

## SUMMARY OF PRODUCT CHARACTERISTICS

### 1 NAME OF THE MEDICINAL PRODUCT

Teicoplanin 400 mg Powder for solution for Injection/infusion or oral solution

### 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Each vial contains 400 mg teicoplanin equivalent to not less than 400,000 IU

After reconstitution, the solution will contain 400 mg of teicoplanin in 3.0 ml.

Excipient(s) with known effect: 10 mg of sodium per vial.

For a full list of excipients, see section 6.1.

### 3 PHARMACEUTICAL FORM

Powder for solution for Injection/infusion or oral solution.

White to yellowish lyophilized powder

### 4 CLINICAL PARTICULARS

#### 4.1 Therapeutic indications

#### 4.1 Therapeutic indications

Teicoplanin is indicated in adults and in children from birth for the parenteral treatment of the following infections (see sections 4.2, 4.4 and 5.1):

- complicated skin and soft tissue infections,
- bone and joint infections,
- hospital acquired pneumonia,
- community acquired pneumonia,
- complicated urinary tract infections,
- infective endocarditis,
- peritonitis associated with continuous ambulatory peritoneal dialysis (CAPD),
- bacteraemia that occurs in association with any of the indications listed above.

Teicoplanin is also indicated as an alternative oral treatment for *Clostridioides difficile* infection-associated diarrhoea and colitis.

Where appropriate, teicoplanin should be administered in combination with other antibacterial agents.

Consideration should be given to official guidance on the appropriate use of antibacterial agents.

## 4.2 Posology and method of administration

### Posology

The dose and duration of treatment should be adjusted according to the underlying type and severity of infection and clinical response of the patient, and patient factors such as age and renal function.

### Measurement of serum concentrations

Teicoplanin trough serum concentrations should be monitored at steady state after completion of the loading dose regimen in order to ensure that a minimum trough serum concentration has been reached:

- For most Gram-positive infections, teicoplanin trough levels of at least 10 mg/L when measured by High Performance Liquid Chromatography (HPLC), or at least 15 mg/L when measured by Fluorescence Polarization Immunoassay (FPIA) method.
- For endocarditis and other severe infections, teicoplanin trough levels of 15-30 mg/L when measured by HPLC, or 30-40 mg/L when measured by FPIA method.

During maintenance treatment, teicoplanin trough serum concentrations monitoring may be performed at least once a week to ensure that these concentrations are stable.

### Adults and elderly patients with normal renal function

| <i>Indications</i>   | Loading dose   |  | Maintenance dose   |   |
|--|--|--|--|---|
|  | Loading dose regimen   | Targeted trough concentrations at day 3 to 5 | Maintenance dose   | Targeted trough concentrations during maintenance |
| - Complicated skin and soft tissue infections<br>- Pneumonia<br>- Complicated urinary tract infections | 6 mg/kg bodyweight every 12 hours for 3 intravenous or intramuscular administrations | >15 mg/L <sup>1</sup>                        | 6 mg/kg body weight intravenous or intramuscular once a day  | >15 mg/L <sup>1</sup> once a week                 |
| - Bone and joint infections  | 12 mg/kg bodyweight every 12 hours for 3 to 5 intravenous administrations            | >20 mg/L <sup>1</sup>                        | 12 mg/kg body weight intravenous or intramuscular once a day | >20 mg/L <sup>1</sup>                             |

|                          |   |                         |  |                       |
|--------------------------|---|-------------------------|--|-----------------------|
| - Infective endocarditis | 12 mg/kg bodyweight every 12 hours for 3 to 5 intravenous administrations | 30-40 mg/L <sup>1</sup> | 12 mg/kg body weight intravenous or intramuscular once a day | >30 mg/L <sup>1</sup> |
|--------------------------|---|-------------------------|--|-----------------------|

<sup>1</sup> Measured by FPIA

The dose is to be adjusted on bodyweight whatever the weight of the patient.

#### Duration of treatment

The duration of treatment should be decided based on the clinical response. For infective endocarditis a minimum of 21 days is usually considered appropriate. Treatment should not exceed 4 months.

#### Combination therapy

Teicoplanin has a limited spectrum of antibacterial activity (Gram positive). It is not suitable for use as a single agent for the treatment of some types of infections unless the pathogen is already documented and known to be susceptible or there is a high suspicion that the most likely pathogen(s) would be suitable for treatment with teicoplanin.

#### *Clostridioides difficile infection-associated diarrhea and colitis*

The recommended dose is 100-200 mg administered orally twice a day for 7 to 14 days.

#### Elderly population

No dose adjustment is required, unless there is renal impairment (see below).

#### Adults and elderly patients with impaired renal function

Dose adjustment is not required until the fourth day of treatment, at which time dosing should be adjusted to maintain a serum trough concentration of at least 10 mg/L when measured by HPLC, or at least 15 mg/L when measured by FPIA method.

After the fourth day of treatment:

- In mild and moderate renal insufficiency (creatinine clearance 30-80 mL/min): maintenance dose should be halved, either by administering the dose every two days or by administering half of this dose once a day.
- In severe renal insufficiency (creatinine clearance less than 30 mL/min) and in haemodialysed patients: dose should be one-third the usual dose, either by administering the initial unit dose every third day or by administering one-third of this dose once a day.

Teicoplanin is not removed by haemodialysis.

#### Patients in continuous ambulatory peritoneal dialysis (CAPD)

After a single intravenous loading dose of 6 mg/kg bodyweight, 20 mg/L is administered in the bag of the dialysis solution in the first week, 20 mg/L in different bags the second week and then 20 mg/L in the overnight bag in the third week.

#### Paediatric population

The dose recommendations are the same in adults and children above 12 years of age.

#### *Neonates and infants up to the age of*

##### *2 months: Loading dose*

One single dose of 16 mg/kg body weight, administered intravenously by infusion on the first

day.

*Maintenance dose*

One single dose of 8 mg/kg body weight administered intravenously by infusion once a day.

Children (2 months to

12 years): Loading

*dose*

One single dose of 10 mg/kg body weight administered intravenously every 12 hours, repeated 3 times.

*Maintenance dose*

One single dose of 6-10 mg/kg body weight administered intravenously once a day.

Method of administration

Teicoplanin should be administered by the intravenous or intramuscular route. The intravenous injection may be administered either as a bolus over 3 to 5 minutes or as a 30-minute infusion.

Only the infusion method should be used in neonates and infants up to the age of 2 months.

For *Clostridioides difficile* infection-associated diarrhoea and colitis, the oral route is to be used.

For instructions on reconstitution and dilution of the medicinal product before administration, see section 6.6.

### **4.3 Contraindications**

Hypersensitivity to teicoplanin or to any of the excipients listed in section 6.

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

Teicoplanin should not be administered by intraventricular use.

Hypersensitivity reactions

Serious, life-threatening hypersensitivity reactions, sometimes fatal, have been reported with teicoplanin (e.g. anaphylactic shock). If an allergic reaction to teicoplanin occurs, treatment should be discontinued immediately and appropriate emergency measures should be initiated.

Teicoplanin must be administered with caution in patients with known hypersensitivity to vancomycin, as crossed hypersensitivity reactions, including fatal anaphylactic shock, may occur.

However, a prior history of "red man syndrome" with vancomycin is not a contraindication to the use of teicoplanin.

Infusion related reactions

In rare cases (even at the first dose), red man syndrome (a complex of symptoms including pruritus, urticaria, erythema, angioneurotic oedema, tachycardia, hypotension, dyspnoea) has been observed. Stopping or slowing the infusion may result in cessation of these reactions. Infusion related reactions can be limited if the daily dose is not given via bolus injection but infused over a 30-minute period.

### Severe cutaneous adverse reactions

Severe cutaneous adverse reactions (SCAR) including Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN) and drug reaction with eosinophilia and systemic symptoms (DRESS), which can be life-threatening or fatal have been reported with the use of teicoplanin (see section 4.8). Acute generalized exanthematous pustulosis (AGEP) has also been reported with the use of teicoplanin (see section 4.8). At the time of prescription, patients should be advised of the signs and symptoms of severe skin reactions (e.g. progressive skin rash often with blisters or mucosal lesions or pustular rash, or any other sign of skin hypersensitivity) and be closely monitored. If signs and symptoms suggestive of severe skin reactions appear, teicoplanin should be withdrawn and alternative treatment should be considered.

### Spectrum of antibacterial activity

Teicoplanin has a limited spectrum of antibacterial activity (*Gram-positive*). It is not suitable for use as a single agent for the treatment of some types of infections unless the pathogen is already documented and known to be susceptible or there is a high suspicion that the most likely pathogen(s) would be suitable for treatment with teicoplanin.

The rational use of teicoplanin should take into account the bacterial spectrum of activity, the safety profile and the suitability of standard antibacterial therapy to treat the individual patient. On this basis it is expected that in most instances teicoplanin will be used to treat severe infections in patients for whom standard antibacterial activity is considered to be unsuitable.

### Thrombocytopenia

Thrombocytopenia has been reported with teicoplanin (see section 4.8). Periodic haematological examinations, including complete blood count, are recommended during treatment.

### Nephrotoxicity

Nephrotoxicity and renal failure have been reported in patients treated with teicoplanin (see section 4.8). Patients with renal insufficiency in those receiving the high loading dose regimen of teicoplanin, and those receiving teicoplanin in conjunction with or sequentially with other medicinal products with known nephrotoxic potential (e.g. aminoglycosides, colistin, amphotericin B, ciclosporin, and cisplatin) should be carefully monitored, and should get auditory tests (see "Ototoxicity" below).

Since teicoplanin is mainly excreted by the kidney, the dose of teicoplanin must be adapted in patients with renal impairment (see section 4.2).

### Ototoxicity

As with other glycopeptides, ototoxicity (deafness and tinnitus) has been reported in patients treated with teicoplanin (see section 4.8). Patients who develop signs and symptoms of impaired hearing or disorders of the inner ear during treatment with teicoplanin should be carefully evaluated and monitored, especially in case of prolonged treatment and in patients with renal insufficiency. Patients receiving teicoplanin in conjunction with or sequentially with other medicinal products with known nephrotoxic and/or neurotoxic/ototoxic potential (e.g. aminoglycosides, colistin, amphotericin B, ciclosporin, cisplatin, furosemide and ethacrynic acid) should be carefully monitored and the benefit of teicoplanin evaluated if hearing deteriorates.

Special precautions must be taken when administering teicoplanin in patients who require concomitant treatment with ototoxic and/or nephrotoxic medicinal products for which it is recommended that regular haematology, liver and kidney function tests are carried out.

### Superinfection

As with other antibiotics, the use of teicoplanin, especially if prolonged, may result in overgrowth of non-susceptible organisms. If superinfection occurs during therapy, appropriate measures should be taken.

### Excipients

This medicinal product contains less than 1 mmol sodium (23 mg) per vial, i.e. essentially 'sodium-free'.

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

No specific interaction studies have been performed.

Teicoplanin and aminoglycoside solutions are incompatible and must not be mixed for injection; however, they are compatible in dialysis fluid and may be freely used in the treatment of CAPD-related peritonitis. Teicoplanin should be used with care in conjunction with or sequentially with other medicinal products with known nephrotoxic and/or neurotoxic/ototoxic potential. These include *e.g.* aminoglycosides, colistin, amphotericin B, ciclosporin, cisplatin, furosemide, and ethacrynic acid (see section 4.4 "Nephrotoxicity" and "Ototoxicity"). However, there is no evidence of synergistic toxicity in combinations with teicoplanin.

In clinical studies, teicoplanin has been administered to many patients already receiving various medications including other antibiotics, antihypertensives, anaesthetic agents, cardiac medicinal products and antidiabetic agents without evidence of adverse interaction.

### Paediatric population

Interaction studies have only been performed in adults.

## **4.6 Fertility, pregnancy and lactation**

### Pregnancy

There are a limited amount of data from the use of teicoplanin in pregnant women. Studies in animals have shown reproductive toxicity at high doses (see section 5.3): in rats there was an increased incidence of stillbirths and neonatal mortality. The potential risk for humans is unknown.

Therefore, teicoplanin should not be used during pregnancy unless clearly necessary. A potential risk of inner ear and renal damage to the foetus cannot be excluded (see section 4.4).

### Breast-feeding

It is unknown whether teicoplanin is excreted in human milk. There is no information on the excretion of teicoplanin in animal milk. A decision on whether to continue/discontinue breast-feeding or to continue/discontinue therapy with teicoplanin should be made taking into account the benefit of breast-feeding to the child and the benefit of teicoplanin therapy to the mother.

### Fertility

Animal reproduction studies have not shown evidence of impairment of fertility.

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

Teicoplanin has minor influence on the ability to drive and use machines. Teicoplanin can cause dizziness and headache. The ability to drive or use machines may be affected. Patients experiencing these undesirable effects should not drive or use machines.

#### 4.8 Undesirable effects

##### Tabulated list of adverse reactions

In the table below all the adverse reactions, which occurred at an incidence greater than placebo and more than one patient are listed using the following convention:

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.

| System organ class                       | 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 available data)  |
|--|-------------------------------------|---|---|----------------------------|--|
| Infections and infestations              |                                     |   | Abcess                                  |                            | Superinfection (overgrowth of non-susceptible organisms)   |
| Blood and the lymphatic system disorders |                                     | Leucopenia, thrombocytopenia, eosinophilia                              |   |                            | Agranulocytosis, neutropenia, pancytopenia   |
| Immune system disorders                  |                                     | Anaphylactic reaction (anaphylaxis) (see section 4.4)                   |   |                            | DRESS syndrome (drug reaction with eosinophilia and systemic symptoms), Anaphylactic shock (see section 4.4) |
| Nervous system disorders                 |                                     | Dizziness, headache   |   |                            | Seizures   |
| Ear and Labyrinth disorders              |                                     | Deafness, hearing loss (see section 4.4), tinnitus, vestibular disorder |   |                            |  |
| Vascular disorders                       |                                     | Phlebitis   |   |                            | Thrombophlebitis   |

|  |                          |   |   |  |  |
|--|--------------------------|---|---|--|--|
| Respiratory, thoracic and mediastinal disorders      |                          | Bronchospasm  |   |  |  |
| Gastro-intestinal disorders                          |                          | Diarrhoea, vomiting, nausea   |   |  |  |
| Skin and subcutaneous tissue disorders               | Rash, erythema, pruritus |   | Red man syndrome (e.g. Flushing of the upper part of the body) (see section 4.4). |  | Toxic epidermal necrolysis, Stevens-Johnson syndrome, erythema multiforme, angioedema, dermatitis exfoliative, urticaria (see section 4.4) |
| Renal and Urinary disorders                          |                          | Blood creatinine increased  |   |  | Renal failure (including renal failure acute) (see below description of selected adverse reactions)*                                       |
| General disorders and administration site conditions | Pain, pyrexia            |   |   |  | Injection site abscess, chills (rigors)  |
| Investigations                                       |                          | Transaminases increased (transient abnormality of transaminases), blood alkaline phosphatase increased (transient abnormality of alkaline phosphatase), |   |  |  |

#### Description of selected adverse reactions

\*Based on literature reports, the estimated rate of nephrotoxicity in patients receiving low loading dose regimen of average 6 mg/kg twice a day, followed by a maintenance dose of average 6 mg/kg once daily, is around 2%.

In an observational post-authorisation safety study which enrolled 300 patients with a mean age of 63 years (treated for bone and joint infection, endocarditis or other severe infections) who received the high loading dose regimen of 12 mg/kg twice a day (receiving 5 loading doses as a median) followed by a maintenance dose of 12 mg/kg once daily, the observed rate of confirmed nephrotoxicity was 11.0% (95% CI = [7.4%; 15.5%]) over the first 10 days. The cumulative rate of nephrotoxicity from the start of treatment up to 60 days after the last dose was 20.6% (95% CI = [16.0%;

25.8%]). In patients receiving more than 5 high loading doses of 12 mg/kg twice a day, followed by a maintenance dose of 12 mg/kg once daily, the observed cumulative rate of nephrotoxicity from the start of treatment up to 60 days after the last administration was 27% (95% CI = [20.7%; 35.3%]) (see section 4.4).

### **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, [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard) or search for MHRA Yellow Card in the Google Play or Apple App Store.

## **4.9 Overdose**

### Symptoms

Cases of accidental administration of excessive doses to paediatric patients have been reported. In one case agitation occurred in a 29-day-old newborn who had been administered 400 mg intravenously (95 mg/kg).

### Management

Treatment of teicoplanin overdose should be symptomatic.

Teicoplanin is not removed by haemodialysis and only slowly by peritoneal dialysis.

## **5 PHARMACOLOGICAL PROPERTIES**

### **5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: Glycopeptide Antibacterials, ATC code: J01XA 02

#### Mechanism of action

Teicoplanin inhibits the growth of susceptible organisms by interfering with cell-wall biosynthesis at a site different from that affected by beta-lactams. Peptidoglycan synthesis is blocked by specific binding to D-alanyl-D-alanine residues.

#### Mechanism of resistance

Resistance to teicoplanin can be based on the following mechanisms:

- Modified target structure: this form of resistance has occurred particularly in *Enterococcus faecium*. The modification is based on exchange of the terminal D-alanine-D-alanine function of the amino-acid chain in a murein precursor with D-Ala-D-lactate, thus reducing the affinity to vancomycin. The responsible enzymes are a newly synthesised D-lactate dehydrogenase or ligase.
- The reduced sensitivity or resistance of staphylococci to teicoplanin is based on the overproduction of murein precursors to which teicoplanin is bound.

Cross-resistance between teicoplanin and the glycoprotein vancomycin may occur. A number of vancomycin-resistant enterococci are sensitive to teicoplanin (Van-B phenotype).

### Susceptibility testing breakpoints

The MICs breakpoints according to the European Committee on Antimicrobial Susceptibility Testing (EUCAST), version 3.1, February 11, 2013 are displayed in the following table:

| <b>Microorganism</b>   | <b>Susceptible</b> | <b>Resistant</b> |
|--|--------------------|------------------|
| <i>Staphylococcus aureus</i> <sup>a</sup>                      | ≤2 mg/L            | >2mg/ml          |
| Coagulase-negative staphylococci <sup>a</sup>                  | ≤4 mg/L            | >4 mg/ml         |
| <i>Enterococcus</i> spp.                                       | ≤2 mg/L            | >2 mg/ml         |
| <i>Streptococcus</i> spp. (A, B, C, G) <sup>b</sup>            | ≤2 mg/L            | >2 mg/ml         |
| <i>Streptococcus pneumoniae</i> <sup>b</sup>                   | ≤2 mg/L            | >2 mg/ml         |
| Viridans group streptococci <sup>b</sup>                       | ≤2 mg/L            | >2 mg/ml         |
| Gram-positive anaerobes except <i>Clostridioides difficile</i> | IE                 | IE               |
| PK/PD (Non-species related) breakpoints <sup>c,d</sup>         | IE                 | IE               |

<sup>a</sup> Glycopeptide MICs are method dependent and should be determined by broth microdilution (reference ISO 20776). *S. aureus* with vancomycin MIC values of 2 mg/ml are on the border of the wild type MIC distribution and there may be an impaired clinical response. The resistance breakpoint for *S. aureus* has been reduced to 2 mg/ml to avoid reporting of GISA isolates intermediate as serious infections with GISA isolates are not treatable with increased doses of vancomycin or teicoplanin.

<sup>b</sup> Isolates with MIC values above the susceptible breakpoint are very rare or not yet reported. The identification and antimicrobial susceptibility tests on any such isolate must be repeated and if the result is confirmed the isolate must be sent to a reference laboratory. Until there is evidence regarding clinical response for confirmed isolates with MIC above the current resistant breakpoint they should be reported resistant.

<sup>c</sup> IE indicates that there is insufficient evidence that the species in question is a good target for therapy with the drug.

<sup>d</sup> A MIC with a comment but without an accompanying S, I or R categorisation may be reported.

### Pharmacokinetic/Pharmacodynamic relationship

Teicoplanin antimicrobial activity depends essentially on the duration of time during which the substance level is higher than the minimum inhibitory concentration (MIC) of the pathogen.

### Susceptibility

The prevalence of resistance may vary geographically and over time for selected species and local information on resistance is desirable, particularly when treating severe infections. As necessary, expert advice should be sought when the local prevalence of resistance is such that the utility of the agent in at least some of types of infections is questionable.

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### **Commonly susceptible species**

#### ***Aerobic Gram-positive bacteria***

*Corynebacterium jeikeium*<sup>a</sup>

*Enterococcus faecalis*

*Staphylococcus aureus* (including methicillin-resistant strains)

*Streptococcus agalactiae*

*Streptococcus dysgalactiae* subsp. *equisimilis*<sup>a</sup>

(Group C & G streptococci)

*Streptococcus pneumoniae*

*Streptococcus pyogenes*

Streptococci in the viridans group <sup>a b</sup>  
**Anaerobic Gram-positive bacteria**  
*Clostridioides difficile* <sup>a</sup>  
*Peptostreptococcus spp.* <sup>a</sup>

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**Species for which acquired resistance may be a problem**

**Aerobic Gram-positive bacteria**  
*Enterococcus faecium*  
*Staphylococcus epidermidis*  
*Staphylococcus haemolyticus*  
*Staphylococcus hominis*

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**Inherently resistant bacteria**

All Gram-negative bacteria

**Other bacteria**

*Chlamydia spp.*  
*Chlamydophila spp.*  
*Legionella pneumophila*  
*Mycoplasma spp.*

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*a* No current data were available when the tables were published. The primary literature, standard volumes and treatment recommendations assume sensitivity

*b* Collective term for a heterogeneous group of streptococcus species. Resistance rate can vary depending on the actual streptococcus species

## 5.2 Pharmacokinetic properties

### Absorption

Teicoplanin is administered by parenteral route (intravenously or intramuscularly). After intramuscular administration, the bioavailability of teicoplanin (as compared to intravenous administration) is almost complete (90%). After six daily intramuscular administrations of 200 mg the mean (SD) maximum teicoplanin concentration (C<sub>max</sub>) amounts to 12.1 (0.9) mg/L and occurs at 2 hours after administration.

After a loading dose of 6 mg/kg administered intravenously every 12 hours for 3 to 5 administrations, C<sub>max</sub> values range from 60 to 70 mg/L and C<sub>trough</sub> are usually above 10 mg/L. After an intravenous loading dose of 12 mg/kg administered every 12 hours for 3 administrations, mean values of C<sub>max</sub> and C<sub>trough</sub> are estimated to be around 100 mg/L and 20 mg/L, respectively.

After a maintenance dose of 6 mg/kg administered once daily C<sub>max</sub> and C<sub>trough</sub> values are approximately 70 mg/L and 15 mg/L, respectively. After a maintenance dose of 12 mg/kg once daily C<sub>trough</sub> values range from 18 to 30 mg/L.

When administered by oral route teicoplanin is not absorbed from the gastrointestinal tract. When administered by oral route at 250 or 500 mg single dose to healthy subjects, teicoplanin is not detected in serum or urine but only recovered in feces (about 45% of the administered dose) as unchanged medicinal product.

### Distribution

The binding to human serum proteins ranges from 87.6 to 90.8% without any variation in function of the teicoplanin concentrations. Teicoplanin is mainly bound to human serum albumin. Teicoplanin is not distributed in red cells.

The volume of distribution at steady-state ( $V_{ss}$ ) varies from 0.7 to 1.4 ml/kg. The highest values of  $V_{ss}$  are observed in the recent studies where the sampling period was superior to 8 days.

Teicoplanin distributed mainly in lung, myocardium and bone tissues with tissue/serum ratios superior to 1. In blister fluids, synovial fluid and peritoneal fluid the tissue/serum ratios ranged from 0.5 to 1. Elimination of teicoplanin from peritoneal fluid occurs at the same rate as from serum. In pleural fluid and subcutaneous fat tissue the tissue/serum ratios are comprised between 0.2 and 0.5. Teicoplanin does not readily penetrate into the cerebrospinal fluid (CSF).

#### Biotransformation

Unchanged form of teicoplanin is the main compound identified in plasma and urine, indicating minimal metabolism. Two metabolites are formed probably by hydroxylation and represents 2 to 3% of the administered dose.

#### Elimination

Unchanged teicoplanin is mainly excreted by urinary route (80% within 16 days) while 2.7% of the administered dose is recovered in feces (via bile excretion) within 8 days following administration. Elimination half-life of teicoplanin varies from 100 to 170 hours in the most recent studies where blood sampling duration is about 8 to 35 days.

Teicoplanin has a low total clearance in the range of 10 to 14 ml/h/kg and a renal clearance in the range of 8 to 12 ml/h/kg indicating that teicoplanin is mainly excreted by renal mechanisms.

#### Linearity

Teicoplanin exhibited linear pharmacokinetics at dose range of 2 to 25 mg/kg.

#### Special populations

- *Renal impairment:*

As teicoplanin is eliminated by renal route, teicoplanin elimination decreases according to the degree of renal impairment. The total and renal clearances of teicoplanin depends on the creatinine clearance.

- *Elderly patients:*

In the elderly population the teicoplanin pharmacokinetics is not modified unless in case of renal impairment.

- *Paediatric population*

A higher total clearance (15.8 ml/h/kg for neonates, 14.8 ml/h/kg for a mean age 8 years) and a shorter elimination half-life (40 hours neonates; 58 hours for 8 years) are observed compared to adult patients.

### **5.3 Preclinical safety data**

Following repeated parenteral administration to the rat and dog, effects on the kidney were observed and were shown to be dose-dependent and reversible. Studies to investigate the potential to cause ototoxicity in the guinea-pig indicate that a mild impairment of cochlear and vestibular function is possible, in the absence of morphological damage.

Subcutaneous administration of teicoplanin at up to 40 mg/kg/day did not affect male and female fertility in the rat. In embryofetal development studies, no malformations were observed following subcutaneous administration of up to 200 mg/kg/day in the rat and intramuscular administration up to 15 mg/kg/day in the rabbit. However, in the rat, there was an increased incidence of stillbirths at doses of 100 mg/kg/day and above and neonatal mortality at 200 mg/kg/day. This effect was not reported at 50 mg/kg/day. A peri and postnatal study in rats showed no effects on the fertility of the F1 generation or on the survival and development of the F2 generation following subcutaneous administration of up to 40 mg/kg/day.

Teicoplanin did not show any potential to cause antigenicity (in mice, guinea-pigs or rabbits), genotoxicity or local irritancy.

## **6 PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

Sodium chloride

Sodium hydroxide (for pH adjustment)

### **6.2 Incompatibilities**

Teicoplanin and aminoglycoside are incompatible when mixed directly and must not be mixed before injection.

If teicoplanin is administered in combination therapy with other antibiotics, the preparation must be administered separately.

This medicinal product must not be mixed with other medicinal products except those mentioned in section 6.6.

### **6.3 Shelf life**

Shelf life of powder as packaged for sale:

3 years

Shelf life of reconstituted solution:

Chemical and physical in-use stability of the reconstituted solution prepared as recommended has been demonstrated for 24 hours at 2 to 8°C.

From a microbiological point of view, the medicinal product should be used immediately. If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2 to 8°C, unless reconstitution has taken place in controlled and validated aseptic conditions.

Shelf life of diluted medicinal product:

Chemical and physical in-use stability of the reconstituted solution prepared as recommended has been demonstrated for 24 hours at 2 to 8°C.

From a microbiological point of view, the medicinal product should be used immediately. If not used immediately, in-use storage times and conditions prior to use are the responsibility of the user and would normally not be longer than 24 hours at 2 to 8°C, unless reconstitution/dilution has taken place in controlled and validated aseptic conditions.

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

Powder as packaged for sale:

This medicinal product does not require any special storage condition.

For storage conditions of the reconstituted/diluted medicinal product, see section 6.3.

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

Colourless, Type I glass vials of 20 ml for Teicoplanin 400 mg, closed with a bromobutyl rubber stopper and sealed with an aluminium/plastic “flip-off cap”.

Pack size: 1 or 10 vials.

Not all pack sizes may be marketed.

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

This medicinal product is for single use only.

Preparation of reconstituted solution:

- The powder should be reconstituted with 3.14 ml of water for injections.
- Gently roll the vial between the hands until the powder is completely dissolved. If the solution does become foamy, then it should be left to stand for about 15 minutes. Only clear and yellowish solutions should be used.

The reconstituted solutions will contain 200 mg of teicoplanin in 3.0 ml and 400 mg in 3.0 ml.

|  |        |        |
|--|--------|--------|
| Nominal teicoplanin content of vial  | 200 mg | 400 mg |
| Volume of powder vial  | 10 ml  | 20 ml  |
| Volume containing nominal teicoplanin dose (extracted by 5 mL syringe and 23 G needle) | 3.0 ml | 3.0 ml |

The reconstituted solution may be injected directly or alternatively further diluted, or orally administered.

Preparation of the diluted solution before infusion:

Teicoplanin can be administered in the following infusion solutions:

- sodium chloride 9 mg/ml (0.9%) solution
- Ringer solution
- Ringer-lactate solution
- 5% dextrose injection
- 10% dextrose injection
- 0.18% sodium chloride and 4% glucose solution
- 0.45% sodium chloride and 5% glucose solution
- Peritoneal dialysis solution containing 1.36% or 3.86% glucose solution.

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

**7      MARKETING AUTHORISATION HOLDER**

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