

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

### 1.3.1.1 Professional Information for Medicines for Human Use

<p><b>SCHEDULING STATUS</b></p> <p><b>S4</b></p>
<p><b>1. NAME OF THE MEDICINE</b></p> <p><b>ZATYP TABLETS</b> 500 mg film coated tablets</p>
<p><b>2. QUALITATIVE AND QUANTITATIVE COMPOSITION</b></p> <p><b>ZATYP TABLETS</b> 500 mg film coated tablets :</p> <p>Each film coated tablet contains Azithromycin Dihydrate Ph.Eur 500 mg.</p> <p>Contains Sugar (Lactose Monohydrate 15.4 mg).</p> <p>For full list of excipients, see section 6.1</p>
<p><b>3. PHARMACEUTICAL FORM</b></p> <p><b>ZATYP TABLETS</b> 500 mg film coated tablets:</p> <p>White to off-white, oval shaped, film coated biconvex tablets, debossed with “6” &amp; “7” on either side of the score-line on one side and “D” on other side</p>
<p><b>4. CLINICAL PARTICULARS</b></p>
<p><b>4.1. Therapeutic indications</b></p>
<p><b>Adults:</b></p> <p><b>ZATYP TABLETS</b> are indicated for mild to moderate infections caused by susceptible organisms; in lower respiratory tract infections including bronchitis due to <i>Haemophilus influenzae</i>, <i>Moraxella catarrhalis</i>, <i>Streptococcus pneumoniae</i> or <i>Staphylococcus aureus</i> and pneumonia due to <i>Streptococcus pneumoniae</i> or <i>Haemophilus influenzae</i>; uncomplicated skin and soft tissue infections; sinusitis due to <i>Haemophilus influenzae</i>, <i>Streptococcus pneumoniae</i> or <i>Staphylococcus aureus</i>; and as an alternative to first line therapy of pharyngitis/tonsillitis.</p> <p>In sexually transmitted diseases in men and women, <b>ZATYP TABLETS</b> are indicated in the treatment of uncomplicated genital infections due to <i>Chlamydia trachomatis</i> and chancroid due to <i>Haemophilus ducreyi</i>.</p>

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

<p>Children 1 year and over:</p> <p><b>ZATYP TABLETS</b> are indicated for pharyngitis/tonsillitis and otitis media caused by susceptible organisms in children over 45 kg.</p>
<p><b>4.2. Posology and method of administration</b></p>
<p><b>ZATYP TABLETS :</b></p> <p><b>ZATYP TABLETS</b> should be administered as a single daily dose with or without food.</p> <p><b>ZATYP TABLETS</b> should be taken whole.</p> <p><b>Adults:</b></p> <p>For all indications other than sexually transmitted diseases, the total dose is 1,5 g which should be given as 500 mg daily for 3 days.</p> <p>For sexually transmitted diseases caused by <i>Chlamydia trachomatis</i> or <i>Haemophilus ducreyi</i>, the dose is 1 g given as a single dose.</p> <p><i>Special Populations</i></p> <p><b>Use in patients with hepatic impairment</b></p> <p><b>ZATYP TABLETS</b> is contraindicated in patients with severe hepatic impairment (see Section 4.3)</p> <p><b>Use in the elderly:</b></p> <p>Normal adult dosage is recommended. Elderly patients may be more susceptible to development of Torsade de Pointes dysrhythmia than younger patients (see section 4.4).</p> <p><b>Use in children:</b></p> <p>Children over 45 kg - dose as per adults.</p> <p>This formulation is not suitable for children under 45 kg.</p>
<p><b>Method of administration</b></p> <p>Oral</p>
<p><b>4.3. Contraindications</b></p> <p><b>ZATYP TABLETS</b> is contraindicated in patients with a known hypersensitivity to azithromycin, erythromycin, any of the macrolide antibiotics, or to any excipient listed under section 6.1.</p> <p>Because of the theoretical possibility of ergotism, <b>ZATYP TABLETS</b> and ergot derivatives should</p>

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

not be co-administered.

**Use in hepatic impairment:**

As the liver is the principal route of excretion of **ZATYP TABLETS**, it should not be prescribed in patients with hepatic diseases.

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

**Hypersensitivity:**

Serious allergic reactions, including angioedema and anaphylaxis and dermatologic reactions including Stevens-Johnson Syndrome, Acute Generalised Exanthematous Exanthemateous Pustulosis (AGEP), Drug with Eosinophilic and systemic symptoms (DRESS) and toxic epidermal necrolysis have been reported. Some of these reactions with **ZATYP TABLETS** have resulted in recurrent symptoms and required a longer period of observation and treatment.

If an allergic reaction occurs, **ZATYP TABLETS** should be discontinued and appropriate therapy should be instituted. Medical practitioners should be aware that reappearance of the allergic symptoms may occur when symptomatic therapy is discontinued.

**Hepatotoxicity:**

Since the liver is the principal route of elimination for azithromycin. **ZATYP TABLETS** should not be used in patients with hepatic disease (see Section 4.3).

Abnormal liver function, hepatitis, cholestatic jaundice, hepatic necrosis and hepatic failure, some of which have resulted in death, have been reported. Discontinue **ZATYP TABLETS** immediately if signs and/or symptoms of hepatitis occur.

**Ergot derivatives:**

In patients receiving ergot derivatives, ergotism has been precipitated by co-administration of some macrolide antibiotics. There is no data concerning the possibility of an interaction between ergot and **ZATYP TABLETS**. However, because of the theoretical possibility of ergotism, **ZATYP TABLETS** and ergot derivatives should not be co-administered (see section 4.3).

**Superinfection:**

Observation for signs of superinfection with non-susceptible organisms, including fungi is recommended.

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

**Pseudomembranous colitis:**

Pseudomembranous colitis has been reported and may range in severity from mild to life-threatening.

Therefore, it is important to consider this diagnosis in patients with diarrhoea subsequent to administration of **ZATYP TABLETS**.

***Clostridium difficile*-associated diarrhoea:**

*Clostridium difficile*-associated diarrhoea (CDAD) due to overgrowth of *Clostridium difficile* in the gut, has been reported with use of **ZATYP TABLETS**, and may range in severity from mild diarrhoea to fatal colitis.

If CDAD is suspected or confirmed, ongoing **ZATYP TABLETS** use should be discontinued.

Appropriate fluid and electrolyte management, protein supplementation, antibiotic treatment of *Clostridium difficile* and surgical evaluation should be instituted as clinically indicated.

**Renal impairment:**

In patients with a creatinine clearance < 30, a 33 % increase in systemic exposure to **ZATYP TABLETS** was observed (see: section 5.2). Acute renal failure and interstitial nephritis have been reported (see section 4.8).

**Prolongation of the QT interval:**

Prolonged cardiac repolarisation and QT interval, imparting a risk of developing cardiac dysrhythmia and Torsade de Pointes, have been seen in treatment with other macrolides including **ZATYP TABLETS** (see section 4.8).

Prescribers should specifically consider the risk of QT prolongation, which can be fatal in at-risk groups including:

- Patients with congenital or documented QT prolongation
- Patients currently receiving treatment with other active substances known to prolong QT interval such as antidysrhythmics of classes IA and III; antipsychotic medicines; antidepressants; and fluoroquinolones.
- Patients with electrolyte disturbance, particularly in cases of hypokalaemia and

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

hypomagnesaemia.

- Patients with clinically relevant bradycardia, cardiac dysrhythmia or cardiac insufficiency.
- Elderly patients: elderly patients may be more susceptible to medicine-associated effects on the QT interval.
- Myasthenia gravis

Exacerbation of symptoms of myasthenia gravis and new-onset of myasthenia syndrome have been reported in patients receiving azithromycin therapy

• **Use in children under 1 year of age:**

The safety and efficacy of **ZATYP TABLETS** in children less than 1 year have not been established

**Lactose intolerance:**

Patients with rare hereditary problems of galactose intolerance, total lactase deficiency or glucose galactose malabsorption should not take this medicine.

Contains lactose which may have an effect on the glycaemic control of patients with diabetes mellitus.

**4.5. Interaction with other medicines and other forms of interaction**

**Ergot derivatives:**

Because of the theoretical possibility of ergotism, **ZATYP TABLETS** and ergot derivatives should not be co-administered (see section 4.3 and section 4.4).

**Cetirizine:**

In healthy volunteers, co-administration of a 5-day regimen of azithromycin with cetirizine 20 mg at steady-state resulted in no pharmacokinetic interaction and no significant changes in the QT interval.

Azithromycin does not interact significantly with the hepatic cytochrome P450 system. It is not believed to be associated with the pharmacokinetic medicine interactions seen with erythromycin.

Hepatic cytochrome P450 induction or inactivation via cytochrome-metabolite complex does not occur with azithromycin.

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

**Pharmacokinetic studies have been conducted between azithromycin and the following medicines known to undergo significant cytochrome P450 mediated metabolism:**

**Atorvastatin:**

Co-administration of atorvastatin (10 mg daily) and azithromycin (500 mg daily) did not alter the plasma concentrations of atorvastatin (based on a HMG CoA reductase inhibition assay). However, post-marketing cases of rhabdomyolysis in patients receiving Azithromycin with statins have been reported.

**Efavirenz:**

Co-administration of a 600 mg single dose of azithromycin and 400 mg efavirenz daily for 7 days did not result in any clinically significant pharmacokinetic interactions.

**Fluconazole:**

Co-administration of a single dose of 1200 mg **ZATYP TABLETS** did not alter the pharmacokinetics of a single dose of 800 mg fluconazole. Total exposure and half-life of **ZATYP TABLETS** were unchanged by the co-administration of fluconazole, however, a clinically insignificant decrease in  $C_{max}$  (18 %) of **ZATYP TABLETS** was observed.

**Indinavir:**

Co-administration of a single dose of 1200 mg **ZATYP TABLETS** had no statistically significant effect on the pharmacokinetics of indinavir administered as 800 mg three times daily for 5 days.

**Midazolam:**

In healthy volunteers, co-administration of **ZATYP TABLETS** 500 mg/day for 3 days did not cause clinically significant changes in the pharmacokinetic properties and pharmacodynamics properties of a single 15 mg dose of midazolam.

**Nelfinavir:**

Co-administration of **ZATYP TABLETS** (1200 mg) and nelfinavir at steady state (750 mg three times daily) resulted in increased azithromycin concentrations. No clinically significant adverse effects were observed and although a dose adjustment of **ZATYP TABLETS** is not recommended when administered in combination with nelfinavir, close monitoring for known side effects of **ZATYP TABLETS** is warranted.

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

**Sildenafil:**

In normal healthy male volunteers, there was no evidence of an effect of azithromycin (500 mg daily for 3 days) on the AUC and  $C_{max}$ , of sildenafil or its major circulating metabolite.

**Triazolam:**

In 14 healthy volunteers, co-administration of azithromycin 500 mg on day 1 and 250 mg on day 2 with 0,125 mg triazolam on day 2 had no significant effect on any of the pharmacokinetic variables for triazolam compared to triazolam and placebo.

**Trimethoprim/sulfamethoxazole:**

Co-administration of trimethoprim/sulfamethoxazole (160 mg/800 mg) for 7 days with azithromycin 1 200 mg on day 7 had no significant effect on peak concentrations, total exposure or urinary excretion of either trimethoprim or sulfamethoxazole. Azithromycin serum concentrations were similar to those seen in other studies.

**Special administration advised with the following:**

**Antacids:**

In a pharmacokinetic study investigating the effects of simultaneous administration of antacids azithromycin, no effect on overall bioavailability was seen although peak serum concentrations were reduced by approximately 24 %. In patients receiving both **ZATYP TABLETS** and antacids, the medicines should not be taken simultaneously. **ZATYP TABLETS** should be taken at least 1 hour before or 2 hours after an antacid.

**Cimetidine:**

A single dose of cimetidine administered 2 hours before **ZATYP TABLETS** had no effect on the pharmacokinetics of **ZATYP TABLETS**.

**No pharmacokinetic interactions were reported in studies of ZATYP TABLETS co-administered with:**

*Carbamazepine, methylprednisolone, didanosine (dideoxyinosine), theophylline, rifabutin*

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

(however co-administration of **ZATYP TABLETS** and rifabutin was associated with the development of neutropenia. A causal relationship to its combination with **ZATYP TABLETS** has not been established (see section 4.8)) and zidovudine (single 1000 mg) doses and multiple 1200 mg or 600 mg doses of azithromycin had little effect on the plasma pharmacokinetics or urinary excretion of zidovudine or its glucuronide metabolite. However, administration of azithromycin increased the concentrations of phosphorylated zidovudine, the clinically active metabolite, in peripheral blood mononuclear cells. The clinical significance of this finding is unclear, but it may be of benefit to patients).

**Special precautionary monitoring is advised with the following:**

**Ciclosporin:**

In a pharmacokinetic study with healthy volunteers that were administered a 500 mg/day oral dose of azithromycin for 3 days and were then administered a single 10 mg/kg oral dose of ciclosporin, the resulting ciclosporin  $C_{max}$  and  $AUC_{0-5}$  were found to be significantly elevated ( $C_{max}$  increase by 24 % and  $AUC_{0-5}$  was 5 107 and 4 210  $\mu\text{g}/\text{mL}$  with and without azithromycin, respectively,  $p \leq 0.05$ ). Consequently, caution should be exercised before co-administration of these two medicines. If co-administration is necessary, ciclosporin levels should be monitored and the dose adjusted accordingly.

**P-glycoprotein substrates:**

Concomitant administration of **ZATYP TABLETS** with P-glycoprotein substrates such as digoxin or dabigatran, has been reported to result in increased serum levels of the P-glycoprotein substrate. Therefore, if **ZATYP TABLETS** and P-glycoprotein substrates such as digoxin or dabigatran are administered concomitantly, the possibility of elevated serum medicine concentrations should be considered. Clinical monitoring and serum monitoring of digoxin levels during treatment with **ZATYP TABLETS** and after its discontinuation are necessary.

Some of the macrolide antibiotics have been reported to impair the metabolism of digoxin (in the gut) in some patients. Therefore, in patients receiving concomitant **ZATYP TABLETS**, a related azalide antibiotic, and digoxin the possibility of raised digoxin levels should be borne in mind.

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

**Warfarin:**

In a pharmacokinetic interaction study, azithromycin did not alter the anticoagulant effect of a single 15 mg dose of warfarin administered to healthy volunteers. However there have been reports received in the post-marketing period of potentiated anticoagulation subsequent to co-administration of **ZATYP TABLETS** and warfarin. Although a causal relationship has not been established, consideration should be given to the frequency of monitoring prothrombin time when **ZATYP TABLETS** is used in patients receiving coumarin-type oral anticoagulants.

**4.6. Fertility, pregnancy and lactation**

The safety and efficacy of **ZATYP TABLETS** in pregnancy and lactation have not been established.

**Pregnancy**

Animal reproduction studies have been performed at doses up to moderately maternally toxic dose concentrations. In these studies, no evidence of harm to the foetus due to azithromycin was found. There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, **ZATYP TABLETS** should be used during pregnancy only if clearly needed.

**Lactation**

Azithromycin has been reported to be secreted into human breast milk, but there are no adequate and well controlled clinical studies in nursing women that have characterized the pharmacokinetics of azithromycin excretion into human breast milk.

**ZATYP TABLETS** should only be used in lactating women where adequate alternatives are not available.

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

<b>4.7. Effects on ability to drive and use machines</b>	
Side effects such as dizziness, convulsions, vertigo, somnolence, and syncope have been reported with usage of <b>ZATYP TABLETS</b> . These side effects may affect a patient's ability to drive or operate machinery.	
<b>4.8. Undesirable effects</b>	
<b>a. Tabulated list of adverse reactions</b>	
<b>System organ class</b>	<b>ZATYP TABLETS Side effects</b>
<b>Blood and lymphatic system disorders</b>	
Less frequent	Neutropenia
<b>Immune system disorders</b>	
Less frequent	Angioedema
<b>Eye disorders</b>	
Less frequent	Abnormal vision
<b>Ear and labyrinth disorders</b>	
Less frequent	Hearing impairment including hearing loss, deafness and/or tinnitus
<b>Cardiac disorders</b>	
Less frequent	Chest pains, dysrhythmias including ventricular tachycardia, palpitations, QT prolongation, Torsade de Pointes
<b>Gastrointestinal disorders</b>	
Frequent	Abdominal discomfort (pain/ cramps), diarrhoea, nausea
Less frequent	Flatulence, loose stools, vomiting
Less frequent	Malena
<b>Hepatobiliary disorders</b>	
Frequent	

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

Less frequent	Abnormal liver function													
<b><i>Skin and subcutaneous tissue disorders</i></b>														
Less frequent	Rash													
Less frequent	Allergic reactions													
<b><i>Renal and urinary disorders</i></b>														
Less frequent	Nephritis													
<b><i>General disorders and administration site conditions</i></b>														
Frequent														
<p><b>In post-marketing experience, the following additional undesirable effects have been reported with frequency unknown:</b></p> <table border="1"> <thead> <tr> <th>System organ class</th> <th>ZATYP TABLETS Side effects</th> </tr> </thead> <tbody> <tr> <td><b><i>Infections and infestations</i></b></td> <td>Moniliasis, vaginitis</td> </tr> <tr> <td><b><i>Blood and lymphatic system disorders</i></b></td> <td>Thrombocytopenia</td> </tr> <tr> <td><b><i>Immune system disorders</i></b></td> <td>Anaphylaxis</td> </tr> <tr> <td><b><i>Metabolism and nutrition disorders</i></b></td> <td>Anorexia</td> </tr> <tr> <td><b><i>Psychiatric disorders</i></b></td> <td>Nervousness, aggressive reaction, agitation, anxiety</td> </tr> </tbody> </table>			System organ class	ZATYP TABLETS Side effects	<b><i>Infections and infestations</i></b>	Moniliasis, vaginitis	<b><i>Blood and lymphatic system disorders</i></b>	Thrombocytopenia	<b><i>Immune system disorders</i></b>	Anaphylaxis	<b><i>Metabolism and nutrition disorders</i></b>	Anorexia	<b><i>Psychiatric disorders</i></b>	Nervousness, aggressive reaction, agitation, anxiety
System organ class	ZATYP TABLETS Side effects													
<b><i>Infections and infestations</i></b>	Moniliasis, vaginitis													
<b><i>Blood and lymphatic system disorders</i></b>	Thrombocytopenia													
<b><i>Immune system disorders</i></b>	Anaphylaxis													
<b><i>Metabolism and nutrition disorders</i></b>	Anorexia													
<b><i>Psychiatric disorders</i></b>	Nervousness, aggressive reaction, agitation, anxiety													

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

<b><i>Nervous system disorders</i></b>	Dizziness, convulsions, headache, hyperactivity, hypoesthesia, paraesthesia, somnolence, syncope, taste/smell perversion and/or loss
<b><i>Ear and labyrinth disorders</i></b>	Deafness, tinnitus, impaired hearing, vertigo
<b><i>Cardiac disorders</i></b>	Palpitations, dysrhythmias including ventricular tachycardia, QT prolongation, Torsade de Pointes
<b><i>Vascular disorders</i></b>	Hypotension

#### **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 to SAHPRA via The '6.04 Adverse Drug Reactions Reporting Form'. Found under SAHPRA's publications: <https://www.sahpra.org.za/Publications/Index/8>

#### **4.9. Overdose**

Adverse events experienced in higher than recommended doses were similar to those seen at normal doses.

Typical symptoms of over dosage with macrolide antibiotics include hearing loss, severe nausea, vomiting and diarrhoea. General supportive measures are indicated.

### **5. PHARMACOLOGICAL PROPERTIES**

#### **5.1. Pharmacodynamic properties**

Azithromycin is an azalide, a subclass of the macrolide antibiotics. Chemically it is derived by insertion of a nitrogen atom into the lactone ring of erythromycin A. The chemical name of

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

azithromycin is 9-deoxy-9a-aza- 9a-methyl-9a-homoerythromycin A. The molecular weight is 749,0. Azithromycin binds to the 23S rRNA of the 50S ribosomal subunit. It blocks protein synthesis by inhibiting the transpeptidation/ translocation step of protein synthesis and by inhibiting the assembly of the 50S ribosomal subunit.

*Cardiac electrophysiology:*

QTc interval-prolongation was studied in a randomised, placebo-controlled parallel trial in 116 healthy subjects who received either chloroquine (1 000 mg) alone or in combination with azithromycin (500 mg, 1 000 mg, and 1 500 mg once daily). Co-administration of azithromycin significantly increased the QTc interval in a dose- and concentration-dependent manner. In comparison to chloroquine alone, the maximum mean (95 % upper confidence bound) increases in QTcF were 5 (10) ms, 7 (12) ms and 9 (14) ms with the co-administration of 500 mg, 1 000 mg and 1 500 mg azithromycin, respectively.

Efflux pumps occur in a number of bacteria, including Gram-negatives, such as *Haemophilus influenzae* (where they may determine intrinsically higher MICs) and staphylococci. In streptococci and enterococci, an efflux pump that recognises 14 - and 15-membered macrolides (which include, respectively, erythromycin and azithromycin) is encoded by *mef(A)* genes.

Azithromycin demonstrates cross-resistance with erythromycin-resistant Gram-positive organisms. Ribosomal modifications determine cross-resistance with other classes of antibiotics whose ribosomal binding sites overlap that of the macrolides: the lincosamides (including clindamycin), and the streptogramins B (which include, for example, the quinupristin component of quinupristin/dalfopristin). A decrease in macrolide susceptibility over time has been noted in particular in *Streptococcus pneumoniae* and *Staphylococcus aureus*, and has also been observed in *viridans streptococci* and in *Streptococcus agalactiae*.

Azithromycin has *in vitro* activity against:

- Aerobic and facultative Gram-positive bacteria (erythromycin-susceptible organisms).
- Aerobic and facultative Gram-negative bacteria.

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

*In vitro* resistance to azithromycin:

Azithromycin-resistant organisms are encountered relatively frequently among aerobic and facultative Gram- positive bacteria, in particular among methicillin-resistant *Staphylococcus aureus* (MRSA) and penicillin- resistant *Streptococcus pneumoniae* (PRSP).

*Pseudomonas* spp. and most *Enterobacteriaceae* are inherently resistant to azithromycin, although azithromycin has been used to treat *Salmonella enterica*, *Pneumocystis jirovecii* and *Toxoplasma gondii* infections.

*In vitro* sensitivity does not necessarily imply *in vivo* efficacy.

## 5.2. Pharmacokinetic properties

### Absorption

Following oral administration in humans, azithromycin is widely distributed throughout the body; bioavailability is approximately 37 %. No significant decrease in bioavailability was observed when azithromycin was administered with a meal. The time taken to peak plasma levels is 2 - 3 hours. In patients hospitalised with community acquired pneumonia receiving single daily one-hour intravenous infusions for 2 to 5 days of 500 mg azithromycin at a concentration of 2 mg/mL, the mean  $C_{max} \pm S.D.$  achieved was  $3,63 \pm 1,60 \mu\text{g/mL}$ , while the 24-hour trough level was  $0,20 \pm 0,15 \mu\text{g/mL}$ , and the  $AUC_{24}$  was  $9,60 \pm 4,80 \mu\text{g}\cdot\text{h/mL}$ . The mean  $C_{max}$ , 24-hour trough and  $AUC_{24}$  values were  $1,14 \pm 0,14 \mu\text{g/mL}$ ,  $0,18 \pm 0,02 \mu\text{g}$ , and  $8,03 \pm 0,86 \mu\text{gh/mL}$ , respectively, in normal volunteers receiving a 3-hour intravenous infusion of 500 mg azithromycin at a concentration of 1 mg/mL.

### Distribution

Kinetic studies of variable times ranging from hours to days after oral intake have shown markedly higher azithromycin levels in tissue than in plasma (up to 50 times the maximum observed concentration in plasma) indicating that the medicine is highly tissue bound. Concentrations in

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

target tissues such as lung, tonsil and prostate exceed the MIC90 for likely pathogens after a single dose of 500 mg

**Elimination**

Plasma terminal elimination half-life closely reflects the tissue depletion half-life of 2 to 4 days. Approximately 12 % of an intravenously administered dose is excreted in the urine over 3 days as azithromycin, the majority in the first 24 hours. Biliary excretion of azithromycin is a major route of elimination for unchanged medicine following oral administration. Very high concentrations of unchanged medicine have been found in human bile, together with 10 metabolites, formed by N- and O-demethylation, by hydroxylation of the desosamine and aglycone rings, and by cleavage of the cladinose conjugate. Comparison of HPLC and microbiological assays in tissues suggests that metabolites play no part in the microbiological activity of azithromycin.

In a multiple-dose study in 12 normal volunteers utilising a 500 mg (1 mg/mL) one-hour intravenous dosage regimen for five days, the amount of administered azithromycin dose excreted in urine in 24 hours was about 11 % after the 1st dose and 14 % after the 5th dose. These values are greater than the reported 6 % excreted unchanged in urine after oral administration of azithromycin.

The pharmacokinetics of azithromycin in adult patients with mild-to-moderate renal impairment (GFR 10 – 80 mL/min) were not affected following a single 1 g dose of immediate release azithromycin. Statistically significant differences in  $AUC_{0-120}$  (8,8 mg × hr/mL vs. 11,7 mg × hr/mL),  $C_{max}$  (1,0 mg/mL vs. 1,6 mg/mL) and  $CL_r$  (2,3 mL/min/kg vs. 0,2 mL/min/kg) were observed between the group with severe renal impairment (GFR < 10 mL/min) and the group with normal renal function.

**Hepatic insufficiency:**

In patients with mild (Class A) to moderate (Class B) hepatic impairment, there is no evidence of a marked change in serum pharmacokinetics of azithromycin compared to normal hepatic function. The urinary clearance of azithromycin appears to increase in these patients, perhaps to compensate for reduced hepatic clearance. Azithromycin has not been studied and should not be used in patients with severe hepatic impairment.

**Elderly:**

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

<p>Elderly volunteers (&gt; 65 years) had slightly higher AUC values than in young volunteers (&lt; 40 years) after a 5-day regimen, but these are not considered clinically significant, and hence no dose adjustment is recommended.</p>
<p><b>5.3 Preclinical safety data</b></p> <p><b>Not applicable</b></p>
<p><b>Environmental Risk Assessment</b></p> <p><b>ZATYP TABLETS</b> is a well-established active ingredient used in pharmaceutical preparations for human use. Given the anticipated pattern of use and disposal of the product, the environmental exposure of the active substance and metabolites are expected to be very limited. The use of <b>ZATYP TABLETS</b> 500 mg is not considered warranting any environmental concerns or requiring any special product labelling.</p>
<p><b>6. PHARMACEUTICAL PARTICULARS</b></p>
<p><b>6.1. List of excipients</b></p> <p>Azithromycin Dihydrate</p> <p>Calcium Hydrogen Phosphate, Anhydrous</p> <p>Starch, Pregelatinised</p> <p>Croscarmellose Sodium</p> <p>Starch, Pregelatinised</p> <p>Sodium Lauryl Sulfate</p> <p>Magnesium Stearate</p> <p>Opadry II 31K58902 white</p> <p>Purified water</p>
<p><b>6.2. Incompatibilities</b></p> <p>Not applicable</p>
<p><b>6.3. Shelf life</b></p> <p>3 years</p>
<p><b>6.4. Special precautions for storage</b></p> <p>Store at or below 25 °C.</p> <p>Keep in original packaging until required for use.</p>

**Applicant:** Aurogen South Africa (Pty) Ltd  
**Product Name:** ZATYP TABLETS  
**Dosage form and strength:** Film coated Tablet, 500 mg

**MODULE 1**  
**Date:** 22.05.2020

<b>KEEP OUT OF REACH OF CHILDREN.</b>
<b>6.5. Nature and contents of container</b>
<p><b>Clear PVC Film- Aluminium foil blister pack:</b></p> <p>Azithromycin Tablets 500 mg are packed in above blisters shall be further packed in pre-printed cartons with package leaflet according to the approved pack size. The proposed labelling text for the primary and secondary pack.</p> <p><b>For 500 mg:</b></p> <p><b>3's:</b> Printed cardboard carton containing 1 blister of 3 tablets each.</p>
<b>6.6. Special precautions for disposal of a used medicine or waste materials derived from such medicine and other handling of the product</b>
No special requirements.
<b>7. NAME AND BUSINESS ADDRESS OF THE HOLDER OF THE CERTIFICATE OF REGISTRATION</b>
<p>AUROGEN SA (Pty) Ltd</p> <p>Woodhill Office Park, Building 1, First Floor</p> <p>53 Phillip Engelbrecht Avenue</p> <p>Meyersdal, Ext. 12, 1448</p> <p>Johannesburg</p> <p>South Africa</p>
<b>8. REGISTRATION NUMBER</b>
50/20.1.1/0755
<b>9. DATE OF FIRST AUTHORISATION</b>
10 NOVEMBER 2020
<b>10. DATE OF REVISION OF TEXT</b>
TBA