



For the use of a Registered Medical Practitioner or a Hospital or a Laboratory only

Rx

# Tigecycline for Injection USP 50mg



**COMPOSITION**  
Each Vial contains:  
Tigecycline USP 50 mg  
Excipients q.s.  
**Sodium chloride Injection IP 5ml FFS Plastic Ampoule**  
Each mL contains:  
Sodium chloride IP 9.0mg  
Sterile water for injections IP q.s.

**PHARMACEUTICAL FORM**  
Lyophilized powder for reconstitution in a single-dose vial.  
(For IV Use only)

**PHARMACOLOGICAL PROPERTIES**  
**Pharmacodynamic Properties**  
Pharmacotherapeutic group: Antibacterials for systemic use  
ATC code: J01AA12

Tigecycline is a tetracycline derivative (a glycylicycline) for intravenous infusion. The chemical name of tigecycline is (4S,4aS,5aR,12aS)-9-[2-(tert-butylamino)acetamido]-4,7-bis(dimethylamino)-1,4,4a,5,5a,6,11,12a-octahydro-3,10,12,12a-tetrahydroxy-1,11-dioxo-2-naphthacene-carboxamide. The empirical formula is C<sub>24</sub>H<sub>34</sub>N<sub>4</sub>O<sub>8</sub>, and the molecular weight is 585.65.

**Mechanism of Action**  
Tigecycline, a glycylicycline, inhibits protein translation in bacteria by binding to the 30S ribosomal subunit and blocking the entry of amino-acyl tRNA molecules into the A site of the ribosome. This prevents incorporation of amino acid residues into elongating peptide chains. Tigecycline carries a glycyllamido moiety attached to the 9-position of minocycline.

**Pharmacokinetic Properties**  
The mean pharmacokinetic parameters of tigecycline after single and multiple intravenous doses based on pooled data from clinical pharmacology studies are summarized in the below table. Intravenous infusions of tigecycline were administered over approximately 30 to 60 minutes.

**Table 1: Mean Pharmacokinetic Parameters Of Tigecycline After Single And Multiple Intravenous Doses**

	Single Dose 100 mg (N=224)	Multiple Dose* 50 mg q12h (N=103)
C <sub>max</sub> (µg/ml) <sup>†</sup>	1.45 (22%)	0.87 (27%)
C <sub>max</sub> (µg/ml) <sup>‡</sup>	0.90 (30%)	0.63 (15%)
AUC (µg/ml)	5.19 (36%)	--
AUC 0-24h(µg/ml)	--	4.70 (36%)
C <sub>min</sub> (µg/ml)	--	0.13 (59%)
t1/2 (h)	27.1 (53%)	42.4 (83%)
CL (L/h)	21.8 (40%)	23.8 (33%)
CL <sub>r</sub> (mL/min)	38.0 (82%)	51.0 (58%)
V <sub>ss</sub> (L)	568 (43%)	639 (48%)

<sup>†</sup> 100 mg initially, followed by 50 mg every 12 hours

<sup>‡</sup> 30-minute infusion, 60-minute infusion

The *in vitro* plasma protein binding of tigecycline ranges from approximately 71% to 89% at concentrations observed in clinical studies (0.1 to 1.0 µg/mL). Tigecycline is not extensively metabolized. Overall, the primary route of elimination for tigecycline is biliary excretion of unchanged tigecycline and its metabolites. Glucuronidation and renal excretion of unchanged tigecycline are secondary routes.

**Clinical Studies**  
*Complicated Skin and Skin Structure Infections*

Tigecycline was evaluated in adults for the treatment of complicated skin and skin structure infections (cSSSI) in two randomized, double-blind, active-controlled, multinational, multicenter studies (Studies 300 and 305). These studies compared tigecycline (100 mg IV initial dose followed by 50 mg every 12 hours) with vancomycin (1g IV every 12 hours)/aztreonam (2 g IV every 12 hours) for 5 to 14 days. Patients with complicated deep soft tissue infections including wound infections and cellulitis (≥10 cm, requiring surgery/drainage or with complicated underlying disease), major abscesses, infected ulcers, and burns were enrolled in the studies. The primary efficacy endpoint was the clinical response at the test of cure (TOC) visit in the coprimary populations of the clinically evaluable (CE) and clinical modified intent-to-treat (mITT) patients.

**Table 2: Clinical Cure Rates from Two Pivotal Studies in Complicated Skin and Skin Structure Infections after 5 to 14 Days of Therapy**

	Tigecycline* n/N (%)	Vancomycin/Aztreonam* n/N (%)
Integrated CE	365/422 (86.5)	364/411 (88.6)
c-mITT	429/538 (79.7)	425/519 (81.9)
Study 300 CE	165/199 (82.9)	163/198 (82.3)
c-mITT	209/277 (75.5)	200/260 (76.9)
Study 305 CE	200/223 (89.7)	201/213 (94.4)
c-mITT	220/261 (84.3)	225/259 (86.9)

<sup>\*</sup> 100 mg initially, followed by 50 mg every 12 hours

<sup>\*</sup> Vancomycin (1 g IV every 12 hours)/Aztreonam (2 g IV every 12 hours)

**Table 3: Clinical Cure Rates By Infecting Pathogen in Microbiologically Evaluable Patients with Complicated Skin and Skin Structure Infections\***

Pathogen	Tigecycline n/N (%)	Vancomycin/Aztreonam n/N (%)
Escherichia coli Enterococcus faecalis (vancomycin-susceptible only)	27/32 (84.4)	26/30 (86.7)
Methicillin-susceptible Staphylococcus aureus (MSSA)	13/17 (76.5)	24/29 (82.8)
Methicillin-resistant Staphylococcus aureus (MRSA)	125/139 (89.9)	118/126 (93.7)
Methicillin-resistant Staphylococcus aureus (MRSA)	29/37 (78.4)	26/34 (76.5)
Streptococcus agalactiae	8/8 (100)	11/13 (84.6)
Streptococcus anginosus grp.*	16/20 (80.0)	9/10 (90.0)
Streptococcus pyogenes	31/33 (93.9)	24/27 (88.9)
Bacteroides fragilis	6/8 (75.0)	4/5 (80.0)

<sup>\*</sup> Two cSSSI pivotal studies and one Phase 3 Resistant Pathogen study

<sup>\*</sup> Includes Streptococcus anginosus, Streptococcus intermedius, and Streptococcus constellatus

*Complicated Intra-abdominal Infections*

Tigecycline was evaluated in adults for the treatment of complicated intra-abdominal infections (cIAI) in two randomized, double-blind, active-controlled, multinational, multicenter studies (Studies 301 and 306). These studies compared tigecycline (100 mg IV initial dose followed by 50 mg every 12 hours) with imipenem/cilastatin (500 mg IV every 6 hours) for 5 to 14 days. Patients with complicated diagnoses including appendicitis, cholecystitis, diver ticulitis, gastric/duodenal perforation, intra-abdominal abscess, perforation of intestine, and peritonitis were enrolled in the studies. The primary efficacy endpoint was the clinical response at the TOC visit for the co-primary populations of the microbiologically evaluable (ME) and the microbiologically modified intent-to-treat (m-mITT) patients.

**Table 4: Clinical Cure Rates from Two Pivotal Studies in Complicated Intra-abdominal Infections after 5 to 14 Days of Therapy**

	Tigecycline* n/N (%)	Imipenem/Cilastatin* n/N (%)
Integrated ME	441/512 (86.1)	442/513 (86.2)
m-mITT	506/631 (80.2)	514/631 (81.5)
Study 301 ME	199/247 (80.6)	210/255 (82.4)
m-mITT	227/309 (73.5)	244/312 (78.2)
Study 306 ME	242/265 (91.3)	232/258 (89.9)
m-mITT	279/322 (86.6)	270/319 (84.6)

<sup>\*</sup> 100 mg initially, followed by 50 mg every 12 hours

<sup>\*</sup> Imipenem/Cilastatin (500 mg every 6 hours)



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colour, if not, the solution should be discarded. Parenteral drug products should be inspected visually for particulate matter and discoloration (e.g. green or black) prior to administration. If discoloured to green or black, then solution to be discarded. Once reconstituted, TIGEPLUG for injection may be stored at room temperature (Not exceeding 25°C/77°F) for upto 24 hrs (upto 6 hrs. in vial & remaining time in IV bag).

Alternatively, TIGEPLUG for injection may be stored refrigerated at 2 to 8°C (36° to 46°F) for up to 48 hours, following immediate transfer of reconstituted solution in to the IV bag. Reconstituted solution must be transferred & further diluted for IV infusion.

TIGEPLUG may be administered intravenously through a dedicated line or through a Y-site. If the same intravenous line is used for sequential infusion of several drugs, the line should be flushed before and after infusion of TIGEPLUG with 0.9% sodium chloride injection IP. 5% Dextrose injection IP. Injection should be made with an infusion solution compatible with Tigecycline and with any other drug administered via this common line.

## Compatibilities

Compatible intravenous solutions include 0.9% Sodium Chloride Injection, IP, and 5% Dextrose Injection, IP. When administered through a Y-site, tigecycline is compatible with the following drugs or diluents: dobutamine, dopamine HCl, Lactated Ringer's, lidocaine HCl, potassium chloride, ranitidine HCl, and theophylline.

## Incompatibilities

The following drugs should not be administered simultaneously through the same Y-site as tigecycline: amphotericin B, chlorpromazine, methylprednisolone, and voriconazole.

## Contraindications

Tigecycline is contraindicated for use in patients who have known hypersensitivity to tigecycline.

## Special Warnings and Precautions for Use

### Warnings

Tigecycline class antibiotics are structurally similar to tetracycline class antibiotics and may have similar adverse effects.

Tigecycline may cause fetal harm when administered to a pregnant woman. If the patient becomes pregnant while taking tigecycline, the patient should be apprised of the potential hazard to the fetus.

The use of tigecycline during tooth development (last half of pregnancy, infancy, and childhood to the age of 8 years) may cause permanent discoloration of the teeth (yellowgray brown). Tigecycline should be administered with caution in patients with known hypersensitivity to tetracycline class antibiotics. Pseudomembranous colitis has been reported with nearly all antibacterial agents and may range in severity from mild to life-threatening. Therefore, it is important to consider this diagnosis in patients who present with diarrhea subsequent to the administration of any antibacterial agent.

## Precautions

### General

Caution should be exercised when considering tigecycline monotherapy in patients with complicated intra-abdominal infections (cIAI) secondary to clinically apparent intestinal perforation.

Glycylicycline class antibiotics are structurally similar to tetracycline class antibiotics and may have similar adverse effects. Such effects may include: photosensitivity, pseudotumor cerebri, pancreatitis, and anti-anabolic action (which has lead to increased BUN, azotemia, acidosis, and hypophosphatemia).

As with other antibacterial drugs, use of tigecycline may result in overgrowth of non susceptible organisms, including fungi. Patients should be carefully monitored during therapy. If superinfection occurs, appropriate measures should be taken.

Prescribing tigecycline in the absence of a proven or strongly suspected bacterial infection is unlikely to provide benefit to the patient and increases the risk of the development of drug resistant bacteria.

## Drug Interactions

Tigecycline (100 mg followed by 50 mg every 12 hours) and digoxin (0.5 mg followed by 0.25 mg, orally, every 24 hours) were coadministered to healthy subjects in a drug interaction study. Tigecycline slightly decreased the C<sub>max</sub> of digoxin by 13%, but did not affect the AUC or clearance of digoxin. In addition, digoxin did not affect the pharmacokinetic profile of tigecycline. Therefore, no dosage adjustment of either drug is necessary when tigecycline is administered with digoxin. Concomitant administration of tigecycline (100 mg followed by 50mg every 12 hours) and warfarin (25 mg single-dose) to healthy subjects resulted in a decrease in clearance of R-Warfarin and S-Warfarin by 40% and 23%, an increase in C<sub>max</sub> by 38% and 43% and an increase in AUC by 68% and 29%, respectively. Tigecycline did not significantly alter the effects of warfarin on INR. In addition, warfarin did not affect the pharmacokinetic profile of tigecycline. However, prothrombin time or other suitable anticoagulation test should be monitored if tigecycline is administered with warfarin.

*In vitro* studies in human liver microsomes indicate that tigecycline does not alter the metabolism of drugs metabolized by these enzymes. In addition, because tigecycline is not extensively metabolized, clearance of tigecycline is not expected to be affected by drugs that inhibit or induce the activity of these CYP450 isoforms.

Concurrent use of antibacterial drugs with oral contraceptives may render oral contraceptives less effective.

## Microbiology

Tigecycline, a glycylicycline, inhibits protein translation in bacteria by binding to the 30S ribosomal subunit and blocking entry of amino-acyl tRNA molecules into the A site of the ribosome. This prevents incorporation of amino acid residues into elongating peptide chains.

Tigecycline carries a glycyllamido moiety attached to the 9-position of minocycline. The substitution pattern is not present in any naturally occurring or semisynthetic tetracycline and imparts certain microbiologic properties to tigecycline.

Tigecycline is not affected by the two major tetracycline resistance mechanisms, ribosomal protection and efflux. Accordingly, tigecycline has demonstrated *in vitro* and *in vivo* activity against a broad spectrum of bacterial pathogens. There has been no cross resistance observed between tigecycline and other antibiotics. Tigecycline is not affected by resistance mechanisms such as beta-lactamases (including extended spectrum beta-lactamases), target site modifications, macrolide efflux pumps or enzyme target changes (e.g. gyrase/topoisomerase).

Tigecycline has been shown to be active against most strains of the following microorganisms, both *in vitro* and in clinical infections.

### Aerobic facultative gram-positive microorganisms

*Enterococcus faecalis* (vancomycin-susceptible isolates only), *Staphylococcus aureus* (methicillin-susceptible and -resistant isolates), *Streptococcus agalactiae*, *Streptococcus anginosus* grp. (includes *S. anginosus*, *S. intermedius*, and *S. Constellatus*), *Streptococcus pyogenes*.

### Aerobic and facultative gram-negative microorganisms

*Citrobacter freundii*, *Enterobacter cloacae*, *Escherichia coli*, *Klebsiella oxytoca*.

### Anaerobic microorganisms

*Bacteroides fragilis*, *Bacteroides thetaiotaomicron*, *Bacteroides uniformis*, *Bacteroides vulgatus*, *Clostridium perfringens*, *Peptostreptococcus micros*.

At least 90% of the following bacteria exhibit *in vitro* minimum inhibitory concentrations (MICs) that are at concentrations that are achievable using the prescribed dosing regimens. However, the clinical significance of this is unknown because the safety and effectiveness of tigecycline in treating clinical infections due to these bacteria have not been established in adequate and well-controlled clinical trials.

### Aerobic and facultative gram-positive microorganisms

*Enterococcus avium*, *Enterococcus casseliflavus*, *Enterococcus faecalis* (vancomycin resistant isolates), *Enterococcus faecium* (vancomycin-susceptible and resistant isolates), *Enterococcus gallinarum*, *Listeria monocytogenes*, *Staphylococcus epidermidis* (methicillin susceptible and -resistant isolates) and



*Staphylococcus haemolyticus*.  
*Aerobic and facultative gram-negative microorganisms*  
*Acinetobacter baumannii*, *Aeromonas hydrophila*, *Citrobacter koseri*, *Enterobacter aerogenes*, *Pasteurella multocida*, *Serratiamarcescens* and *Stenotrophomonas maltophilia*.  
*Anaerobic microorganisms*  
*Bacteroides distasonis*, *Bacteroides ovatus*, *Peptostreptococcus spp.*, *Porphyromonas spp.*, *Prevotella spp.*

### Other microorganisms

*Mycobacterium abscessus*, *Mycobacterium chelonae*, *Mycobacterium fortuitum*

## Pregnancy and Lactation

### Pregnancy

There are no adequate and well-controlled studies of tigecycline in pregnant women. Tigecycline should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

### Lactation

Because many drugs are excreted in human milk, caution should be exercised when tigecycline is administered to a nursing woman.

## Effects on Ability to Drive and Use Machines

No studies on the effects of tigecycline on the ability to drive and use machines have been performed. Dizziness may occur and this may have an effect on driving and use of machines.

## Undesirable Effects

The most common treatment-emergent adverse events, were nausea and vomiting which generally occurred during the first 1 – 2 days of therapy.

The following drug-related adverse events were reported infrequently (≥0.2% and <2%) in patients receiving tigecycline in Phase 3 clinical studies:

*Body as a Whole:* injection site inflammation, injection site pain, injection site reaction, septic shock, allergic reaction, chills, injection site edema, injection site phlebitis.

*Cardiovascular System:* thrombophlebitis, bradycardia, tachycardia, vasodilatation

*Digestive System:* anorexia, dry mouth, jaundice, abnormal stools

*Metabolic/Nutritional System:* increased creatinine, hypocalcemia, hypoglycemia, hyponatremia

*Nervous System:* somnolence

*Special Senses:* taste perversion

*Hemic and Lymphatic System:* prolonged activated partial thromboplastin time (aPTT), prolonged prothrombin time (PTI), eosinophilia, increased international normalized ratio (INR), thrombocytopenia

*Urogenital System:* vaginal moniliasis, vaginitis, leukorrhea.

## Overdose

No specific information is available on the treatment of overdose with tigecycline. Intravenous administration of tigecycline at a single dose of 300 mg over 60 minutes in healthy volunteers reported an increased incidence of nausea and vomiting. In single dose intravenous toxicity studies conducted with tigecycline in mice, the estimated median lethal dose (LD<sub>50</sub>) was 124 mg/kg in males and 98 mg/kg in females. In rats, the estimated LD<sub>50</sub> was 106 mg/kg for both sexes. Tigecycline is not removed in significant quantities by hemodialysis.

## PHARMACEUTICAL PARTICULARS

### Shelf Life

Please refer carton/label.

## Storage and Precautions

### Store at a temperature below 25°C. Protect from light.

Once reconstituted, tigecycline may be stored at room temperature for up to 24 hours (up to 6 hours in the vial and the remaining time in the IV bag).

Keep out of reach of children.

## Special Precautions for Disposal and Other Handling

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

## Nature and Contents of Container

**TIGEPLUG<sup>®</sup>** for injection is available in 10mL clear transparent glass vial, stoppered and sealed with flip off seal. One vial is packed with a 5mL FFS plastic ampoule of sodium chloride injection IP 0.9% w/v in a PVC tray, along with the package insert in a carton.

**Pack size:** 10mL vials

Marketed by:  
**Biocon Biologics India Limited**  
Biocon House, Semicon Park,  
Electronics City, Phase - II,  
Bengaluru - 560 100, India.

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To report adverse events and/or product complaints visit our website **www.biocon.com** or call toll free number: **1800 102 9465** or e-mail us at **drugsafety@biocon.com**.

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