SUMMARY OF PRODUCT CHARACTERISTICS

1 NAME OF THE MEDICINAL PRODUCT
Tamoxifen 20mg Tablets

2 QUALITATIVE AND QUANTITATIVE COMPOSITION
Each tablet contains 20mg Tamoxifen (as citrate)
For the full list of excipients, see section 6.1

3 PHARMACEUTICAL FORM
Tablet
White to off-white, round, biconvex, tablets with scoring and ‘20’ embossed on one side.

4 CLINICAL PARTICULARS

4.1 Therapeutic indications
1. The treatment of breast cancer
2. The treatment of anovulatory infertility

4.2 Posology and method of administration
Posology
1. Breast cancer
Adults
The recommended daily dose of Tamoxifen is normally 20 mg. No additional benefit, in terms of delayed recurrence or improved survival in patients, has been demonstrated with higher doses. Substantive evidence supporting the use of treatment with 30-40 mg per day is not available, although these doses have been used in some patients with advanced disease.

Elderly
Similar dosing regimens of Tamoxifen have been used in elderly patients with breast cancer and in some of these patients it has been used as sole therapy.

2. Anovulatory Infertility
Before commencing any course of treatment, whether initial or subsequent, the possibility of pregnancy must be excluded. In women who are menstruating regularly, but with anovular cycles, the initial course of treatment consists of 20 mg given daily on the second, third, fourth and fifth days of the menstrual cycle. If unsatisfactory basal temperature records or poor pre-ovulatory cervical mucus indicate that this initial course of treatment has been unsuccessful, further courses may be given during subsequent menstrual periods, increasing the dosage to 40 mg and then to 80 mg daily. In women who are not menstruating regularly, the initial course may begin on any day. If no signs of ovulation are demonstrable, then a subsequent course of treatment may start 45 days later, with dosage increased as above. If a patient responds with menstruation, then the next course of treatment is commenced on the second day of the cycle.

Paediatric population
The use of Tamoxifen is not recommended in children, as safety and efficacy have not been established (see sections 5.1 and 5.2).

Method of administration
For administration by the oral route

4.3 Contraindications
Tamoxifen Tablets should not be used in the following:

- pregnancy: Pre-menopausal patients must be carefully examined before treatment for breast cancer or infertility to exclude the possibility of pregnancy (see also Section 4.6).
- hypersensitivity to the active substance or to any of the excipients listed in section 6.1.
- Concurrent anastrozole therapy (see section 4.5).
- treatment for infertility: Patients with a personal or family history of confirmed idiopathic venous thromboembolic events or a known genetic defect.

4.4 Special warnings and precautions for use
Menstruation is suppressed in a proportion of pre-menopausal women receiving Tamoxifen for the treatment of breast cancer.

An increased incidence of endometrial changes including hyperplasia, polyps, cancer and uterine sarcoma (mostly malignant mixed Mullerian tumours), has been reported in association with Tamoxifen treatment. The underlying mechanism is unknown but may be related to the oestrogen-like effect properties of Tamoxifen. Any patient receiving or having previously received Tamoxifen who report abnormal gynaecological symptoms, especially vaginal bleeding, or who presents with menstrual irregularities, vaginal discharge and symptoms such as pelvic pain or pressure should be promptly investigated.

A number of second primary tumours, occurring at sites other than the endometrium and the opposite breast, have been reported in clinical trials, following the treatment
of breast cancer patients with tamoxifen. No causal link has been established and the clinical significance of these observations remains unclear.

Venous thromboembolism

- A 2-3-fold increase in the risk for VTE has been demonstrated in healthy tamoxifen-treated women (see section 4.8).

- In patients with breast cancer, prescribers should obtain careful histories with respect to the patient's personal and family history of VTE. If suggestive of a prothrombotic risk, patients should be screened for thrombophilic factors. Patients who test positive should be counselled regarding their thrombotic risk. The decision to use tamoxifen in these patients should be based on the overall risk to the patient. In selected patients, the use of tamoxifen with prophylactic anticoagulation may be justified (cross-reference section 4.5).

- The risk of VTE is further increased by severe obesity, increasing age and all other risk factors for VTE. The risks and benefits should be carefully considered for all patients before treatment with tamoxifen. In patients with breast cancer, this risk is also increased by concomitant chemotherapy (see section 4.5). Long-term anticoagulant prophylaxis may be justified for some patients with breast cancer who have multiple risk factors for VTE.

- Surgery and immobility: For patients being treated for infertility, tamoxifen should be stopped at least 6 weeks before surgery or long-term immobility (when possible) and re-started only when the patient is fully mobile. For patients with breast cancer, tamoxifen treatment should only be stopped if the risk of tamoxifen-induced thrombosis clearly outweighs the risks associated with interrupting treatment. All patients should receive appropriate thrombosis prophylactic measures and should include graduated compression stockings for the period of hospitalisation, early ambulation, if possible, and anti-coagulant treatment.

- If any patient presents with VTE, tamoxifen should be stopped immediately and appropriate anti-thrombosis measures initiated. In patients being treated for infertility, tamoxifen should not be re-started unless there is a compelling alternative explanation for their thrombotic event. In patients receiving tamoxifen for breast cancer, the decision to re-start tamoxifen should be made with respect to the overall risk for the patient. In selected patients with breast cancer, the continued use of tamoxifen with prophylactic anticoagulation may be justified.

- All patients should be advised to contact their doctors immediately if they become aware of any symptoms of VTE.

In delayed microsurgical breast reconstruction Tamoxifen may increase the risk of microvascular flap complications.

In an uncontrolled trial in 28 girls aged 2–10 years with McCune Albright Syndrome (MAS), who received 20 mg once a day for up to 12 months duration, mean uterine volume increased after 6 months of treatment and doubled at the end of the one-year study. While this finding is in line with the pharmacodynamic properties of tamoxifen, a causal relationship has not been established (see section 5.1).

In the literature it has been shown that CYP2D6 poor metabolisers have a lowered plasma level of endoxifen, one of the most important active metabolites of tamoxifen (see section 5.2).
Concomitant medications that inhibit (CYPD2D6 may lead to reduced concentrations of the active metabolite endoxifen. Therefore, potent inhibitors of CYP2D6 (e.g. paroxetine, fluoxetine, quinidine, cinacalcet or bupropion) should whenever possible be avoided during tamoxifen treatment (see section 4.5 and 5.2).

Radiation recall has been reported rarely in patients on Tamoxifen who have received prior radiotherapy. The reaction is usually reversible upon temporary cessation of therapy and re-challenge may result in a milder reaction. Treatment with Tamoxifen was continued in most cases.

4.5 Interaction with other medicinal products and other forms of interaction

When Tamoxifen Tablets are used in combination with coumarin-type anticoagulants, a significant increase in anticoagulant effect may occur. Where such co-administration is initiated, careful monitoring of the patient is recommended.

When Tamoxifen is used in combination with cytotoxic agents for the treatment of breast cancer, there is increased risk of thromboembolic events occurring. (See also Sections 4.4 and 4.8). Because of this increase in risk of VTE, thrombosis prophylaxis should be considered for these patients for the period of concomitant chemotherapy.

The use of tamoxifen in combination with anastrozole as adjuvant therapy has not shown improved efficacy compared with tamoxifen alone.

As tamoxifen is metabolised by cytochrome P450 3A4, care is required when co-administering with drugs, such as rifampicin, known to induce this enzyme as tamoxifen levels may be reduced. The clinical relevance of this reduction is unknown.

Pharmacokinetic interaction with CYP2D6 inhibitors, showing a reduction in plasma level of an active tamoxifen metabolite, 4-hydroxy-N-desmethyltamoxifen (endoxifen), has been reported in the literature.

Pharmacokinetic interaction with CYP2D6 inhibitors, showing a 65-75% reduction in plasma levels of one of the more active forms of the drug, i.e. endoxifen, has been reported in the literature.

Reduced efficacy of tamoxifen has been reported with concomitant usage of some SSRI antidepressants (e.g. paroxetine) in some studies. As a reduced effect of tamoxifen cannot be excluded, co-administration with potent CYP2D6 inhibitors (e.g. paroxetine, fluoxetine, quinidine, cinacalcet or bupropion) should whenever possible be avoided (see section 4.4 and 5.2).

4.6 Pregnancy and lactation

Pregnancy

Tamoxifen Tablets must not be administered during pregnancy. There have been a small number of reports of spontaneous abortions, birth defects and foetal deaths after women have taken tamoxifen, although no causal relationship has been established.
Reproductive toxicology studies in rats, rabbits and monkeys have shown no teratogenic potential.

In rodent models of foetal reproductive tract development, tamoxifen was associated with changes similar to those caused by oestradiol, ethynylestradiol, clomiphene and diethylstilboestrol (DES). Although the clinical relevance of these changes is unknown, some of them, especially vaginal adenosis, are similar to those seen in young women who were exposed to DES in utero and who have a 1 in 1000 risk of developing clear-cell carcinoma of the vagina or cervix. Only a small number of pregnant women have been exposed to tamoxifen. Such exposure has not been reported to cause subsequent vaginal adenosis or clear-cell carcinoma of the vagina or cervix in young women exposed in utero to tamoxifen.

Women should be advised not to become pregnant whilst taking Tamoxifen 10mg Tablets and should use barrier or other non-hormonal contraceptive methods if sexually active. Pre-menopausal patients must be carefully examined before treatment to exclude pregnancy. Women should be informed of the potential risks to the foetus, should they become pregnant whilst taking Tamoxifen 10mg Tablets or within two months of cessation of therapy.

**Breast-feeding**

It is not known if Tamoxifen Tablets is excreted in human milk and therefore the drug is not recommended during breast-feeding. The decision either to discontinue nursing or discontinue Tamoxifen Tablets should take into account the importance of the drug to the mother.

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

Tamoxifen is unlikely to impair the ability of patients to drive or operate machinery. However, fatigue has been reported with the use of Tamoxifen and caution should be observed when driving or using machinery while such symptoms persist.

### 4.8 Undesirable effects

Unless specified, the following frequency categories were calculated from the number of adverse events reported in a large phase III study conducted in 9366 postmenopausal women patients with operable breast cancer treated for 5 years and unless specified, no account was taken of the frequency within the comparative treatment group or whether the investigator considered it to be related to study medication.

#### Table 1: Adverse Drug Reactions (ADR) seen with Tamoxifen

<table>
<thead>
<tr>
<th>Frequency</th>
<th>System Organ Class (SOC)</th>
<th>ADR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Very common</strong></td>
<td><em>Gastrointestinal disorders</em></td>
<td><em>Nausea</em></td>
</tr>
<tr>
<td><em>(≥10%)</em></td>
<td><em>Metabolism and nutrition disorders</em></td>
<td><em>Fluid retention</em></td>
</tr>
<tr>
<td></td>
<td><em>Reproductive system and breast disorders</em></td>
<td><em>Vaginal bleeding</em></td>
</tr>
<tr>
<td>Frequency</td>
<td>System Organ Class (SOC)</td>
<td>Adverse Drug Reactions (ADR) seen with Tamoxifen</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td><strong>Skin and subcutaneous tissue disorders</strong></td>
<td>• Vaginal discharge</td>
</tr>
<tr>
<td></td>
<td><strong>Vascular disorders</strong></td>
<td>• Skin Rash</td>
</tr>
<tr>
<td></td>
<td><strong>General disorders and administration site conditions</strong></td>
<td>• Hot flushes</td>
</tr>
<tr>
<td>Common (≥1% and &lt;10%)</td>
<td><strong>Blood and lymphatic system disorders</strong></td>
<td>• Fatigue</td>
</tr>
<tr>
<td></td>
<td><strong>Eye disorders</strong></td>
<td>• Anaemia</td>
</tr>
<tr>
<td></td>
<td><strong>Immune system disorders</strong></td>
<td>• Cataracts</td>
</tr>
<tr>
<td></td>
<td><strong>Investigations</strong></td>
<td>• Retinopathy</td>
</tr>
<tr>
<td></td>
<td><strong>Musculoskeletal and connective tissue disorders</strong></td>
<td>• Hypersensitivity reactions</td>
</tr>
<tr>
<td></td>
<td><strong>Neoplasms benign, malignant and unspecified (incl cysts and polyps)</strong></td>
<td>• Elevated triglycerides</td>
</tr>
<tr>
<td></td>
<td><strong>Nervous system disorders</strong></td>
<td>• Leg cramp</td>
</tr>
<tr>
<td></td>
<td><strong>Reproductive system and breast disorders</strong></td>
<td>• Myalgia</td>
</tr>
<tr>
<td></td>
<td><strong>Skin and subcutaneous tissue disorders</strong></td>
<td>• Uterine fibroids</td>
</tr>
<tr>
<td></td>
<td><strong>Gastrointestinal disorders</strong></td>
<td>• Sensory disturbances (including paraesthesia and dysgeusia)</td>
</tr>
<tr>
<td></td>
<td><strong>Hepatobiliary disorders</strong></td>
<td>• Pruritus valvae</td>
</tr>
<tr>
<td></td>
<td><strong>Multiple SOC Terms</strong></td>
<td>• Endometrial changes (including hyperplasia and polyps)</td>
</tr>
<tr>
<td></td>
<td><strong>Uncommon</strong></td>
<td>• Alopecia</td>
</tr>
<tr>
<td></td>
<td><strong>Blood and lymphatic system</strong></td>
<td>• Thrombocytopenia</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Frequency</th>
<th>System Organ Class (SOC)</th>
<th>Adverse Drug Reactions (ADR) seen with Tamoxifen</th>
</tr>
</thead>
<tbody>
<tr>
<td>(≥ 0.1% and &lt;1%)</td>
<td>disorders</td>
<td>- Leukopenia</td>
</tr>
<tr>
<td></td>
<td>Eye disorders</td>
<td>- Visual disturbances</td>
</tr>
<tr>
<td></td>
<td>Gastrointestinal disorders</td>
<td>- Pancreatitis</td>
</tr>
<tr>
<td></td>
<td>Metabolism and nutrition disorders</td>
<td>- Hypercalcaemia (in patients with bony metastases)</td>
</tr>
<tr>
<td></td>
<td>Neoplasms benign, malignant and unspecified (incl cysts and polyps)</td>
<td>- Endometrial cancer</td>
</tr>
<tr>
<td></td>
<td>Respiratory, thoracic and mediastinal disorders</td>
<td>- Interstitial pneumonitis</td>
</tr>
<tr>
<td></td>
<td>Hepatobiliary disorders</td>
<td>- Cirrhosis of the liver</td>
</tr>
<tr>
<td>Rare (≥ 0.01% and &lt;0.1%)</td>
<td>Blood and lymphatic system disorders</td>
<td>- Neutropenia&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Eye disorders</td>
<td>- Agranulocytosis&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Neoplasms benign, malignant and unspecified (incl cysts and polyps)</td>
<td>- Corneal changes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Optic neuropathy&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Nervous system</td>
<td>- Uterine Sarcoma (mostly malignant mixed Mullerian tumours)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Hepatobiliary disorders</td>
<td>- Tumour Flare&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- OPTIC neuritis</td>
</tr>
<tr>
<td></td>
<td>Skin and subcutaneous tissue disorders</td>
<td>- Hepatitis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Cholestasis&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Hepatic failure&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Hepatocellular injury&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Hepatic necrosis&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Reproductive system and breast disorders</td>
<td>- Angioedema</td>
</tr>
<tr>
<td>Very Rare (&lt;0.01%)</td>
<td>Skin and subcutaneous tissue disorders</td>
<td>- Steven-Johnsons syndrome&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Cutaneous vasculitis&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Bullous pemphigoid&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Erythema multiforme&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Reproductive system and breast disorders</td>
<td>- Endometriosis&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Cystic ovarian swelling&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Vaginal polyps</td>
</tr>
<tr>
<td></td>
<td>Skin and subcutaneous tissue disorders</td>
<td>- Cutaneous lupus erythematosus&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>
**Table 1**

<table>
<thead>
<tr>
<th>Frequency</th>
<th>System Organ Class (SOC)</th>
<th>ADR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Congenital, familial and genetic disorders</strong></td>
<td>• Porphyria cutanea tarda&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td><strong>Injury, poisoning and procedural complications</strong></td>
<td>• Radiation Recall&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> This adverse drug reaction was not reported in the tamoxifen arm (n= 3094) of the above study; however, it has been reported in other trials or from other sources. The frequency has been calculated using the upper limit of the 95% confidence interval for the point estimate (based on 3/X, where X represents the total sample size e.g. 3094). This is calculated as 3/3094 which equates to a frequency category of ‘rare’.

<sup>b</sup> The event was not observed in other major clinical studies. The frequency has been calculated using the upper limit of the 95% confidence interval for the point estimate (based on 3/X, where X represents the total sample size of 13,357 patients in the major clinical studies). This is calculated as 3/13,357 which equates to a frequency category of ‘very rare’.

Side effects can be classified as either due to the pharmacological action of the drug, e.g., hot flushes, vaginal bleeding, vaginal discharge, pruritus vulvae and tumour flare, or as more general side effects, e.g., gastro-intestinal intolerance, headache, light-headedness and occasionally, fluid retention and alopecia.

When side effects are severe, it may be possible to control them by a simple reduction of dosage (to not less than 20 mg/day) without loss of control of the disease. If side effects do not respond to this measure, it may be necessary to stop the treatment.

Skin rashes (including isolated reports of erythema multiforme, Stevens-Johnson syndrome and bullous pemphigoid) and rare hypersensitivity reactions including angioedema have been reported.

Uncommonly, of patients with bony metastases have developed hypercalcaemia on initiation of therapy.

Cases of visual disturbance including reports of corneal changes and common reports of retinopathy have been described in patients receiving tamoxifen therapy. Cataracts have been reported commonly in association with the administration of Tamoxifen.

Cases of optic neuropathy and optic neuritis have been reported in patients receiving Tamoxifen and, in a small number of cases, blindness has occurred.

Sensory disturbances (including paraesthesia and dysgeusia) have been reported commonly in patients receiving Tamoxifen.

Uterine fibroids and endometrial changes including hyperplasia and polyps have been reported.

Falls in platelet count, usually to 80,000 to 90,000 per cu mm but occasionally lower, have been reported in patients taking Tamoxifen for breast cancer.

Leucopenia has been observed following the administration of Tamoxifen, sometimes in association with anaemia and/or thrombocytopenia. Neutropenia has been reported on rare occasions; this can sometimes be severe, and very rarely cases of agranulocytosis have been reported.
There is evidence of ischaemic cerebrovascular events and thromboembolic events, including deep vein thrombosis, microvascular thrombosis and pulmonary embolism have been reported during tamoxifen therapy (see sections 4.3, 4.4 and 4.5. When tamoxifen is used in combination with cytotoxic agents, there is an increased risk of thrombo-embolic events occurring.

Leg cramps and myalgia have been reported commonly in patients receiving Tamoxifen.

Uncommonly, cases of interstitial pneumonitis have been reported. Tamoxifen has been associated with changes in liver enzyme levels and on rare occasions with a spectrum of more severe liver abnormalities including fatty liver, cholestasis and hepatitis, liver failure, cirrhosis, and, hepatocellular injury (including hepatic necrosis).

Commonly, elevation of serum triglyceride levels, in some cases with pancreatitis, may be associated with the use of Tamoxifen.

Cystic ovarian swellings have occasionally been observed in pre-menopausal women receiving Tamoxifen.

Vaginal polyps have rarely been observed in women receiving Tamoxifen.

Cutaneous lupus erythematosus has been observed very rarely in patients receiving Tamoxifen.

Porphyria cutanea tarda has been observed very rarely in patients receiving Tamoxifen.

Fatigue has been reported very commonly in patients taking Tamoxifen.

Radiation recall has been observed very rarely in patients receiving Tamoxifen.

Uncommonly incidence of endometrial cancer and rare instances of uterine sarcoma (mostly malignant mixed Mullerian tumours) has been reported in association with Tamoxifen treatment.

**Reporting of suspected adverse reactions**

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via the Yellow Card Scheme website: www.mhra.gov.uk/yellowcard.

**4.9 Overdose**

On theoretical grounds, an overdosage would be expected to cause enhancement of the pharmacological side effects mentioned above. Observations in animals show that extreme overdosage (100 - 200 times recommended daily dose) may produce oestrogenic effects.

There have been reports in the literature that Tamoxifen given at several times the standard dose may be associated with prolongation of the QT interval of the ECG.
There is no specific antidote to overdosage, and treatment must be symptomatic.

5.1 Pharmacodynamic properties
Pharmacotherapeutic group: Anti-estrogens. ATC code: L02BA01.

Mechanism of action:
Tamoxifen is a non-steroidal, triphenylethylene-based drug, which displays a complex spectrum of oestrogen antagonist and oestrogen agonist-like pharmacological effects in different tissues. In breast cancer patients, at the tumour level, tamoxifen acts primarily as an antioestrogen, preventing oestrogen binding to the oestrogen receptor. However, clinical studies have shown some benefit in oestrogen receptor negative tumours, which may indicate other mechanisms of action. In the clinical situation, it is recognised that tamoxifen leads to reductions in levels of blood total cholesterol and low density lipoproteins in postmenopausal women of the order of 10 - 20%. Tamoxifen does not adversely affect bone mineral density.

Paediatric population:
An uncontrolled trial was undertaken in a heterogenous group of 28 girls aged 2 to 10 years with McCune Albright Syndrome (MAS), who received 20 mg once a day for up to 12 months duration. Among the patients who reported vaginal bleeding during the pre-study period, 62% (13 out of 21 patients) reported no bleeding for a 6-month period and 33% (7 out of 21 patients) reported no vaginal bleeding for the duration of the trial. Mean uterine volume increased after 6 months of treatment and doubled at the end of the one-year study. While this finding is in line with the pharmacodynamic properties of tamoxifen, a causal relationship has not been established (see section 4.4). There are no long-term safety data in children. In particular, the long-term effects of tamoxifen on growth, puberty and general development have not been studied.

CYP2D6 polymorphism:
CYP2D6 polymorphism status may be associated with variability in clinical response to tamoxifen. The poor metaboliser status may be associated with reduced response. The consequences of the findings for the treatment of CYP2D6 poor metabolisers have not been fully elucidated (see sections 4.4, 4.5 and 5.2).

CYP2D6 genotype:
Available clinical data suggest that patients, who are homozygote for non-functional CYP2D6 alleles, may experience reduced effect of tamoxifen in the treatment of breast cancer.

The available studies have mainly been performed in postmenopausal women (see sections 4.4 and 5.2).

5.2 Pharmacokinetic properties

Absorption:
After oral administration, tamoxifen is absorbed rapidly with maximum serum concentrations attained within 4 - 7 hours. Steady state concentrations (about 300 mg/ml) are achieved after four weeks treatment with 40 mg daily.

Distribution:
The drug is highly protein bound to serum albumin (> 99%).

Biotransformation:
Metabolism is by hydroxylation, demethylation and conjugation, giving rise to several metabolites, which have a similar pharmacological profile to the parent compound and thus contribute to the therapeutic effect. An elimination half-life of approximately seven days has been calculated for the drug itself, whereas that for N-desmethyltamoxifen, the principal circulating metabolite, is 14 days.

Elimination:
Excretion occurs primarily via the faeces.

Paediatric population:
In a clinical study where girls between 2 and 10 years with McCune Albright Syndrome (MAS) received 20 mg tamoxifen once a day for up to 12 months duration, there was an age-dependent decrease in clearance and an increase in exposure (AUC), (with values up to 50% higher in the youngest patients) compared with adults.

CYP2D6 polymorphism:
Tamoxifen is metabolised mainly via CYP3A4 to N-desmethyl-tamoxifen, which is further metabolised by CYP2D6 to another active metabolite endoxifen. In patients who lack the enzyme CYP2D6 endoxifen concentrations are approximately 75% lower than in patients with normal CYP2D6 activity. Administration of strong CYP2D6 inhibitors reduces endoxifen circulating levels to a similar extent.

5.3 Preclinical safety data
Tamoxifen was not mutagenic in a range of in-vitro and in-vivo mutagenicity tests. Tamoxifen was genotoxic in some in-vitro and in-vivo genotoxicity tests in rodents. Gonadal tumours in mice and liver tumours in rats receiving tamoxifen have been reported in long-term studies. The clinical relevance of these findings has not been established.
Tamoxifen is a drug on which extensive clinical experience has been obtained. Relevant information for the prescriber is provided elsewhere in the Summary of Product Characteristics.

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients
Calcium hydrogen phosphate
Microcrystalline cellulose
Sodium starch glycollate (Type A)
Povidone K25
Magnesium stearate
Colloidal anhydrous silica
6.2 Incompatibilities
Not applicable

6.3 Shelf life
48 months

6.4 Special precautions for storage
Do not store above 25°C. Store in the original package.

6.5 Nature and contents of container
The tablets are packed in blisters constituted from a PVC and aluminium foil.

6.6 Special precautions for disposal
None

7 MARKETING AUTHORISATION HOLDER
Milpharm Limited,
Ares,
Odyssey Business Park,
West End Road,
South Ruislip HA4 6QD,
United Kingdom

8 MARKETING AUTHORISATION NUMBER(S)
PL16363/0135

9 DATE OF FIRST AUTHORISATION/RENEWAL OF THE AUTHORISATION
29/08/2007

10 DATE OF REVISION OF THE TEXT
24/06/2016