency.

No dose adjustment is required in patients above 65 years of age.

#### *Paediatric population*

Arava is not recommended for use in patients below 18 years since efficacy and safety in juvenile rheumatoid arthritis (JRA) have not been established (see sections 5.1 and 5.2).

#### Method of administration

Arava tablets are for oral use. The tablets should be swallowed whole with sufficient amounts of liquid. The extent of leflunomide absorption is not affected if it is taken with food.

### **4.3 Contraindications**

- Hypersensitivity (especially previous Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme) to the active substance, to the principal active metabolite teriflunomide or to any of the excipients listed in section 6.1.
- Patients with impairment of liver function.
- Patients with severe immunodeficiency states, e.g. AIDS.
- Patients with significantly impaired bone marrow function or significant anaemia, leucopenia, neutropenia or thrombocytopenia due to causes other than rheumatoid or psoriatic arthritis.
- Patients with serious infections (see section 4.4).
- Patients with moderate to severe renal insufficiency, because insufficient clinical experience is available in this patient group.
- Patients with severe hypoproteinaemia, e.g. in nephrotic syndrome.
- Pregnant women, or women of childbearing potential who are not using reliable contraception during treatment with leflunomide and thereafter as long as the plasma levels of the active metabolite are above 0.02 mg/L (see section 4.6). Pregnancy must be excluded before start of treatment with leflunomide.
- Breast-feeding women (see section 4.6).

### **4.4 Special warnings and precautions for use**

Concomitant administration of hepatotoxic or haematotoxic DMARDs (e.g. methotrexate) is not advisable.

The active metabolite of leflunomide, A771726, has a long half-life, usually 1 to 4 weeks. Serious undesirable effects might occur (e.g. hepatotoxicity, haematotoxicity or allergic reactions, see below), even if the treatment with leflunomide has been stopped. Therefore, when such toxicities occur or if

for any other reason A771726 needs to be cleared rapidly from the body, the washout procedure has to be followed. The procedure may be repeated as clinically necessary.

For washout procedures and other recommended actions in case of desired or unintended pregnancy, see section 4.6.

#### Liver reactions

Rare cases of severe liver injury, including cases with fatal outcome, have been reported during treatment with leflunomide. Most of the cases occurred within the first 6 months of treatment. Co-treatment with other hepatotoxic medicinal products was frequently present. It is considered essential that monitoring recommendations are strictly adhered to.

ALT (SGPT) must be checked before initiation of leflunomide and at the same frequency as the complete blood cell count (every two weeks) during the first six months of treatment and every 8 weeks thereafter.

For ALT (SGPT) elevations between 2- and 3-fold the upper limit of normal, dose reduction from 20 mg to 10 mg may be considered and monitoring must be performed weekly. If ALT (SGPT) elevations of more than 2-fold the upper limit of normal persist or if ALT elevations of more than 3-fold the upper limit of normal are present, leflunomide must be discontinued and wash-out procedures initiated. It is recommended that monitoring of liver enzymes be maintained after discontinuation of leflunomide treatment, until liver enzyme levels have normalised.

Due to a potential for additive hepatotoxic effects, it is recommended that alcohol consumption be avoided during treatment with leflunomide.

Since the active metabolite of leflunomide, A771726, is highly protein bound and cleared via hepatic metabolism and biliary secretion, plasma levels of A771726 are expected to be increased in patients with hypoproteinaemia. Arava is contraindicated in patients with severe hypoproteinaemia or impairment of liver function (see section 4.3).

#### Haematological reactions

Together with ALT, a complete blood cell count, including differential white blood cell count and platelets, must be performed before start of leflunomide treatment as well as every 2 weeks for the first 6 months of treatment and every 8 weeks thereafter.

In patients with pre-existing anaemia, leucopenia, and/or thrombocytopenia as well as in patients with impaired bone marrow function or those at risk of bone marrow suppression, the risk of haematological disorders is increased. If such effects occur, a washout (see below) to reduce plasma levels of A771726 should be considered.

In case of severe haematological reactions, including pancytopenia, Arava and any concomitant myelosuppressive treatment must be discontinued and a leflunomide washout procedure initiated.

#### Combinations with other treatments

The use of leflunomide with antimalarials used in rheumatic diseases (e.g. chloroquine and hydroxychloroquine), intramuscular or oral gold, D-penicillamine, azathioprine and other immunosuppressive agents including Tumour Necrosis Factor alpha-Inhibitors has not been adequately studied up to now in randomised trials (with the exception of methotrexate, see section 4.5). The risk associated with combination therapy, in particular in long-term treatment, is unknown. Since such therapy can lead to additive or even synergistic toxicity (e.g. hepato- or haematotoxicity), combination with another DMARD (e.g. methotrexate) is not advisable.

Co-administration of teriflunomide with leflunomide is not recommended, as leflunomide is the parent compound of teriflunomide.

### Switching to other treatments

As leflunomide has a long persistence in the body, a switching to another DMARD (e.g. methotrexate) without performing the washout procedure (see below) may raise the possibility of additive risks even for a long time after the switching (i.e. kinetic interaction, organ toxicity).

Similarly, recent treatment with hepatotoxic or haematotoxic medicinal products (e.g. methotrexate) may result in increased side effects; therefore, the initiation of leflunomide treatment has to carefully be considered regarding these benefit/risk aspects and closer monitoring is recommended in the initial phase after switching.

### Skin reactions

In case of ulcerative stomatitis, leflunomide administration should be discontinued.

Very rare cases of Stevens Johnson syndrome or toxic epidermal necrolysis and Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS) have been reported in patients treated with leflunomide. As soon as skin and/or mucosal reactions are observed which raise the suspicion of such severe reactions, Arava and any other possibly associated treatment must be discontinued, and a leflunomide washout procedure initiated immediately. A complete washout is essential in such cases. In such cases re-exposure to leflunomide is contraindicated (see section 4.3).

Pustular psoriasis and worsening of psoriasis have been reported after the use of leflunomide. Treatment withdrawal may be considered taking into account patient's disease and past history.

### Infections

It is known that medicinal products with immunosuppressive properties - like leflunomide – may cause patients to be more susceptible to infections, including opportunistic infections. Infections may be more severe in nature and may, therefore, require early and vigorous treatment. In the event that severe, uncontrolled infections occur, it may be necessary to interrupt leflunomide treatment and administer a washout procedure as described below.

Rare cases of Progressive Multifocal Leukoencephalopathy (PML) have been reported in patients receiving leflunomide among other immunosuppressants.

Before starting treatment, all patients should be evaluated for active and inactive (“latent”) tuberculosis, as per local recommendations. This can include medical history, possible previous contact with tuberculosis, and/or appropriate screening such as lung x-ray, tuberculin test and/or interferon-gamma release assay, as applicable. Prescribers are reminded of the risk of false negative tuberculin skin test results, especially in patients who are severely ill or immunocompromised. Patients with a history of tuberculosis should be carefully monitored because of the possibility of reactivation of the infection.

### Respiratory reactions

Interstitial lung disease, as well as rare cases of pulmonary hypertension have been reported during treatment with leflunomide (see section 4.8). The risk of their occurrence can be increased in patients with a history of interstitial lung disease. Interstitial lung disease is a potentially fatal disorder, which may occur acutely during therapy. Pulmonary symptoms, such as cough and dyspnoea, may be a reason for discontinuation of the therapy and for further investigation, as appropriate.

### Peripheral neuropathy

Cases of peripheral neuropathy have been reported in patients receiving Arava. Most patients improved after discontinuation of Arava. However there was a wide variability in final outcome, i.e. in some patients the neuropathy resolved and some patients had persistent symptoms. Age older than 60 years, concomitant neurotoxic medications, and diabetes may increase the risk for peripheral neuropathy. If a patient taking Arava develops a peripheral neuropathy, consider discontinuing Arava therapy and performing the drug elimination procedure (see section 4.4).

### Colitis

Colitis, including microscopic colitis has been reported in patients treated with leflunomide. In patients on leflunomide treatment presenting unexplained chronic diarrhoea appropriate diagnostic procedures should be performed.

### Blood pressure

Blood pressure must be checked before the start of leflunomide treatment and periodically thereafter.

### Procreation (recommendations for men)

Male patients should be aware of the possible male-mediated foetal toxicity. Reliable contraception during treatment with leflunomide should also be guaranteed.

There are no specific data on the risk of male-mediated foetal toxicity. However, animal studies to evaluate this specific risk have not been conducted. To minimise any possible risk, men wishing to father a child should consider discontinuing use of leflunomide and taking colestyramine 8 g 3 times daily for 11 days or 50 g of activated powdered charcoal 4 times daily for 11 days.

In either case the A771726 plasma concentration is then measured for the first time. Thereafter, the A771726 plasma concentration must be determined again after an interval of at least 14 days. If both plasma concentrations are below 0.02 mg/L, and after a waiting period of at least 3 months, the risk of foetal toxicity is very low.

### Washout procedure

Colestyramine 8 g is administered 3 times daily. Alternatively, 50 g of activated powdered charcoal is administered 4 times daily. Duration of a complete washout is usually 11 days. The duration may be modified depending on clinical or laboratory variables.

### Lactose

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

### Interference with determination of ionised calcium levels

The measurement of ionised calcium levels might show falsely decreased values under treatment with leflunomide and/or teriflunomide (the active metabolite of leflunomide) depending on the type of ionised calcium analyser used (e.g. blood gas analyser). Therefore, the plausibility of observed decreased ionised calcium levels needs to be questioned in patients under treatment with leflunomide or teriflunomide. In case of doubtful measurements, it is recommended to determine the total albumin adjusted serum calcium concentration.



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

Interactions studies have only been performed in adults.

Increased side effects may occur in case of recent or concomitant use of hepatotoxic or haematotoxic medicinal products or when leflunomide treatment is followed by such medicinal products without a washout period (see also guidance concerning combination with other treatments, section 4.4). Therefore, closer monitoring of liver enzymes and haematological parameters is recommended in the initial phase after switching.

### Methotrexate

In a small (n=30) study with co-administration of leflunomide (10 to 20 mg per day) with methotrexate (10 to 25 mg per week) a 2- to 3-fold elevation in liver enzymes was seen on 5 of 30 patients. All elevations resolved 2 with continuation of both medicinal products and 3 after discontinuation of leflunomide. A more than 3-fold increase was seen in another 5 patients. All of these also resolved, 2 with continuation of both medicinal products and 3 after discontinuation of leflunomide.

In patients with rheumatoid arthritis, no pharmacokinetic interaction between the leflunomide (10 to 20 mg per day) and methotrexate (10 to 25 mg per week) was demonstrated.

### Vaccinations

No clinical data are available on the efficacy and safety of vaccinations under leflunomide treatment. Vaccination with live attenuated vaccines is, however, not recommended. The long half-life of leflunomide should be considered when contemplating administration of a live attenuated vaccine after stopping Arava.

### Warfarin and other coumarine anticoagulants

There have been case reports of increased prothrombin time, when leflunomide and warfarin were co-administered. A pharmacodynamics interaction with warfarin was observed with A771726 in a clinical pharmacology study (see below). Therefore, when warfarin or another coumarin anticoagulant is co-administered, close international normalised ratio (INR) follow-up and monitoring is recommended.

### NSAIDs/Corticosteroids

If the patient is already receiving nonsteroidal anti-inflammatory drugs (NSAIDs) and/or corticosteroids, these may be continued after starting leflunomide.

### Effect of other medicinal products on leflunomide:

#### *Cholestyramine or activated charcoal*

It is recommended that patients receiving leflunomide are not treated with colestyramine or activated powdered charcoal because this leads to a rapid and significant decrease in plasma A771726 (the active metabolite of leflunomide; see also section 5) concentration. The mechanism is thought to be by interruption of enterohepatic recycling and/or gastrointestinal dialysis of A771726.

#### *CYP450 inhibitors and inducers*

*In vitro* inhibition studies in human liver microsomes suggest that cytochrome P450 (CYP) 1A2, 2C19 and 3A4 are involved in leflunomide metabolism. An *in vivo* interaction study with leflunomide and cimetidine (non-specific weak cytochrome P450 (CYP) inhibitor) has demonstrated a lack of a

significant impact on A771726 exposure. Following concomitant administration of a single dose of leflunomide to subjects receiving multiple doses of rifampicin (non-specific cytochrome P450 inducer) A771726 peak levels were increased by approximately 40%, whereas the AUC was not significantly changed. The mechanism of this effect is unclear.

#### Effect of leflunomide on other medicinal products:

##### *Oral contraceptives*

In a study in which leflunomide was given concomitantly with a triphasic oral contraceptive pill containing 30 µg ethinylloestradiol to healthy female volunteers, there was no reduction in contraceptive activity of the pill, and A771726 pharmacokinetics were within predicted ranges. A pharmacokinetic interaction with oral contraceptives was observed with A771726 (see below).

The following pharmacokinetic and pharmacodynamic interaction studies were conducted with A771726 (principal active metabolite of leflunomide). As similar drug-drug interactions cannot be excluded for leflunomide at recommended doses, the following study results and recommendations should be considered in patients treated with leflunomide:

##### Effect on repaglinide (CYP2C8 substrate)

There was an increase in mean repaglinide  $C_{max}$  and AUC (1.7- and 2.4-fold, respectively), following repeated doses of A771726, suggesting that A771726 is an inhibitor of CYP2C8 *in vivo*. Therefore, monitoring patients with concomitant use of medicinal products metabolised by CYP2C8, such as repaglinide, paclitaxel, pioglitazone or rosiglitazone, is recommended as they may have higher exposure.

##### Effect on caffeine (CYP1A2 substrate)

Repeated doses of A771726 decreased mean  $C_{max}$  and AUC of caffeine (CYP1A2 substrate) by 18% and 55%, respectively, suggesting that A771726 may be a weak inducer of CYP1A2 *in vivo*. Therefore, medicinal products metabolised by CYP1A2 (such as duloxetine, alosetron, theophylline and tizanidine) should be used with caution during treatment, as it could lead to the reduction of the efficacy of these products.

##### Effect on organic anion transporter 3 (OAT3) substrates

There was an increase in mean cefaclor  $C_{max}$  and AUC (1.43- and 1.54-fold, respectively), following repeated doses of A771726, suggesting that A771726 is an inhibitor of OAT3 *in vivo*. Therefore, when co-administered with substrates of OAT3, such as cefaclor, benzylpenicillin, ciprofloxacin, indomethacin, ketoprofen, furosemide, cimetidine, methotrexate, zidovudine, caution is recommended.

##### Effect on BCRP (Breast Cancer Resistance Protein) and /or organic anion transporting polypeptide B1 and B3 (OATP1B1/B3) substrates

There was an increase in mean rosuvastatin  $C_{max}$  and AUC (2.65- and 2.51-fold, respectively), following repeated doses of A771726. However, there was no apparent impact of this increase in plasma rosuvastatin exposure on the HMG-CoA reductase activity. If used together, the dose of rosuvastatin should not exceed 10 mg once daily. For other substrates of BCRP (e.g., methotrexate, topotecan, sulfasalazine, daunorubicin, doxorubicin) and the OATP family especially HMG-CoA reductase inhibitors (e.g., simvastatin, atorvastatin, pravastatin, methotrexate, nateglinide, repaglinide, rifampicin) concomitant administration should also be undertaken with caution. Patients should be closely monitored for signs and symptoms of excessive exposure to the medicinal products and reduction of the dose of these medicinal products should be considered.

##### Effect on oral contraceptive (0.03 mg ethinylestradiol and 0.15 mg levonorgestrel)

There was an increase in mean ethinylestradiol  $C_{max}$  and  $AUC_{0-24}$  (1.58- and 1.54-fold, respectively) and levonorgestrel  $C_{max}$  and  $AUC_{0-24}$  (1.33- and 1.41-fold, respectively) following repeated doses of

A771726. While this interaction is not expected to adversely impact the efficacy of oral contraceptives, consideration should be given to the type of oral contraceptive treatment.

#### Effect on warfarin (CYP2C9 substrate)

Repeated doses of A771726 had no effect on the pharmacokinetics of S-warfarin, indicating that A771726 is not an inhibitor or an inducer of CYP2C9. However, a 25% decrease in peak international normalised ratio (INR) was observed when A771726 was co-administered with warfarin as compared with warfarin alone. Therefore, when warfarin is co-administered, close INR follow-up and monitoring is recommended.

## 4.6 Fertility, pregnancy and lactation

### Pregnancy

The active metabolite of leflunomide, A771726 is suspected to cause serious birth defects when administered during pregnancy. Arava is contraindicated in pregnancy (see section 4.3).

Women of childbearing potential have to use effective contraception during and up to 2 years after treatment (see “waiting period” below) or up to 11 days after treatment (see abbreviated “washout period” below).

The patient must be advised that if there is any delay in onset of menses or any other reason to suspect pregnancy, they must notify the physician immediately for pregnancy testing, and if positive, the physician and patient must discuss the risk to the pregnancy. It is possible that rapidly lowering the blood level of the active metabolite, by instituting the drug elimination procedure described below, at the first delay of menses may decrease the risk to the foetus from leflunomide.

In a small prospective study in women (n=64) who became inadvertently pregnant while taking leflunomide for no more than three weeks after conception and followed by a drug elimination procedure, no significant differences (p=0.13) were observed in the overall rate of major structural defects (5.4%) compared to either of the comparison groups (4.2% in the disease matched group [n=108] and 4.2% in healthy pregnant women [n=78]).

For women receiving leflunomide treatment and who wish to become pregnant, one of the following procedures is recommended in order to ascertain that the foetus is not exposed to toxic concentrations of A771726 (target concentration below 0.02 mg/L):

#### *Waiting period*

A771726 plasma levels can be expected to be above 0.02 mg/L for a prolonged period. The concentration may be expected to decrease below 0.02 mg/L about 2 years after stopping the treatment with leflunomide.

After a 2-year waiting period, the A771726 plasma concentration is measured for the first time. Thereafter, the A771726 plasma concentration must be determined again after an interval of at least 14 days. If both plasma concentrations are below 0.02 mg/L no teratogenic risk is to be expected.

For further information on the sample testing please contact the Marketing Authorisation Holder or its local representative (see section 7).

### *Washout procedure*

After stopping treatment with leflunomide:

- colestyramine 8 g is administered 3 times daily for a period of 11 days,
- alternatively, 50 g of activated powdered charcoal is administered 4 times daily for a period of 11 days.

However, also following either of the washout procedures, verification by 2 separate tests at an interval of at least 14 days and a waiting period of one-and-a-half months between the first occurrence of a plasma concentration below 0.02 mg/L and fertilisation is required.

Women of childbearing potential should be told that a waiting period of 2 years after treatment discontinuation is required before they may become pregnant. If a waiting period of up to approximately 2 years under reliable contraception is considered unpractical, prophylactic institution of a washout procedure may be advisable.

Both colestyramine and activated powdered charcoal may influence the absorption of oestrogens and progestogens such that reliable contraception with oral contraceptives may not be guaranteed during the washout procedure with colestyramine or activated powdered charcoal. Use of alternative contraceptive methods is recommended.

### Breast-feeding

Animal studies indicate that leflunomide or its metabolites pass into breast milk. Breast-feeding women must, therefore, not receive leflunomide.

### Fertility

Results of animal fertility studies have shown no effect on male and female fertility, but adverse effects on male reproductive organs were observed in repeated dose toxicity studies (see section 5.3).

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

In the case of side effects such as dizziness the patient's ability to concentrate and to react properly may be impaired. In such cases patients should refrain from driving cars and using machines.

## **4.8 Undesirable effects**

### Summary of the safety profile

The most frequently reported adverse effects with leflunomide are: mild increase in blood pressure, leucopenia, paraesthesia, headache, dizziness, diarrhoea, nausea, vomiting, oral mucosal disorders (e.g. aphthous stomatitis, mouth ulceration), abdominal pain, increased hair loss, eczema, rash (including maculo-papular rash), pruritus, dry skin, tenosynovitis, CPK increased, anorexia, weight loss (usually insignificant), asthenia, mild allergic reactions and elevation of liver parameters (transaminases (especially ALT), less often gamma-GT, alkaline phosphatase, bilirubin)).

Classification of expected frequencies:

Very common ( $\geq 1/10$ ); common ( $\geq 1/100$  to  $< 1/10$ ); uncommon ( $\geq 1/1,000$  to  $< 1/100$ ); rare ( $\geq 1/10,000$  to  $< 1/1,000$ ); very rare ( $< 1/10,000$ ), not known (cannot be estimated from the available data).

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

### *Infections and infestations*

Rare: severe infections, including sepsis which may be fatal.

Like other agents with immunosuppressive potential, leflunomide may increase susceptibility to infections, including opportunistic infections (see also section 4.4). Thus, the overall incidence of infections can increase (in particular of rhinitis, bronchitis and pneumonia).

### *Neoplasms benign, malignant and unspecified (incl. cysts and polyps)*

The risk of malignancy, particularly lymphoproliferative disorders, is increased with use of some immunosuppressive agents.

### *Blood and lymphatic system disorders*

Common: leucopenia (leucocytes >2 G/L)

Uncommon: anaemia, mild thrombocytopenia (platelets <100 G/L)

Rare: pancytopenia (probably by antiproliferative mechanism), leucopenia (leucocytes <2 G/L), eosinophilia

Very rare: agranulocytosis

Recent, concomitant or consecutive use of potentially myelotoxic agents may be associated with a higher risk of haematological effects.

### *Immune system disorders*

Common: mild allergic reactions

Very rare: severe anaphylactic/anaphylactoid reactions, vasculitis, including cutaneous necrotizing vasculitis

### *Metabolism and nutrition disorders*

Common: CPK increased

Uncommon: hypokalaemia, hyperlipidemia, hypophosphataemia

Rare: LDH increased

Not known: hypouricemia

### *Psychiatric disorders*

Uncommon: anxiety

### *Nervous system disorders*

Common: paraesthesia, headache, dizziness, peripheral neuropathy

### *Cardiac disorders*

Common: mild increase in blood pressure

Rare: severe increase in blood pressure

### *Respiratory, thoracic and mediastinal disorders*

Rare: interstitial lung disease (including interstitial pneumonitis), which may be fatal.

Not known: pulmonary hypertension

### *Gastrointestinal disorders*

Common: colitis including microscopic colitis such as lymphocytic colitis, collagenous colitis, diarrhoea, nausea, vomiting, oral mucosal disorders (e.g., aphthous stomatitis, mouth ulceration), abdominal pain

Uncommon: taste disturbances

Very rare: pancreatitis

### *Hepatobiliary disorders*

Common: elevation of liver parameters (transaminases [especially ALT], less often gamma-GT, alkaline phosphatase, bilirubin)  
Rare: hepatitis, jaundice/cholestasis  
Very rare: severe liver injury such as hepatic failure and acute hepatic necrosis that may be fatal

### *Skin and subcutaneous tissue disorders*

Common: increased hair loss, eczema, rash (including maculopapular rash), pruritus, dry skin  
Uncommon: urticaria  
Very rare: toxic epidermal necrolysis, Stevens-Johnson syndrome, erythema multiforme  
Not known: cutaneous lupus erythematosus, pustular psoriasis or worsening psoriasis, Drug Reaction with Eosinophilia and Systemic Symptoms (DRESS)

### *Musculoskeletal and connective tissue disorders*

Common: tenosynovitis  
Uncommon: tendon rupture

### *Renal and urinary disorders*

Not known: renal failure

### *Reproductive system and breast disorders*

Not known: marginal (reversible) decreases in sperm concentration, total sperm count and rapid progressive motility

### *General disorders and administration site conditions*

Common: anorexia, weight loss (usually insignificant), asthenia

### 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 national reporting system listed in [Appendix V](#).

## **4.9 Overdose**

### Symptoms

There have been reports of chronic overdose in patients taking Arava at daily doses up to five times the recommended daily dose, and reports of acute overdose in adults and children. There were no adverse events reported in the majority of case reports of overdose. Adverse events consistent with the safety profile for leflunomide were: abdominal pain, nausea, diarrhoea, elevated liver enzymes, anaemia, leucopenia, pruritus and rash.

### Management

In the event of an overdose or toxicity, colestyramine or charcoal is recommended to accelerate elimination. Colestyramine given orally at a dose of 8 g three times a day for 24 hours to three healthy volunteers decreased plasma levels of A771726 by approximately 40% in 24 hours and by 49% to 65% in 48 hours.

Administration of activated charcoal (powder made into a suspension) orally or via nasogastric tube (50 g every 6 hours for 24 hours) has been shown to reduce plasma concentrations of the active metabolite A771726 by 37% in 24 hours and by 48% in 48 hours.

These washout procedures may be repeated if clinically necessary.

Studies with both hemodialysis and CAPD (chronic ambulatory peritoneal dialysis) indicate that A771726, the primary metabolite of leflunomide, is not dialysable.

## 5. PHARMACOLOGICAL PROPERTIES

### 5.1 Pharmacodynamic properties

Pharmacotherapeutic group: selective immunosuppressants, ATC code: L04AA13.

#### Human pharmacology

Leflunomide is a disease-modifying anti-rheumatic agent with antiproliferative properties.

#### Animal pharmacology

Leflunomide is effective in animal models of arthritis and of other autoimmune diseases and transplantation, mainly if administered during the sensitisation phase. It has immunomodulating/ immunosuppressive characteristics, acts as an antiproliferative agent, and displays anti-inflammatory properties. Leflunomide exhibits the best protective effects on animal models of autoimmune diseases when administered in the early phase of the disease progression.

*In vivo*, it is rapidly and almost completely metabolised to A771726 which is active *in vitro*, and is presumed to be responsible for the therapeutic effect.

#### Mechanism of action

A771726, the active metabolite of leflunomide, inhibits the human enzyme dihydroorotate dehydrogenase (DHODH) and exhibits antiproliferative activity.

#### Clinical efficacy and safety

##### *Rheumatoid arthritis*

The efficacy of Arava in the treatment of rheumatoid arthritis was demonstrated in 4 controlled trials (1 in phase II and 3 in phase III). The phase II trial, study YU203, randomised 402 subjects with active rheumatoid arthritis to placebo (n=102), leflunomide 5 mg (n=95), 10 mg (n=101) or 25 mg/day (n=104). The treatment duration was 6 months.

All leflunomide patients in the phase III trials used an initial dose of 100 mg for 3 days.

Study MN301 randomised 358 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=133), sulphasalazine 2 g/day (n=133), or placebo (n=92). Treatment duration was 6 months.

Study MN303 was an optional 6-month blinded continuation of MN301 without the placebo arm, resulting in a 12-month comparison of leflunomide and sulphasalazine.

Study MN302 randomised 999 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=501) or methotrexate at 7.5 mg/week increasing to 15 mg/week (n=498). Folate supplementation was optional and only used in 10% of patients. Treatment duration was 12-months.

Study US301 randomised 482 subjects with active rheumatoid arthritis to leflunomide 20 mg/day (n=182), methotrexate 7.5 mg/week increasing to 15 mg/week (n=182), or placebo (n=118). All patients received folate 1 mg bid. Treatment duration was 12 months.

Leflunomide at a daily dose of at least 10 mg (10 to 25 mg in study YU203, 20 mg in studies MN301 and US301) was statistically significantly superior to placebo in reducing the signs and symptoms of rheumatoid arthritis in all 3 placebo-controlled trials. The ACR (American College of Rheumatology) response rates in study YU203 were 27.7% for placebo, 31.9% for 5 mg, 50.5% for 10 mg and 54.5% for 25 mg/day. In the phase III trials, the ACR response rates for leflunomide 20 mg/day versus placebo were 54.6% versus 28.6% (study MN301), and 49.4% versus 26.3% (study US301). After 12 months with active treatment, the ACR response rates in leflunomide patients were 52.3% (studies MN301/303), 50.5% (study MN302) and 49.4% (study US301), compared to 53.8% (studies

MN301/303) in sulphasalazine patients, 64.8% (study MN302), and 43.9% (study US301) in methotrexate patients. In study MN302 leflunomide was significantly less effective than methotrexate. However, in study US301 no significant differences were observed between leflunomide and methotrexate in the primary efficacy parameters. No difference was observed between leflunomide and sulphasalazine (study MN301). The leflunomide treatment effect was evident by 1 month, stabilised by 3 to 6 months and continued throughout the course of treatment.

A randomised, double-blind, parallel-group non-inferiority study compared the relative efficacy of two different daily maintenance doses of leflunomide, 10 mg and 20 mg. From the results it can be concluded that efficacy results of the 20 mg maintenance dose were more favourable, on the other hand, the safety results favoured the 10 mg daily maintenance dose.

#### *Paediatric population*

Leflunomide was studied in a single multicenter, randomized, double-blind, active-controlled trial in 94 patients (47 per arm) with polyarticular course juvenile rheumatoid arthritis. Patients were 3–17 years of age with active polyarticular course JRA regardless of onset type and naive to methotrexate or leflunomide. In this trial, the loading dose and maintenance dose of leflunomide was based on three weight categories: <20 kg, 20-40 kg, and >40 kg. After 16 weeks treatment, the difference in response rates was statistically significant in favour of methotrexate for the JRA Definition of Improvement (DOI)  $\geq 30\%$  ( $p=0.02$ ). In responders, this response was maintained during 48 weeks (see section 4.2).

The pattern of adverse events of leflunomide and methotrexate seems to be similar, but the dose used in lighter subjects resulted in a relatively low exposure (see section 5.2). These data do not allow an effective and safe dose recommendation.

#### *Psoriatic arthritis*

The efficacy of Arava was demonstrated in one controlled, randomised, double blind study 3L01 in 188 patients with psoriatic arthritis, treated at 20 mg/day. Treatment duration was 6 months.

Leflunomide 20 mg/day was significantly superior to placebo in reducing the symptoms of arthritis in patients with psoriatic arthritis: the PsARC (Psoriatic Arthritis treatment Response Criteria) responders were 59% in the leflunomide group and 29.7% in the placebo group by 6 months ( $p<0.0001$ ). The effect of leflunomide on improvement of function and on reduction of skin lesions was modest.

#### *Postmarketing studies*

A randomised study assessed the clinical efficacy response rate in DMARD-naïve patients ( $n=121$ ) with early RA, who received either 20 mg or 100 mg of leflunomide in two parallel groups during the initial three day double blind period. The initial period was followed by an open label maintenance period of three months, during which both groups received leflunomide 20 mg daily. No incremental overall benefit was observed in the studied population with the use of a loading dose regimen. The safety data obtained from both treatment groups were consistent with the known safety profile of leflunomide, however, the incidence of gastrointestinal adverse events and of elevated liver enzymes tended to be higher in the patients receiving the loading dose of 100 mg leflunomide.

## **5.2 Pharmacokinetic properties**

Leflunomide is rapidly converted to the active metabolite, A771726, by first-pass metabolism (ring opening) in gut wall and liver. In a study with radiolabelled  $^{14}\text{C}$ -leflunomide in three healthy volunteers, no unchanged leflunomide was detected in plasma, urine or faeces. In other studies, unchanged leflunomide levels in plasma have rarely been detected, however, at ng/ml plasma levels. The only plasma-radiolabelled metabolite detected was A771726. This metabolite is responsible for essentially all the *in vivo* activity of Arava.

### Absorption



Excretion data from the <sup>14</sup>C study indicated that at least about 82 to 95% of the dose is absorbed. The time to peak plasma concentrations of A771726 is very variable; peak plasma levels can occur between 1 hour and 24 hours after single administration. Leflunomide can be administered with food, since the extent of absorption is comparable in the fed and fasting state. Due to the very long half-life of A771726 (approximately 2 weeks), a loading dose of 100 mg for 3 days was used in clinical studies to facilitate the rapid attainment of steady-state levels of A771726. Without a loading dose, it is estimated that attainment of steady-state plasma concentrations would require nearly two months of dosing. In multiple dose studies in patients with rheumatoid arthritis, the pharmacokinetic parameters of A771726 were linear over the dose range of 5 to 25 mg. In these studies, the clinical effect was closely related to the plasma concentration of A771726 and to the daily dose of leflunomide. At a dose level of 20 mg/day, average plasma concentration of A771726 at steady state is approximately 35 µg/ml. At steady state plasma levels accumulate about 33- to 35-fold compared with single dose.

### Distribution

In human plasma, A771726 is extensively bound to protein (albumin). The unbound fraction of A771726 is about 0.62%. Binding of A771726 is linear in the therapeutic concentration range. Binding of A771726 appeared slightly reduced and more variable in plasma from patients with rheumatoid arthritis or chronic renal insufficiency. The extensive protein binding of A771726 could lead to displacement of other highly-bound drugs. *In vitro* plasma protein binding interaction studies with warfarin at clinically relevant concentrations, however, showed no interaction. Similar studies showed that ibuprofen and diclofenac did not displace A771726, whereas the unbound fraction of A771726 is increased 2- to 3-fold in the presence of tolbutamide. A771726 displaced ibuprofen, diclofenac and tolbutamide but the unbound fraction of these medicinal products is only increased by 10% to 50%. There is no indication that these effects are of clinical relevance. Consistent with extensive protein binding A771726 has a low apparent volume of distribution (approximately 11 litres). There is no preferential uptake in erythrocytes.

### Biotransformation

Leflunomide is metabolised to one primary (A771726) and many minor metabolites including TFMA (4-trifluoromethylaniline). The metabolic biotransformation of leflunomide to A771726 and subsequent metabolism of A771726 is not controlled by a single enzyme and has been shown to occur in microsomal and cytosolic cellular fractions. Interaction studies with cimetidine (non-specific cytochrome P450 inhibitor) and rifampicin (non-specific cytochrome P450 inducer), indicate that *in vivo* CYP enzymes are involved in the metabolism of leflunomide only to a small extent.

### Elimination

Elimination of A771726 is slow and characterised by an apparent clearance of about 31 ml/hr. The elimination half-life in patients is approximately 2 weeks. After administration of a radiolabelled dose of leflunomide, radioactivity was equally excreted in faeces, probably by biliary elimination, and in urine. A771726 was still detectable in urine and faeces 36 days after a single administration. The principal urinary metabolites were glucuronide products derived from leflunomide (mainly in 0 to 24 hour samples) and an oxanilic acid derivative of A771726. The principal faecal component was A771726.

It has been shown in man that administration of an oral suspension of activated powdered charcoal or colestyramine leads to a rapid and significant increase in A771726 elimination rate and decline in plasma concentrations (see section 4.9). This is thought to be achieved by a gastrointestinal dialysis mechanism and/or by interrupting enterohepatic recycling.

### Renal impairment

Leflunomide was administered as a single oral 100 mg dose to 3 haemodialysis patients and 3 patients on continuous peritoneal dialysis (CAPD). The pharmacokinetics of A771726 in CAPD subjects appeared to be similar to healthy volunteers. A more rapid elimination of A771726 was observed in haemodialysis subjects which was not due to extraction of medicinal product in the dialysate.

### Hepatic impairment

No data are available regarding treatment of patients with hepatic impairment. The active metabolite A771726 is extensively protein bound and cleared via hepatic metabolism and biliary secretion. These processes may be affected by hepatic dysfunction.

### Paediatric population

The pharmacokinetics of A771726 following oral administration of leflunomide have been investigated in 73 paediatric patients with polyarticular course Juvenile Rheumatoid Arthritis (JRA) who ranged in age from 3 to 17 years. The results of a population pharmacokinetic analysis of these trials have demonstrated that paediatric patients with body weights  $\leq 40$  kg have a reduced systemic exposure (measured by  $C_{ss}$ ) of A771726 relative to adult rheumatoid arthritis patients (see section 4.2).

### Elderly

Pharmacokinetic data in elderly (>65 years) are limited but consistent with pharmacokinetics in younger adults.

## **5.3 Preclinical safety data**

Leflunomide, administered orally and intraperitoneally, has been studied in acute toxicity studies in mice and rats. Repeated oral administration of leflunomide to mice for up to 3 months, to rats and dogs for up to 6 months and to monkeys for up to 1 month's duration revealed that the major target organs for toxicity were bone marrow, blood, gastrointestinal tract, skin, spleen, thymus and lymph nodes. The main effects were anaemia, leucopenia, decreased platelet counts and panmyelopathy and reflect the basic mode of action of the compound (inhibition of DNA synthesis). In rats and dogs, Heinz bodies and/or Howell-Jolly bodies were found. Other effects found on heart, liver, cornea and respiratory tract could be explained as infections due to immunosuppression. Toxicity in animals was found at doses equivalent to human therapeutic doses.

Leflunomide was not mutagenic. However, the minor metabolite TFMA (4-trifluoromethylaniline) caused clastogenicity and point mutations *in vitro*, whilst insufficient information was available on its potential to exert this effect *in vivo*.

In a carcinogenicity study in rats, leflunomide did not show carcinogenic potential. In a carcinogenicity study in mice an increased incidence of malignant lymphoma occurred in males of the highest dose group, considered to be due to the immunosuppressive activity of leflunomide. In female mice an increased incidence, dose-dependent, of bronchiolo-alveolar adenomas and carcinomas of the lung was noted. The relevance of the findings in mice relative to the clinical use of leflunomide is uncertain.

Leflunomide was not antigenic in animal models.

Leflunomide was embryotoxic and teratogenic in rats and rabbits at doses in the human therapeutic range and exerted adverse effects on male reproductive organs in repeated dose toxicity studies. Fertility was not reduced.

## **6. PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

*Tablet core:*

Maize starch

Povidone (E1201)

Crospovidone (E1202)

Talc (E553b)

Silica colloidal anhydrous

Magnesium stearate (E470b)

Lactose monohydrate

*Film-coating:*

Talc (E553b)

Hypromellose (E464)

Titanium dioxide (E171)

Macrogol 8000.

### **6.2 Incompatibilities**

Not applicable.

### **6.3 Shelf life**

3 years.

### **6.4 Special precautions for storage**

Store in the original package.

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

Aluminium / Aluminium blister. Pack size: 3 film-coated tablets.

### **6.6 Special precautions for disposal**

No special requirements for disposal.

## **7. MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH

D-65926 Frankfurt am Main

Germany

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

EU/1/99/118/009

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

Date of first authorisation: 02 September 1999

Date of latest renewal: 02 September 2009

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

Detailed information on this medicinal product is available on the website of the European Medicines Agency <http://www.ema.europa.eu/>.

## **ANNEX II**

- A. MANUFACTURER RESPONSIBLE FOR BATCH RELEASE**
- B. CONDITIONS OR RESTRICTIONS REGARDING SUPPLY AND USE**
- C. OTHER CONDITIONS AND REQUIREMENTS OF THE MARKETING AUTHORISATION**
- D. CONDITIONS OR RESTRICTIONS WITH REGARD TO THE SAFE AND EFFECTIVE USE OF THE MEDICINAL PRODUCT**

## **A. MANUFACTURER RESPONSIBLE FOR BATCH RELEASE**

### Name and address of the manufacturer responsible for batch release

Sanofi Winthrop Industrie  
56, Route de Choisy au Bac  
F-60205 Compiègne Cedex  
France

## **B. CONDITIONS OR RESTRICTIONS REGARDING SUPPLY AND USE**

Medicinal product subject to restricted medical prescription (see Annex I: Summary of Product Characteristics, section 4.2).

## **C. OTHER CONDITIONS AND REQUIREMENTS OF THE MARKETING AUTHORISATION**

- **Periodic Safety Update Reports**

The requirements for submission of periodic safety update reports for this medicinal product are set out in the list of Union reference dates (EURD list) provided for under Article 107c(7) of Directive 2001/83/EC and any subsequent updates published on the European medicines web-portal.

## **D. CONDITIONS OR RESTRICTIONS WITH REGARD TO THE SAFE AND EFFECTIVE USE OF THE MEDICINAL PRODUCT**

- **Risk Management Plan (RMP)**

The MAH shall perform the required pharmacovigilance activities and interventions detailed in the agreed RMP presented in Module 1.8.2 of the Marketing Authorisation and any agreed subsequent updates of the RMP.

An updated RMP should be submitted:

- At the request of the European Medicines Agency;
- Whenever the risk management system is modified, especially as the result of new information being received that may lead to a significant change to the benefit/risk profile or as the result of an important (pharmacovigilance or risk minimisation) milestone being reached.

- **Additional risk minimisation measures**

The Marketing Authorisation Holder (MAH) shall ensure that all physicians who are expected to prescribe/use Arava are provided with a physician educational pack containing the following:

- The Summary of Product Characteristics
- Physician Leaflet

The Physician Leaflet should contain the following key messages:

- That there is a risk of severe liver injury and so regular measurement of ALT (SGPT) levels to monitor liver function is important. The information provided in the Physician Leaflet should provide information on dose reduction, discontinuation and wash out procedures.
- The identified risk of synergistic hepato- or haematotoxicity associated with combination therapy with another Disease-Modifying Antirheumatic Drug (e.g. methotrexate).
- That there is a risk of teratogenicity and so pregnancy must be avoided until leflunomide plasma levels are at an appropriate level. Physicians and patients should be made aware that

there is an ad hoc advisory service available to provide information on leflunomide plasma level laboratory testing.

- The risk of infections, including opportunistic infections, and the contraindication for use in immuno-compromised patients.
- The need to counsel patients on important risks associated with leflunomide therapy and appropriate precautions when using the medicine.

**ANNEX III**  
**LABELLING AND PACKAGE LEAFLET**



## **A. LABELLING**

**PARTICULARS TO APPEAR ON THE OUTER PACKAGING**

**OUTER PACKAGING/BLISTER PACK**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 10 mg film-coated tablets  
leflunomide

**2. STATEMENT OF ACTIVE SUBSTANCE(S)**

Each film-coated tablet contains 10 mg leflunomide.

**3. LIST OF EXCIPIENTS**

This medicinal product contains lactose (see leaflet for further information).

**4. PHARMACEUTICAL FORM AND CONTENTS**

30 film-coated tablets  
100 film-coated tablets

**5. METHOD AND ROUTE(S) OF ADMINISTRATION**

Read the package leaflet before use.  
Oral use.

**6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

**7. OTHER SPECIAL WARNING(S), IF NECESSARY**

**8. EXPIRY DATE**

EXP

**9. SPECIAL STORAGE CONDITIONS**

Store in the original package.

**10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

**11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

**12. MARKETING AUTHORISATION NUMBER(S)**

EU/1/99/118/001 30 tablets  
EU/1/99/118/002 100 tablets

**13. BATCH NUMBER**

Batch

**14. GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

**15. INSTRUCTIONS ON USE**

**16. INFORMATION IN BRAILLE**

Arava 10 mg

**17. UNIQUE IDENTIFIER – 2D BARCODE**

2D barcode carrying the unique identifier included.

**18. UNIQUE IDENTIFIER - HUMAN READABLE DATA**

PC:  
SN:  
NN:

**MINIMUM PARTICULARS TO APPEAR ON BLISTERS OR STRIPS**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 10 mg film-coated tablets  
leflunomide

**2. NAME OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis

**3. EXPIRY DATE**

EXP

**4. BATCH NUMBER**

Batch

**5. OTHER**

**PARTICULARS TO APPEAR ON THE OUTER PACKAGING**

**OUTER PACKAGING/BOTTLE PACK**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 10 mg film-coated tablets  
leflunomide

**2. STATEMENT OF ACTIVE SUBSTANCE(S)**

Each film-coated tablet contains 10 mg leflunomide.

**3. LIST OF EXCIPIENTS**

This medicinal product contains lactose (see leaflet for further information).

**4. PHARMACEUTICAL FORM AND CONTENTS**

30 film-coated tablets  
100 film-coated tablets

**5. METHOD AND ROUTE(S) OF ADMINISTRATION**

Read the package leaflet before use.  
Oral use.

**6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

**7. OTHER SPECIAL WARNING(S), IF NECESSARY**

**8. EXPIRY DATE**

EXP

**9. SPECIAL STORAGE CONDITIONS**

Keep the bottle tightly closed.

**10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

**11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

**12. MARKETING AUTHORISATION NUMBER(S)**

EU/1/99/118/003 30 tablets  
EU/1/99/118/004 100 tablets

**13. BATCH NUMBER**

Batch

**14. GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

**15. INSTRUCTIONS ON USE**

**16. INFORMATION IN BRAILLE**

Arava 10 mg

**17. UNIQUE IDENTIFIER – 2D BARCODE**

2D barcode carrying the unique identifier included.

**18. UNIQUE IDENTIFIER - HUMAN READABLE DATA**

PC:  
SN:  
NN:

**PARTICULARS TO APPEAR ON THE IMMEDIATE PACKAGING**

**BOTTLE LABEL**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 10 mg film-coated tablets  
leflunomide

**2. STATEMENT OF ACTIVE SUBSTANCE(S)**

Each tablet contains 10 mg leflunomide.

**3. LIST OF EXCIPIENTS**

Also contains lactose.

**4. PHARMACEUTICAL FORM AND CONTENTS**

30 film-coated tablets  
100 film-coated tablets

**5. METHOD AND ROUTE(S) OF ADMINISTRATION**

Read the package leaflet before use.  
Oral use.

**6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

**7. OTHER SPECIAL WARNING(S), IF NECESSARY**

**8. EXPIRY DATE**

EXP

**9. SPECIAL STORAGE CONDITIONS**

Keep the bottle tightly closed.

**10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

**11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH

**12. MARKETING AUTHORISATION NUMBER(S)**

EU/1/99/118/003 30 tablets  
EU/1/99/118/004 100 tablets

**13. BATCH NUMBER**

Batch

**14. GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

**15. INSTRUCTIONS ON USE**

**16. INFORMATION IN BRAILLE**



**PARTICULARS TO APPEAR ON THE OUTER PACKAGING**

**OUTER PACKAGING/BLISTER PACK**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 20 mg film-coated tablets  
leflunomide

**2. STATEMENT OF ACTIVE SUBSTANCE(S)**

Each film-coated tablet contains 20 mg leflunomide.

**3. LIST OF EXCIPIENTS**

This medicinal product contains lactose (see leaflet for further information).

**4. PHARMACEUTICAL FORM AND CONTENTS**

30 film-coated tablets  
100 film-coated tablets

**5. METHOD AND ROUTE(S) OF ADMINISTRATION**

Read the package leaflet before use.  
Oral use.

**6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

**7. OTHER SPECIAL WARNING(S), IF NECESSARY**

**8. EXPIRY DATE**

EXP

**9. SPECIAL STORAGE CONDITIONS**

Store in the original package.

**10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

**11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

**12. MARKETING AUTHORISATION NUMBER(S)**

EU/1/99/118/005 30 tablets  
EU/1/99/118/006 100 tablets

**13. BATCH NUMBER**

Batch

**14. GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

**15. INSTRUCTIONS ON USE**

**16. INFORMATION IN BRAILLE**

Arava 20 mg

**17. UNIQUE IDENTIFIER – 2D BARCODE**

2D barcode carrying the unique identifier included.

**18. UNIQUE IDENTIFIER - HUMAN READABLE DATA**

PC:  
SN:  
NN:

**MINIMUM PARTICULARS TO APPEAR ON BLISTERS OR STRIPS**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 20 mg film-coated tablets  
leflunomide

**2. NAME OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis

**3. EXPIRY DATE**

EXP

**4. BATCH NUMBER**

Batch

**5. OTHER**

**PARTICULARS TO APPEAR ON THE OUTER PACKAGING**

**OUTER PACKAGING/BOTTLE PACK**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 20 mg film-coated tablets  
leflunomide

**2. STATEMENT OF ACTIVE SUBSTANCE(S)**

Each film-coated tablet contains 20 mg leflunomide.

**3. LIST OF EXCIPIENTS**

This medicinal product contains lactose (see leaflet for further information).

**4. PHARMACEUTICAL FORM AND CONTENTS**

30 film-coated tablets  
50 film-coated tablets  
100 film-coated tablets

**5. METHOD AND ROUTE(S) OF ADMINISTRATION**

Read the package leaflet before use.  
Oral use.

**6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

**7. OTHER SPECIAL WARNING(S), IF NECESSARY**

**8. EXPIRY DATE**

EXP

**9. SPECIAL STORAGE CONDITIONS**

Keep the bottle tightly closed.

**10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

**11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

**12. MARKETING AUTHORISATION NUMBER(S)**

EU/1/99/118/007 30 tablets  
EU/1/99/118/010 50 tablets  
EU/1/99/118/008 100 tablets

**13. BATCH NUMBER**

Batch

**14. GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

**15. INSTRUCTIONS ON USE**

**16. INFORMATION IN BRAILLE**

Arava 20 mg

**17. UNIQUE IDENTIFIER – 2D BARCODE**

2D barcode carrying the unique identifier included.

**18. UNIQUE IDENTIFIER - HUMAN READABLE DATA**

PC:  
SN:  
NN:

**PARTICULARS TO APPEAR ON THE IMMEDIATE PACKAGING**

**BOTTLE LABEL**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 20 mg film-coated tablets  
leflunomide

**2. STATEMENT OF ACTIVE SUBSTANCE(S)**

Each tablet contains 20 mg leflunomide.

**3. LIST OF EXCIPIENTS**

Also contains lactose.

**4. PHARMACEUTICAL FORM AND CONTENTS**

30 film-coated tablets  
50 film-coated tablets  
100 film-coated tablets

**5. METHOD AND ROUTE(S) OF ADMINISTRATION**

Read the package leaflet before use.  
Oral use.

**6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

**7. OTHER SPECIAL WARNING(S), IF NECESSARY**

**8. EXPIRY DATE**

EXP

**9. SPECIAL STORAGE CONDITIONS**

Keep the bottle tightly closed.

**10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

**11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH

**12. MARKETING AUTHORISATION NUMBER(S)**

EU/1/99/118/007 30 tablets  
EU/1/99/118/010 50 tablets  
EU/1/99/118/008 100 tablets

**13. BATCH NUMBER**

Batch

**14. GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

**15. INSTRUCTIONS ON USE**

**16. INFORMATION IN BRAILLE**

**PARTICULARS TO APPEAR ON THE OUTER PACKAGING**

**OUTER PACKAGING/BLISTER PACK**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 100 mg film-coated tablets  
leflunomide

**2. STATEMENT OF ACTIVE SUBSTANCE(S)**

Each film-coated tablet contains 100 mg leflunomide.

**3. LIST OF EXCIPIENTS**

This medicinal product contains lactose (see leaflet for further information).

**4. PHARMACEUTICAL FORM AND CONTENTS**

3 film-coated tablets

**5. METHOD AND ROUTE(S) OF ADMINISTRATION**

Read the package leaflet before use.  
Oral use.

**6. SPECIAL WARNING THAT THE MEDICINAL PRODUCT MUST BE STORED OUT OF THE SIGHT AND REACH OF CHILDREN**

Keep out of the sight and reach of children.

**7. OTHER SPECIAL WARNING(S), IF NECESSARY**

**8. EXPIRY DATE**

EXP

**9. SPECIAL STORAGE CONDITIONS**

Store in the original package.



**10. SPECIAL PRECAUTIONS FOR DISPOSAL OF UNUSED MEDICINAL PRODUCTS OR WASTE MATERIALS DERIVED FROM SUCH MEDICINAL PRODUCTS, IF APPROPRIATE**

**11. NAME AND ADDRESS OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

**12. MARKETING AUTHORISATION NUMBER(S)**

EU/1/99/118/009 3 tablets

**13. BATCH NUMBER**

Batch

**14. GENERAL CLASSIFICATION FOR SUPPLY**

Medicinal product subject to medical prescription.

**15. INSTRUCTIONS ON USE**

**16. INFORMATION IN BRAILLE**

Arava 100 mg

**17. UNIQUE IDENTIFIER – 2D BARCODE**

2D barcode carrying the unique identifier included.

**18. UNIQUE IDENTIFIER - HUMAN READABLE DATA**

PC:  
SN:  
NN:

**MINIMUM PARTICULARS TO APPEAR ON BLISTERS OR STRIPS**

**1. NAME OF THE MEDICINAL PRODUCT**

Arava 100 mg film-coated tablets  
leflunomide

**2. NAME OF THE MARKETING AUTHORISATION HOLDER**

Sanofi-Aventis

**3. EXPIRY DATE**

EXP

**4. BATCH NUMBER**

Batch

**5. OTHER**

**B. PACKAGE LEAFLET**

## Package leaflet: Information for the user

### Arava 10 mg film-coated tablets leflunomide

**Read all of this leaflet carefully before you start taking this medicine because it contains important information for you.**

- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor, pharmacist or nurse.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

#### **What is in this leaflet**

1. What Arava is and what it is used for
2. What you need to know before you take Arava
3. How to take Arava
4. Possible side effects
5. How to store Arava
6. Contents of the pack and other information

#### **1. What Arava is and what it is used for**

Arava belongs to a group of medicines called anti-rheumatic medicines. It contains the active substance leflunomide.

Arava is used to treat adult patients with active rheumatoid arthritis or with active psoriatic arthritis.

Symptoms of rheumatoid arthritis include inflammation of joints, swelling, difficulty moving and pain. Other symptoms that affect the entire body include loss of appetite, fever, loss of energy and anaemia (lack of red blood cells).

Symptoms of active psoriatic arthritis include inflammation of joints, swelling, difficulty moving, pain and patches of red, scaly skin (skin lesions).

#### **2. What you need to know before you take Arava**

##### **Do not take Arava**

- if you have ever had an **allergic** reaction to leflunomide (especially a serious skin reaction, often accompanied by fever, joint pain, red skin stains, or blisters e.g. Stevens-Johnson syndrome) or to any of the other ingredients of this medicine (listed in section 6), or if you are allergic to teriflunomide (used to treat multiple sclerosis),
- if you have any **liver problems**,
- if you have moderate to severe **kidney problems**,
- if you have severely low numbers of **proteins in your blood** (hypoproteinaemia),
- if you suffer from any problem which affects your **immune system** (e.g. AIDS),
- if you have any problem with your **bone marrow**, or if you have low numbers of red or white cells in your blood or a reduced number of blood platelets,
- if you are suffering from a **serious infection**,
- if you are **pregnant**, think you may be pregnant, or are breast-feeding.

## Warnings and precautions

Talk to your doctor, pharmacist or nurse before taking Arava

- if you have ever suffered from **inflammation of the lung** (interstitial lung disease).
- if you have ever had **tuberculosis** or if you have been in close contact with someone who has or has had tuberculosis. Your doctor may perform tests to see if you have tuberculosis.
- if you are **male** and wish to father a child. As it can not be excluded that Arava passes into semen, reliable contraception should be used during treatment with Arava. Men wishing to father a child should contact their doctor who may advise them to stop taking Arava and take certain medicines to remove Arava rapidly and sufficiently from their body. You will then need a blood test to make sure that Arava has been sufficiently removed from your body, and you should then wait for at least another 3 months before attempting to father a child.
- if you are due to have a specific blood test (calcium level). Falsely low levels of calcium can be detected.

Arava can occasionally cause some problems with your blood, liver, lungs, or nerves in your arms or legs. It may also cause some serious allergic reactions (including Drug Reaction with Eosinophilia and Systemic Symptoms [DRESS]), or increase the chance of a severe infection. For more information on these, please read section 4 (Possible side effects).

DRESS appears initially as flu-like symptoms and a rash on the face then an extended rash with a high temperature, increased levels of liver enzymes seen in blood tests and an increase in a type of white blood cell (eosinophilia) and enlarged lymph nodes.

Your doctor will carry out **blood tests** at regular intervals, before and during treatment with Arava, to monitor your blood cells and liver. Your doctor will also check your blood pressure regularly as Arava can cause an increase in blood pressure.

Tell your doctor if you have unexplained chronic diarrhoea. Your doctor may perform additional tests for differential diagnosis.

## Children and adolescents

**Arava is not recommended for use in children and adolescents below 18 years of age.**

## Other medicines and Arava

Please tell your doctor or pharmacist if you are taking, have recently taken or might take any other medicines. This includes medicines obtained without a prescription.

This is especially important if you are taking:

- other medicines for rheumatoid arthritis such as antimalarials (e.g. chloroquine and hydroxychloroquine), intramuscular or oral gold, D-penicillamine, azathioprine and other immunosuppressive medicines (e.g. methotrexate) as these combinations are not advisable,
- warfarin and other oral medicines used to thin the blood, as monitoring is necessary to reduce the risk of side effects of this medicine
- teriflunomide for multiple sclerosis
- repaglinide, pioglitazone, nateglinide, or rosiglitazone for diabetes
- daunorubicin, doxorubicin, paclitaxel, or topotecan for cancer
- duloxetine for depression, urinary incontinence or in kidney disease in diabetics
- alosetron for the management of severe diarrhoea
- theophylline for asthma
- tizanidine, a muscle relaxant
- oral contraceptives (containing ethinylestradiol and levonorgestrel)
- cefaclor, benzylpenicillin (penicillin G), ciprofloxacin for infections
- indomethacin, ketoprofen for pain or inflammation
- furosemide for heart disease (diuretic, water pill)
- zidovudine for HIV infection
- rosuvastatin, simvastatin, atorvastatin, pravastatin for hypercholesterolemia (high cholesterol)

- sulfasalazine for inflammatory bowel disease or rheumatoid arthritis
- a medicine called colestyramine (used to reduce high cholesterol) or activated charcoal as these medicines can reduce the amount of Arava which is absorbed by the body.

If you are already taking a nonsteroidal **anti-inflammatory** drug (NSAID) and/or **corticosteroids**, you may continue to take them after starting Arava.

### **Vaccinations**

If you have to be vaccinated, ask your doctor for advice. Certain vaccinations should not be given while taking Arava, and for a certain amount of time after stopping treatment.

### **Arava with food, drink and alcohol**

Arava may be taken with or without food.

It is not recommended to drink alcohol during treatment with Arava. Drinking alcohol while taking Arava may increase the chance of liver damage.

### **Pregnancy and breast-feeding**

**Do not** take Arava if you are, or think you may be **pregnant**. If you are pregnant or become pregnant while taking Arava, the risk of having a baby with serious birth defects is increased. Women of childbearing potential must not take Arava without using reliable contraceptive measures.

Tell your doctor if you plan to become pregnant after stopping treatment with Arava, as you need to ensure that all traces of Arava have left your body before trying to become pregnant. This may take up to 2 years. This may be reduced to a few weeks by taking certain medicines which speed up removal of Arava from your body.

In either case it should be confirmed by a blood test that Arava has been sufficiently removed from your body and you should then wait for at least another month before you become pregnant.

For further information on the laboratory testing please contact your doctor.

If you suspect that you are pregnant while taking Arava or in the two years after you have stopped treatment, you must contact your doctor **immediately** for a pregnancy test. If the test confirms that you are pregnant, your doctor may suggest treatment with certain medicines to remove Arava rapidly and sufficiently from your body, as this may decrease the risk to your baby.

**Do not** take Arava when you are **breast-feeding**, as leflunomide passes into the breast milk.

### **Driving and using machines**

Arava can make you feel dizzy which may impair your ability to concentrate and react. If you are affected, do not drive, or use machines.

### **Arava contains lactose**

If you have been told by your doctor that you have an intolerance to some sugars, contact your doctor before taking this medicine.

## **3. How to take Arava**

Always take this medicine exactly as your doctor or pharmacist has told you. Check with your doctor or pharmacist if you are not sure.

The usual starting dose of Arava is one 100 mg tablet once daily for the first three days. After this, most patients need a dose of:

- For rheumatoid arthritis: 10 or 20 mg Arava once daily, depending on the severity of the disease.
- For psoriatic arthritis: 20 mg Arava once daily.

**Swallow** the tablet **whole** and with plenty of **water**.

It may take about 4 weeks or longer until you start to feel an improvement in your condition. Some patients may even still feel further improvements after 4 to 6 months of therapy.

You will normally take Arava over long periods of time.

#### **If you take more Arava than you should**

If you take more Arava than you should, contact your doctor or get other medical advice. If possible, take your tablets or the box with you to show the doctor.

#### **If you forget to take Arava**

If you forget to take a dose, take it as soon as you remember, unless it is nearly time for your next dose. Do not take a double dose to make up for a forgotten dose.

If you have any further questions on the use of this medicine, ask your doctor, pharmacist or nurse.

## **4. Possible side effects**

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Tell your doctor **immediately** and stop taking Arava:

- if you experience **weakness**, feel light-headed or dizzy or have **difficulty breathing**, as these may be signs of a serious allergic reaction,
- if you develop a **skin rash** or **ulcers in your mouth**, as these may indicate severe, sometimes life-threatening reactions (e.g. Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme, Drug Reaction with Eosinophilia and Systemic Symptoms [DRESS]), see section 2.

Tell your doctor **immediately** if you experience:

- **pale skin, tiredness, or bruising**, as these may indicate blood disorders caused by an imbalance in the different types of blood cells which make up blood,
- **tiredness, abdominal pain, or jaundice** (yellow discolouration of the eyes or skin), as these may indicate serious conditions such as liver failure, which may be fatal,
- any symptoms of an **infection** such as **fever, sore throat or cough**, as this medicine may increase the chance of a severe infection which may be life-threatening,
- **cough** or **breathing problems** as these may indicate problems of the lung (interstitial lung disease or pulmonary hypertension),
- unusual tingling, weakness or pain in your hands or feet as these may indicate problems with your nerves (peripheral neuropathy).

#### **Common side effects (may affect up to 1 in 10 people)**

- a slight decrease in the number of white blood cells (leucopenia),
- mild allergic reactions,
- loss of appetite, weight loss (usually insignificant),
- tiredness (asthenia),
- headache, dizziness,
- abnormal skin sensations like tingling (paraesthesia),
- mild increase in blood pressure,
- colitis,
- diarrhoea,
- nausea, vomiting,
- inflammation of the mouth or mouth ulcers,
- abdominal pain,
- an increase in some liver test results,

- increased hair loss,
- eczema, dry skin, rash, itching,
- tendonitis (pain caused by inflammation in the membrane surrounding the tendons usually in the feet or hands),
- an increase of certain enzymes in the blood (creatine phosphokinase),
- problems in the nerves of the arms or legs (peripheral neuropathy).

#### **Uncommon side effects (may affect up to 1 in 100 people)**

- a decrease in the number of red blood cells (anaemia) and a decrease in the number of blood platelets (thrombocytopenia),
- a decrease in the levels of potassium in the blood,
- anxiety,
- taste disturbances,
- urticaria (nettle rash),
- tendon rupture,
- an increase in the levels of fat in the blood (cholesterol and triglycerides),
- a decrease in the levels of phosphate in the blood.

#### **Rare side effects (may affect up to 1 in 1,000 people)**

- an increase in the numbers of blood cells called eosinophiles (eosinophilia); mild decrease in the number of white blood cells (leucopenia); decrease in the number of all blood cells (pancytopenia),
- severe increase in blood pressure,
- inflammation of the lung (interstitial lung disease),
- an increase in some liver results which may develop into serious conditions such as hepatitis and jaundice,
- severe infections called sepsis which may be fatal,
- an increase of certain enzymes in the blood (lactate dehydrogenase).

#### **Very rare side effects (may affect up to 1 in 10,000 people)**

- a marked decrease of some white blood cells (agranulocytosis),
- severe and potentially severe allergic reactions,
- inflammation of the small vessels (vasculitis, including cutaneous necrotizing vasculitis),
- inflammation of the pancreas (pancreatitis),
- severe liver injury such as liver failure or necrosis which may be fatal,
- severe, sometimes life-threatening reactions (Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme).

Other side effects such as kidney failure, a decrease in the levels of uric acid in your blood, pulmonary hypertension, male infertility (which is reversible once treatment with this medicine is stopped), cutaneous lupus (characterized by rash/erythema on skin areas that are exposed to light), psoriasis (new or worsening) and DRESS may also occur with an unknown frequency.

#### **Reporting of side effects**

If you get any side effects, talk to your doctor or pharmacist. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via [the national reporting system listed in Appendix V](#). By reporting side effects you can help provide more information on the safety of this medicine.

## **5. How to store Arava**

Keep this medicine out of the sight and reach of children.



Do not use this medicine after the expiry date which is stated on the packaging. The expiry date refers to the last day of that month.

Blister: Store in the original package.

Bottle: Keep the bottle tightly closed.

Do not throw away any medicines via wastewater or household waste. Ask your pharmacist how to throw away medicines you no longer use. These measures will help protect the environment.

## **6. Contents of the pack and other information**

### **What Arava contains**

- The active substance is leflunomide. One film-coated tablet contains 10 mg of leflunomide.
- The other ingredients are: maize starch, povidone (E1201), crospovidone (E1202), silica colloidal anhydrous, magnesium stearate (E470b), and lactose monohydrate in the tablet core, as well as talc (E553b), hypromellose (E464), titanium dioxide (E171), and macrogol 8000 in the film-coating.

### **What Arava looks like and contents of the pack**

Arava 10 mg film-coated tablets are white to almost white and round.

Imprint on one side: ZBN.

The tablets are packed in blisters or bottles.

Packs of 30 and 100 tablets are available.

Not all pack size may be marketed.

### **Marketing Authorisation Holder**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

### **Manufacturer**

Sanofi Winthrop Industrie  
56, Route de Choisy au Bac  
F-60205 Compiègne Cedex  
France

For any information about this medicine, please contact the local representative of the Marketing Authorisation Holder.

**België/Belgique/Belgien**

Sanofi Belgium  
Tél/Tel: +32 (0)2 710 54 00

**България**

SANOFI BULGARIA EOOD  
Тел.: +359 (0)2 970 53 00

**Česká republika**

sanofi-aventis, s.r.o.  
Tel: +420 233 086 111

**Danmark**

sanofi-aventis Denmark A/S  
Tlf: +45 45 16 70 00

**Deutschland**

Sanofi-Aventis Deutschland GmbH  
Tel: +49 (0)180 2 222010

**Eesti**

sanofi-aventis Estonia OÜ  
Tel: +372 627 34 88

**Ελλάδα**

sanofi-aventis AEBE  
Τηλ: +30 210 900 16 00

**España**

sanofi-aventis, S.A.  
Tel: +34 93 485 94 00

**France**

sanofi-aventis france  
Tél: 0 800 222 555  
Appel depuis l'étranger : +33 1 57 63 23 23

**Hrvatska**

sanofi-aventis Croatia d.o.o.  
Tel: +385 1 600 34 00

**Ireland**

sanofi-aventis Ireland Ltd. T/A SANOFI  
Tel: +353 (0) 1 403 56 00

**Ísland**

Vistor hf.  
Sími: +354 535 7000

**Italia**

Sanofi S.p.A.  
Tel: 800 536389

**Lietuva**

UAB "SANOFI-AVENTIS LIETUVA"  
Tel: +370 5 2755224

**Luxembourg/Luxemburg**

Sanofi Belgium  
Tél/Tel: +32 (0)2 710 54 00 (Belgique/Belgien)

**Magyarország**

SANOFI-AVENTIS Zrt.  
Tel.: +36 1 505 0050

**Malta**

Sanofi Malta Ltd.  
Tel: +356 21493022

**Nederland**

sanofi-aventis Netherlands B.V.  
Tel: +31 (0)182 557 755

**Norge**

sanofi-aventis Norge AS  
Tlf: +47 67 10 71 00

**Österreich**

sanofi-aventis GmbH  
Tel: +43 1 80 185 – 0

**Polska**

sanofi-aventis Sp. z o.o.  
Tel.: +48 22 280 00 00

**Portugal**

Sanofi - Produtos Farmacêuticos, Lda  
Tel: +351 21 35 89 400

**România**

Sanofi Romania SRL  
Tel: +40 (0) 21 317 31 36

**Slovenija**

sanofi-aventis d.o.o.  
Tel: +386 1 560 48 00

**Slovenská republika**

sanofi-aventis Pharma Slovakia s.r.o.  
Tel: +421 2 33 100 100

**Suomi/Finland**

Sanofi Oy  
Puh/Tel: +358 (0) 201 200 300

**Κύπρος**

sanofi-aventis Cyprus Ltd.

Τηλ: +357 22 871600

**Sverige**

Sanofi AB

Tel: +46 (0)8 634 50 00

**Latvija**

sanofi-aventis Latvia SIA

Tel: +371 67 33 24 51

**United Kingdom**

Sanofi

Tel: +44 (0) 845 372 7101

**This leaflet was last revised in {MM/YYYY}****Other sources of information**

Detailed information on this medicine is available on the European Medicines Agency web site:

<http://www.ema.europa.eu/>.

## Package leaflet: Information for the user

### Arava 20 mg film-coated tablets leflunomide

**Read all of this leaflet carefully before you start taking this medicine because it contains important information for you.**

- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor, pharmacist or nurse.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

#### **What is in this leaflet**

1. What Arava is and what it is used for
2. What you need to know before you take Arava
3. How to take Arava
4. Possible side effects
5. How to store Arava
6. Contents of the pack and other information

#### **1. What Arava is and what it is used for**

Arava belongs to a group of medicines called anti-rheumatic medicines. It contains the active substance leflunomide.

Arava is used to treat adult patients with active rheumatoid arthritis or with active psoriatic arthritis.

Symptoms of rheumatoid arthritis include inflammation of joints, swelling, difficulty moving and pain. Other symptoms that affect the entire body include loss of appetite, fever, loss of energy and anaemia (lack of red blood cells).

Symptoms of active psoriatic arthritis include inflammation of joints, swelling, difficulty moving, pain and patches of red, scaly skin (skin lesions).

#### **2. What you need to know before you take Arava**

##### **Do not take Arava**

- if you have ever had an **allergic** reaction to leflunomide (especially a serious skin reaction, often accompanied by fever, joint pain, red skin stains, or blisters e.g. Stevens-Johnson syndrome) or to any of the other ingredients of this medicine (listed in section 6), or if you are allergic to teriflunomide (used to treat multiple sclerosis),
- if you have any **liver problems**,
- if you have moderate to severe **kidney problems**,
- if you have severely low numbers of **proteins in your blood** (hypoproteinaemia),
- if you suffer from any problem which affects your **immune system** (e.g. AIDS),
- if you have any problem with your **bone marrow**, or if you have low numbers of red or white cells in your blood or a reduced number of blood platelets,
- if you are suffering from a **serious infection**,
- if you are **pregnant**, think you may be pregnant, or are breast-feeding.

## Warnings and precautions

Talk to your doctor, pharmacist or nurse before taking Arava

- if you have ever suffered from **inflammation of the lung** (interstitial lung disease).
- if you have ever had **tuberculosis** or if you have been in close contact with someone who has or has had tuberculosis. Your doctor may perform tests to see if you have tuberculosis.
- if you are **male** and wish to father a child. As it can not be excluded that Arava passes into semen, reliable contraception should be used during treatment with Arava. Men wishing to father a child should contact their doctor who may advise them to stop taking Arava and take certain medicines to remove Arava rapidly and sufficiently from their body. You will then need a blood test to make sure that Arava has been sufficiently removed from your body, and you should then wait for at least another 3 months before attempting to father a child.
- if you are due to have a specific blood test (calcium level). Falsely low levels of calcium can be detected.

Arava can occasionally cause some problems with your blood, liver, lungs, or nerves in your arms or legs. It may also cause some serious allergic reactions (including Drug Reaction with Eosinophilia and Systemic Symptoms [DRESS]), or increase the chance of a severe infection. For more information on these, please read section 4 (Possible side effects).

DRESS appears initially as flu-like symptoms and a rash on the face then an extended rash with a high temperature, increased levels of liver enzymes seen in blood tests and an increase in a type of white blood cell (eosinophilia) and enlarged lymph nodes.

Your doctor will carry out **blood tests** at regular intervals, before and during treatment with Arava, to monitor your blood cells and liver. Your doctor will also check your blood pressure regularly as Arava can cause an increase in blood pressure.

Tell your doctor if you have unexplained chronic diarrhoea. Your doctor may perform additional tests for differential diagnosis.

## Children and adolescents

**Arava is not recommended for use in children and adolescents below 18 years of age.**

## Other medicines and Arava

Please tell your doctor or pharmacist if you are taking, have recently taken or might take any other medicines. This includes medicines obtained without a prescription.

This is especially important if you are taking:

- other medicines for rheumatoid arthritis such as antimalarials (e.g. chloroquine and hydroxychloroquine), intramuscular or oral gold, D-penicillamine, azathioprine and other immunosuppressive medicines (e.g. methotrexate) as these combinations are not advisable,
- warfarin and other oral medicines used to thin the blood, as monitoring is necessary to reduce the risk of side effects of this medicine
- teriflunomide for multiple sclerosis
- repaglinide, pioglitazone, nateglinide, or rosiglitazone for diabetes
- daunorubicin, doxorubicin, paclitaxel, or topotecan for cancer
- duloxetine for depression, urinary incontinence or in kidney disease in diabetics
- alosetron for the management of severe diarrhoea
- theophylline for asthma
- tizanidine, a muscle relaxant
- oral contraceptives (containing ethinylestradiol and levonorgestrel)
- cefaclor, benzylpenicillin (penicillin G), ciprofloxacin for infections
- indomethacin, ketoprofen for pain or inflammation
- furosemide for heart disease (diuretic, water pill)
- zidovudine for HIV infection

- rosuvastatin, simvastatin, atorvastatin, pravastatin for hypercholesterolemia (high cholesterol)
- sulfasalazine for inflammatory bowel disease or rheumatoid arthritis
- a medicine called colestyramine (used to reduce high cholesterol) or activated charcoal as these medicines can reduce the amount of Arava which is absorbed by the body.

If you are already taking a nonsteroidal **anti-inflammatory** drug (NSAID) and/or **corticosteroids**, you may continue to take them after starting Arava.

### **Vaccinations**

If you have to be vaccinated, ask your doctor for advice. Certain vaccinations should not be given while taking Arava, and for a certain amount of time after stopping treatment.

### **Arava with food, drink and alcohol**

Arava may be taken with or without food.

It is not recommended to drink alcohol during treatment with Arava. Drinking alcohol while taking Arava may increase the chance of liver damage.

### **Pregnancy and breast-feeding**

**Do not** take Arava if you are, or think you may be **pregnant**. If you are pregnant or become pregnant while taking Arava, the risk of having a baby with serious birth defects is increased. Women of childbearing potential must not take Arava without using reliable contraceptive measures.

Tell your doctor if you plan to become pregnant after stopping treatment with Arava, as you need to ensure that all traces of Arava have left your body before trying to become pregnant. This may take up to 2 years. This may be reduced to a few weeks by taking certain medicines which speed up removal of Arava from your body.

In either case it should be confirmed by a blood test that Arava has been sufficiently removed from your body and you should then wait for at least another month before you become pregnant.

For further information on the laboratory testing please contact your doctor.

If you suspect that you are pregnant while taking Arava or in the two years after you have stopped treatment, you must contact your doctor **immediately** for a pregnancy test. If the test confirms that you are pregnant, your doctor may suggest treatment with certain medicines to remove Arava rapidly and sufficiently from your body, as this may decrease the risk to your baby.

**Do not** take Arava when you are **breast-feeding**, as leflunomide passes into the breast milk.

### **Driving and using machines**

Arava can make you feel dizzy which may impair your ability to concentrate and react. If you are affected, do not drive, or use machines.

### **Arava contains lactose**

If you have been told by your doctor that you have an intolerance to some sugars, contact your doctor before taking this medicine.

## **3. How to take Arava**

Always take this medicine exactly as your doctor or pharmacist has told you. Check with your doctor or pharmacist if you are not sure.

The usual starting dose of Arava is one 100 mg tablet once daily for the first three days. After this, most patients need a dose of:

- For rheumatoid arthritis: 10 or 20 mg Arava once daily, depending on the severity of the disease.

- For psoriatic arthritis: 20 mg Arava once daily.

Swallow the tablet **whole** and with plenty of **water**.

It may take about 4 weeks or longer until you start to feel an improvement in your condition. Some patients may even still feel further improvements after 4 to 6 months of therapy. You will normally take Arava over long periods of time.

#### **If you take more Arava than you should**

If you take more Arava than you should, contact your doctor or get other medical advice. If possible, take your tablets or the box with you to show the doctor.

#### **If you forget to take Arava**

If you forget to take a dose, take it as soon as you remember, unless it is nearly time for your next dose. Do not take a double dose to make up for a forgotten dose.

If you have any further questions on the use of this medicine, ask your doctor, pharmacist or nurse.

## **4. Possible side effects**

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Tell your doctor **immediately** and stop taking Arava:

- if you experience **weakness**, feel light-headed or dizzy or have **difficulty breathing**, as these may be signs of a serious allergic reaction,
- if you develop a **skin rash** or **ulcers in your mouth**, as these may indicate severe, sometimes life-threatening reactions (e.g. Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme, Drug Reaction with Eosinophilia and Systemic Symptoms [DRESS]), see section 2.

Tell your doctor **immediately** if you experience:

- **pale skin, tiredness, or bruising**, as these may indicate blood disorders caused by an imbalance in the different types of blood cells which make up blood,
- **tiredness, abdominal pain, or jaundice** (yellow discolouration of the eyes or skin), as these may indicate serious conditions such as liver failure, which may be fatal,
- any symptoms of an **infection** such as **fever, sore throat or cough**, as this medicine may increase the chance of a severe infection which may be life-threatening,
- **cough or breathing problems** as these may indicate problems of the lung (interstitial lung disease or pulmonary hypertension),
- unusual tingling, weakness or pain in your hands or feet as these may indicate problems with your nerves (peripheral neuropathy).

#### **Common side effects (may affect up to 1 in 10 people)**

- a slight decrease in the number of white blood cells (leucopenia),
- mild allergic reactions,
- loss of appetite, weight loss (usually insignificant),
- tiredness (asthenia),
- headache, dizziness,
- abnormal skin sensations like tingling (paraesthesia),
- mild increase in blood pressure,
- colitis,
- diarrhoea,
- nausea, vomiting,
- inflammation of the mouth or mouth ulcers,
- abdominal pain,

- an increase in some liver test results,
- increased hair loss,
- eczema, dry skin, rash, itching,
- tendonitis (pain caused by inflammation in the membrane surrounding the tendons usually in the feet or hands),
- an increase of certain enzymes in the blood (creatine phosphokinase),
- problems in the nerves of the arms or legs (peripheral neuropathy).

#### **Uncommon side effects (may affect up to 1 in 100 people)**

- a decrease in the number of red blood cells (anaemia) and a decrease in the number of blood platelets (thrombocytopenia),
- a decrease in the levels of potassium in the blood,
- anxiety,
- taste disturbances,
- urticaria (nettle rash),
- tendon rupture,
- an increase in the levels of fat in the blood (cholesterol and triglycerides),
- a decrease in the levels of phosphate in the blood.

#### **Rare side effects (may affect up to 1 in 1,000 people)**

- an increase in the numbers of blood cells called eosinophiles (eosinophilia); mild decrease in the number of white blood cells (leucopenia); decrease in the number of all blood cells (pancytopenia),
- severe increase in blood pressure,
- inflammation of the lung (interstitial lung disease),
- an increase in some liver results which may develop into serious conditions such as hepatitis and jaundice,
- severe infections called sepsis which may be fatal,
- an increase of certain enzymes in the blood (lactate dehydrogenase).

#### **Very rare side effects (may affect up to 1 in 10,000 people)**

- a marked decrease of some white blood cells (agranulocytosis),
- severe and potentially severe allergic reactions,
- inflammation of the small vessels (vasculitis, including cutaneous necrotizing vasculitis),
- inflammation of the pancreas (pancreatitis),
- severe liver injury such as liver failure or necrosis which may be fatal,
- severe sometimes life-threatening reactions (Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme).

Other side effects such as kidney failure, a decrease in the levels of uric acid in your blood, pulmonary hypertension, male infertility (which is reversible once treatment with this medicine is stopped), cutaneous lupus (characterized by rash/erythema on skin areas that are exposed to light), psoriasis (new or worsening) and DRESS may also occur with an unknown frequency.

#### **Reporting of side effects**

If you get any side effects, talk to your doctor or pharmacist. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via [the national reporting system listed in Appendix V](#). By reporting side effects you can help provide more information on the safety of this medicine.

## **5. How to store Arava**

Keep this medicine out of the sight and reach of children.



Do not use this medicine after the expiry date which is stated on the packaging.  
The expiry date refers to the last day of that month.

Blister: Store in the original package.

Bottle: Keep the bottle tightly closed.

Do not throw away any medicines via wastewater or household waste. Ask your pharmacist how to throw away medicines you no longer use. These measures will help protect the environment.

## **6. Contents of the pack and other information**

### **What Arava contains**

- The active substance is leflunomide. One film-coated tablet contains 20 mg of leflunomide
- The other ingredients are: maize starch, povidone (E1201), crospovidone (E1202), silica colloidal anhydrous, magnesium stearate (E470b), and lactose monohydrate in the tablet core, as well as talc (E553b), hypromellose (E464), titanium dioxide (E171), macrogol 8000 and yellow ferric oxide (E172) in the film-coating.

### **What Arava looks like and contents of the pack**

Arava 20 mg film-coated tablets are yellowish to ochre and triangular.

Imprint on one side: ZBO.

The tablets are packed in blisters or bottles.  
Packs of 30, 50 and 100 tablets are available.

Not all pack size may be marketed.

### **Marketing Authorisation Holder**

Sanofi-Aventis Deutschland GmbH  
D-65926 Frankfurt am Main  
Germany

### **Manufacturer**

Sanofi Winthrop Industrie  
56, Route de Choisy au Bac  
F-60205 Compiègne Cedex  
France

For any information about this medicine, please contact the local representative of the Marketing Authorisation Holder.

**België/Belgique/Belgien**

Sanofi Belgium  
Tél/Tel: +32 (0)2 710 54 00

**България**

SANOFI BULGARIA EOOD  
Тел.: +359 (0)2 970 53 00

**Česká republika**

sanofi-aventis, s.r.o.  
Tel: +420 233 086 111

**Danmark**

sanofi-aventis Denmark A/S  
Tlf: +45 45 16 70 00

**Deutschland**

Sanofi-Aventis Deutschland GmbH  
Tel: +49 (0)180 2 222010

**Eesti**

sanofi-aventis Estonia OÜ  
Tel: +372 627 34 88

**Ελλάδα**

sanofi-aventis AEBE  
Τηλ: +30 210 900 16 00

**España**

sanofi-aventis, S.A.  
Tel: +34 93 485 94 00

**France**

sanofi-aventis france  
Tél: 0 800 222 555  
Appel depuis l'étranger : +33 1 57 63 23 23

**Hrvatska**

sanofi-aventis Croatia d.o.o.  
Tel: +385 1 600 34 00

**Ireland**

sanofi-aventis Ireland Ltd. T/A SANOFI  
Tel: +353 (0) 1 403 56 00

**Ísland**

Vistor hf.  
Sími: +354 535 7000

**Italia**

Sanofi S.p.A.  
Tel: 800 536389

**Lietuva**

UAB "SANOFI-AVENTIS LIETUVA"  
Tel: +370 5 2755224

**Luxembourg/Luxemburg**

Sanofi Belgium  
Tél/Tel: +32 (0)2 710 54 00 (Belgique/Belgien)

**Magyarország**

SANOFI-AVENTIS Zrt.  
Tel.: +36 1 505 0050

**Malta**

Sanofi Malta Ltd.  
Tel: +356 21493022

**Nederland**

sanofi-aventis Netherlands B.V.  
Tel: +31 (0)182 557 755

**Norge**

sanofi-aventis Norge AS  
Tlf: +47 67 10 71 00

**Österreich**

sanofi-aventis GmbH  
Tel: +43 1 80 185 – 0

**Polska**

sanofi-aventis Sp. z o.o.  
Tel.: +48 22 280 00 00

**Portugal**

Sanofi - Produtos Farmacêuticos, Lda  
Tel: +351 21 35 89 400

**România**

Sanofi Romania SRL  
Tel: +40 (0) 21 317 31 36

**Slovenija**

sanofi-aventis d.o.o.  
Tel: +386 1 560 48 00

**Slovenská republika**

sanofi-aventis Pharma Slovakia s.r.o.  
Tel: +421 2 33 100 100

**Suomi/Finland**

Sanofi Oy  
Puh/Tel: +358 (0) 201 200 300

**Κύπρος**

sanofi-aventis Cyprus Ltd.  
Τηλ: +357 22 871600

**Sverige**

Sanofi AB  
Tel: +46 (0)8 634 50 00

**Latvija**

sanofi-aventis Latvia SIA  
Tel: +371 67 33 24 51

**United Kingdom**

Sanofi  
Tel: +44 (0) 845 372 7101

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**Other sources of information**

Detailed information on this medicine is available on the European Medicines Agency web site:  
<http://www.ema.europa.eu/>.

## Package leaflet: Information for the user

### Arava 100 mg film-coated tablets leflunomide

**Read all of this leaflet carefully before you start taking this medicine because it contains important information for you.**

- Keep this leaflet. You may need to read it again.
- If you have any further questions, ask your doctor, pharmacist or nurse.
- This medicine has been prescribed for you only. Do not pass it on to others. It may harm them, even if their signs of illness are the same as yours.
- If you get any side effects, talk to your doctor, pharmacist or nurse. This includes any possible side effects not listed in this leaflet. See section 4.

#### **What is in this leaflet**

1. What Arava is and what it is used for
2. What you need to know before you take Arava
3. How to take Arava
4. Possible side effects
5. How to store Arava
6. Contents of the pack and other information

#### **1. What Arava is and what it is used for**

Arava belongs to a group of medicines called anti-rheumatic medicines. It contains the active substance leflunomide.

Arava is used to treat adult patients with active rheumatoid arthritis or with active psoriatic arthritis.

Symptoms of rheumatoid arthritis include inflammation of joints, swelling, difficulty moving and pain. Other symptoms that affect the entire body include loss of appetite, fever, loss of energy and anaemia (lack of red blood cells).

Symptoms of active psoriatic arthritis include inflammation of joints, swelling, difficulty moving, pain and patches of red, scaly skin (skin lesions).

#### **2. What you need to know before you take Arava**

##### **Do not take Arava**

- if you have ever had an **allergic** reaction to leflunomide (especially a serious skin reaction, often accompanied by fever, joint pain, red skin stains, or blisters e.g. Stevens-Johnson syndrome) or to any of the other ingredients of this medicine (listed in section 6), or if you are allergic to teriflunomide (used to treat multiple sclerosis),
- if you have any **liver problems**,
- if you have moderate to severe **kidney problems**,
- if you have severely low numbers of **proteins in your blood** (hypoproteinaemia),
- if you suffer from any problem which affects your **immune system** (e.g. AIDS),
- if you have any problem with your **bone marrow**, or if you have low numbers of red or white cells in your blood or a reduced number of blood platelets,
- if you are suffering from a **serious infection**,
- if you are **pregnant**, think you may be pregnant, or are breast-feeding.

## Warnings and precautions

Talk to your doctor, pharmacist or nurse before taking Arava

- if you have ever suffered from **inflammation of the lung** (interstitial lung disease).
- if you have ever had **tuberculosis** or if you have been in close contact with someone who has or has had tuberculosis. Your doctor may perform tests to see if you have tuberculosis.
- if you are **male** and wish to father a child. As it can not be excluded that Arava passes into semen, reliable contraception should be used during treatment with Arava. Men wishing to father a child should contact their doctor who may advise them to stop taking Arava and take certain medicines to remove Arava rapidly and sufficiently from their body. You will then need a blood test to make sure that Arava has been sufficiently removed from your body, and you should then wait for at least another 3 months before attempting to father a child.
- if you are due to have a specific blood test (calcium level). Falsely low levels of calcium can be detected.

Arava can occasionally cause some problems with your blood, liver, lungs, or nerves in your arms or legs. It may also cause some serious allergic reactions (including Drug Reaction with Eosinophilia and Systemic Symptoms [DRESS]), or increase the chance of a severe infection. For more information on these, please read section 4 (Possible side effects).

DRESS appears initially as flu-like symptoms and a rash on the face then an extended rash with a high temperature, increased levels of liver enzymes seen in blood tests and an increase in a type of white blood cell (eosinophilia) and enlarged lymph nodes.

Your doctor will carry out **blood tests** at regular intervals, before and during treatment with Arava, to monitor your blood cells and liver. Your doctor will also check your blood pressure regularly as Arava can cause an increase in blood pressure.

Tell your doctor if you have unexplained chronic diarrhoea. Your doctor may perform additional tests for differential diagnosis.

## Children and adolescents

**Arava is not recommended for use in children and adolescents below 18 years of age.**

## Other medicines and Arava

Please tell your doctor or pharmacist if you are taking, have recently taken or might take any other medicines. This includes medicines obtained without a prescription.

This is especially important if you are taking:

- other medicines for rheumatoid arthritis such as antimalarials (e.g. chloroquine and hydroxychloroquine), intramuscular or oral gold, D-penicillamine, azathioprine and other immunosuppressive medicines (e.g. methotrexate) as these combinations are not advisable,
- warfarin and other oral medicines used to thin the blood, as monitoring is necessary to reduce the risk of side effects of this medicine
- teriflunomide for multiple sclerosis
- repaglinide, pioglitazone, nateglinide, or rosiglitazone for diabetes
- daunorubicin, doxorubicin, paclitaxel, or topotecan for cancer
- duloxetine for depression, urinary incontinence or in kidney disease in diabetics
- alosetron for the management of severe diarrhoea
- theophylline for asthma
- tizanidine, a muscle relaxant
- oral contraceptives (containing ethinylestradiol and levonorgestrel)
- cefaclor, benzylpenicillin (penicillin G), ciprofloxacin for infections
- indomethacin, ketoprofen for pain or inflammation
- furosemide for heart disease (diuretic, water pill)
- zidovudine for HIV infection
- rosuvastatin, simvastatin, atorvastatin, pravastatin for hypercholesterolemia (high cholesterol)

- sulfasalazine for inflammatory bowel disease or rheumatoid arthritis
- a medicine called colestyramine (used to reduce high cholesterol) or activated charcoal as these medicines can reduce the amount of Arava which is absorbed by the body.

If you are already taking a nonsteroidal **anti-inflammatory** drug (NSAID) and/or **corticosteroids**, you may continue to take them after starting Arava.

### **Vaccinations**

If you have to be vaccinated, ask your doctor for advice. Certain vaccinations should not be given while taking Arava, and for a certain amount of time after stopping treatment.

### **Arava with food, drink and alcohol**

Arava may be taken with or without food.

It is not recommended to drink alcohol during treatment with Arava. Drinking alcohol while taking Arava may increase the chance of liver damage.

### **Pregnancy and breast-feeding**

**Do not** take Arava if you are, or think you may be **pregnant**. If you are pregnant or become pregnant while taking Arava, the risk of having a baby with serious birth defects is increased. Women of childbearing potential must not take Arava without using reliable contraceptive measures.

Tell your doctor if you plan to become pregnant after stopping treatment with Arava, as you need to ensure that all traces of Arava have left your body before trying to become pregnant. This may take up to 2 years. This may be reduced to a few weeks by taking certain medicines which speed up removal of Arava from your body.

In either case it should be confirmed by a blood test that Arava has been sufficiently removed from your body and you should then wait for at least another month before you become pregnant.

For further information on the laboratory testing please contact your doctor.

If you suspect that you are pregnant while taking Arava or in the two years after you have stopped treatment, you must contact your doctor **immediately** for a pregnancy test. If the test confirms that you are pregnant, your doctor may suggest treatment with certain medicines to remove Arava rapidly and sufficiently from your body, as this may decrease the risk to your baby.

**Do not** take Arava when you are **breast-feeding**, as leflunomide passes into the breast milk.

### **Driving and using machines**

Arava can make you feel dizzy which may impair your ability to concentrate and react. If you are affected, do not drive, or use machines.

### **Arava contains lactose**

If you have been told by your doctor that you have an intolerance to some sugars, contact your doctor before taking this medicine.

## **3. How to take Arava**

Always take this medicine exactly as your doctor or pharmacist has told you. Check with your doctor or pharmacist if you are not sure.

The usual starting dose of Arava is one 100 mg tablet once daily for the first three days. After this, most patients need a dose of:

- For rheumatoid arthritis: 10 or 20 mg Arava once daily, depending on the severity of the disease.
- For psoriatic arthritis: 20 mg Arava once daily.

**Swallow** the tablet **whole** and with plenty of **water**.

It may take about 4 weeks or longer until you start to feel an improvement in your condition. Some patients may even still feel further improvements after 4 to 6 months of therapy.

You will normally take Arava over long periods of time.

#### **If you take more Arava than you should**

If you take more Arava than you should, contact your doctor or get other medical advice. If possible, take your tablets or the box with you to show the doctor.

#### **If you forget to take Arava**

If you forget to take a dose, take it as soon as you remember, unless it is nearly time for your next dose. Do not take a double dose to make up for a forgotten dose.

If you have any further questions on the use of this medicine, ask your doctor, pharmacist or nurse.

## **4. Possible side effects**

Like all medicines, this medicine can cause side effects, although not everybody gets them.

Tell your doctor **immediately** and stop taking Arava:

- if you experience **weakness**, feel light-headed or dizzy or have **difficulty breathing**, as these may be signs of a serious allergic reaction,
- if you develop a **skin rash** or **ulcers in your mouth**, as these may indicate severe, sometimes life-threatening reactions (e.g. Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme, Drug Reaction with Eosinophilia and Systemic Symptoms [DRESS]), see section 2.

Tell your doctor **immediately** if you experience:

- **pale skin, tiredness, or bruising**, as these may indicate blood disorders caused by an imbalance in the different types of blood cells which make up blood,
- **tiredness, abdominal pain, or jaundice** (yellow discolouration of the eyes or skin), as these may indicate serious conditions such as liver failure, which may be fatal,
- any symptoms of an **infection** such as **fever, sore throat or cough**, as this medicine may increase the chance of a severe infection which may be life-threatening,
- **cough** or **breathing problems** as these may indicate problems of the lung (interstitial lung disease or pulmonary hypertension),
- unusual tingling, weakness or pain in your hands or feet as these may indicate problems with your nerves (peripheral neuropathy).

#### **Common side effects (may affect up to 1 in 10 people)**

- a slight decrease in the number of white blood cells (leucopenia),
- mild allergic reactions,
- loss of appetite, weight loss (usually insignificant),
- tiredness (asthenia),
- headache, dizziness,
- abnormal skin sensations like tingling (paraesthesia),
- mild increase in blood pressure,
- colitis,
- diarrhoea,
- nausea, vomiting,
- inflammation of the mouth or mouth ulcers,
- abdominal pain,
- an increase in some liver test results,

- increased hair loss,
- eczema, dry skin, rash, itching,
- tendonitis (pain caused by inflammation in the membrane surrounding the tendons usually in the feet or hands),
- an increase of certain enzymes in the blood (creatine phosphokinase),
- problems in the nerves of the arms or legs (peripheral neuropathy).

#### **Uncommon side effects (may affect up to 1 in 100 people)**

- a decrease in the number of red blood cells (anaemia) and a decrease in the number of blood platelets (thrombocytopenia),
- a decrease in the levels of potassium in the blood,
- anxiety,
- taste disturbances,
- urticaria (nettle rash),
- tendon rupture,
- an increase in the levels of fat in the blood (cholesterol and triglycerides),
- a decrease in the levels of phosphate in the blood.

#### **Rare side effects (may affect up to 1 in 1,000 people)**

- an increase in the numbers of blood cells called eosinophiles (eosinophilia); mild decrease in the number of white blood cells (leucopenia); decrease in the number of all blood cells (pancytopenia),
- severe increase in blood pressure,
- inflammation of the lung (interstitial lung disease),
- an increase in some liver results which may develop into serious conditions such as hepatitis and jaundice,
- severe infections called sepsis which may be fatal,
- an increase of certain enzymes in the blood (lactate dehydrogenase).

#### **Very rare side effects (may affect up to 1 in 10,000 people)**

- a marked decrease of some white blood cells (agranulocytosis),
- severe and potentially severe allergic reactions,
- inflammation of the small vessels (vasculitis, including cutaneous necrotizing vasculitis),
- inflammation of the pancreas (pancreatitis),
- severe liver injury such as liver failure or necrosis which may be fatal,
- severe sometimes life-threatening reactions (Stevens-Johnson syndrome, toxic epidermal necrolysis, erythema multiforme).

Other side effects such as kidney failure, a decrease in the levels of uric acid in your blood, pulmonary hypertension, male infertility (which is reversible once treatment with this medicine is stopped), cutaneous lupus (characterized by rash/erythema on skin areas that are exposed to light), psoriasis (new or worsening) and DRESS may also occur with an unknown frequency.

#### **Reporting of side effects**

If you get any side effects, talk to your doctor or pharmacist. This includes any possible side effects not listed in this leaflet. You can also report side effects directly via [the national reporting system listed in Appendix V](#). By reporting side effects you can help provide more information on the safety of this medicine.

## **5. How to store Arava**

Keep this medicine out of the sight and reach of children.

Do not use this medicine after the expiry date which is stated on the packaging.



The expiry date refers to the last day of that month.

Store in the original package

Do not throw away any medicines via wastewater or household waste. Ask your pharmacist how to throw away medicines you no longer use. These measures will help protect the environment.

## **6. Contents of the pack and other information**

### **What Arava contains**

- The active substance is leflunomide. One film-coated tablet contains 100 mg of leflunomide.
- The other ingredients are: maize starch, povidone (E1201), crospovidone (E1202), talc (E553b), silica colloidal anhydrous, magnesium stearate (E470b), and lactose monohydrate in the tablet core, as well as talc (E553b), hypromellose (E464), titanium dioxide (E171), and macrogol 8000 in the film-coating.

### **What Arava looks like and contents of the pack**

Arava 100 mg film-coated tablets are white to almost white and round.

Imprint on one side: ZBP

The tablets are packed in blisters.

A pack of 3 tablets is available

### **Marketing Authorisation Holder**

Sanofi-Aventis Deutschland GmbH

D-65926 Frankfurt am Main

Germany

### **Manufacturer**

Sanofi Winthrop Industrie

56, Route de Choisy au Bac

F-60205 Compiègne Cedex

France

For any information about this medicine, please contact the local representative of the Marketing Authorisation Holder.

**België/Belgique/Belgien**

Sanofi Belgium  
Tél/Tel: +32 (0)2 710 54 00

**България**

SANOFI BULGARIA EOOD  
Тел.: +359 (0)2 970 53 00

**Česká republika**

sanofi-aventis, s.r.o.  
Tel: +420 233 086 111

**Danmark**

sanofi-aventis Denmark A/S  
Tlf: +45 45 16 70 00

**Deutschland**

Sanofi-Aventis Deutschland GmbH  
Tel: +49 (0)180 2 222010

**Eesti**

sanofi-aventis Estonia OÜ  
Tel: +372 627 34 88

**Ελλάδα**

sanofi-aventis AEBE  
Τηλ: +30 210 900 16 00

**España**

sanofi-aventis, S.A.  
Tel: +34 93 485 94 00

**France**

sanofi-aventis france  
Tél: 0 800 222 555  
Appel depuis l'étranger : +33 1 57 63 23 23

**Hrvatska**

sanofi-aventis Croatia d.o.o.  
Tel: +385 1 600 34 00

**Ireland**

sanofi-aventis Ireland Ltd. T/A SANOFI  
Tel: +353 (0) 1 403 56 00

**Ísland**

Vistor hf.  
Sími: +354 535 7000

**Italia**

Sanofi S.p.A.  
Tel: 800 536389

**Lietuva**

UAB "SANOFI-AVENTIS LIETUVA"  
Tel: +370 5 2755224

**Luxembourg/Luxemburg**

Sanofi Belgium  
Tél/Tel: +32 (0)2 710 54 00 (Belgique/Belgien)

**Magyarország**

SANOFI-AVENTIS Zrt.  
Tel.: +36 1 505 0050

**Malta**

Sanofi Malta Ltd.  
Tel: +356 21493022

**Nederland**

sanofi-aventis Netherlands B.V.  
Tel: +31 (0)182 557 755

**Norge**

sanofi-aventis Norge AS  
Tlf: +47 67 10 71 00

**Österreich**

sanofi-aventis GmbH  
Tel: +43 1 80 185 – 0

**Polska**

sanofi-aventis Sp. z o.o.  
Tel.: +48 22 280 00 00

**Portugal**

Sanofi - Produtos Farmacêuticos, Lda  
Tel: +351 21 35 89 400

**România**

Sanofi Romania SRL  
Tel: +40 (0) 21 317 31 36

**Slovenija**

sanofi-aventis d.o.o.  
Tel: +386 1 560 48 00

**Slovenská republika**

sanofi-aventis Pharma Slovakia s.r.o.  
Tel: +421 2 33 100 100

**Suomi/Finland**

Sanofi Oy  
Puh/Tel: +358 (0) 201 200 300

**Κύπρος**

sanofi-aventis Cyprus Ltd.  
Τηλ: +357 22 871600

**Sverige**

Sanofi AB  
Tel: +46 (0)8 634 50 00

**Latvija**

sanofi-aventis Latvia SIA  
Tel: +371 67 33 24 51

**United Kingdom**

Sanofi  
Tel: +44 (0) 845 372 7101

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**Other sources of information**

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