

Paclitaxel (protein-bound particle) for Injectable Suspension 100mg/vial



Each vial contains :

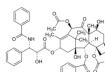
Paclitaxel	IP	100mg
Human Albumin	IP	900mg
(approximately)		
Excipients		q.s.

DESCRIPTION

Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is paclitaxel formulated as albumin-bound nanoparticles with a mean particle size of approximately 130 nanometers. Paclitaxel exists in the particles in a noncrystalline, amorphous state. Paclitaxel is a microtubule inhibitor.

The chemical name for paclitaxel is 5b,20-Epoxy-1,2a,4,7b,10,13a-hexahydroxytax-11-en-9-one,4,10-diacetate 2-benzoate 13-ester with (2R,3S)-N-benzoyl-3phenylsorine.

The empirical formula is $C_{23}H_{31}NO_{14}$ and the molecular weight is 853.91. Paclitaxel has the following structural formula:

**CLINICAL PHARMACOLOGY****Mechanism of Action**

Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is a microtubule inhibitor that promotes the assembly of microtubules from tubulin dimers and stabilizes microtubules by preventing depolymerization.

This stability results in the inhibition of the normal dynamic reorganization of the microtubule network that is essential for vital interphase and mitotic cellular functions.

Paclitaxel induces abnormal arrays or "bundles" of microtubules throughout the cell cycle and multiple asters of microtubules during mitosis.

Pharmacokinetics

The pharmacokinetics of total paclitaxel following 30 and 180-minute infusions of protein bound paclitaxel at dose levels of 80 to 375 mg/m² (0.31 to 1.15 times the maximum approved recommended dosage) were determined in clinical studies. Dose levels of mg/m² refer to mg of paclitaxel in protein bound paclitaxel. Following intravenous administration of protein bound paclitaxel to patients with solid tumors, paclitaxel plasma concentrations declined in a biphasic manner, the initial rapid decline representing distribution to the peripheral compartment and the slower second phase representing drug elimination.

Following protein bound paclitaxel infusion, paclitaxel exhibited linear drug exposure (AUC) across clinical doses ranging from 80 to 300 mg/m² (0.31 to 1.15 times the maximum approved recommended dosage). The pharmacokinetics of paclitaxel in protein bound paclitaxel were independent of the duration of intravenous administration. The pharmacokinetic data of 260 mg/m² protein bound paclitaxel administered over a 30-minute infusion was compared to the pharmacokinetics of 175 mg/m² paclitaxel injection over \geq 3 hour infusion. Clearance was larger (43%) and the volume of distribution was higher (53%) for protein bound paclitaxel than for paclitaxel injection. There were no differences in terminal half-lives.

Distribution

Following protein bound paclitaxel administration to patients with solid tumors, paclitaxel is evenly distributed into blood cells and plasma and is highly bound to plasma proteins (94%). The total volume of distribution is approximately 1741 L; the large volume of distribution indicates extensive extravascular distribution and/or tissue binding of paclitaxel.

In a within-patient comparison study, the fraction of unbound paclitaxel in plasma was significantly higher with protein bound paclitaxel (6.2%) than with solvent-based paclitaxel (2.3%). This contributes to significantly higher exposure to unbound paclitaxel with protein bound paclitaxel compared with solvent-based paclitaxel, when the total exposure is comparable. In vitro studies of binding to human serum proteins, using paclitaxel concentrations ranging from 0.1 to 50 μ g/mL, indicated that the presence of cimetidine, ranitidine, dexamethasone, or diphenhydramine did not affect protein binding of paclitaxel.

Elimination

At the clinical dose range of 80 to 300 mg/m² (0.31 to 1.15 times the maximum approved recommended dosage), the mean total clearance of paclitaxel ranges from 13 to 30 L/h/m² and the mean terminal half-life ranges from 13 to 27 hours.

Metabolism

In vitro studies with human liver microsomes and tissue slices showed that paclitaxel in protein bound paclitaxel was metabolized primarily to 6a-hydroxypaclitaxel by CYP2C8; and to two minor metabolites, 3'-p-hydroxypaclitaxel and 6a, 3'-p-dihydroxypaclitaxel, by CYP3A4. In vitro, the metabolism of paclitaxel to 6a-hydroxypaclitaxel was inhibited by a number of agents (ketonazole, verapamil, diazepam, quinidine, dexamethasone, cyclosporin, teniposide, etoposide, and vincristine), but the concentrations used exceeded those found in vivo following normal therapeutic doses. Testosterone, 21a-ethynodiol, retinoic acid, and quercetin, a specific inhibitor of CYP2C8, also inhibited the formation of 6a-hydroxypaclitaxel in vitro. The pharmacokinetics of paclitaxel may also be altered in vivo as a result of interactions with compounds that are substrates, inducers, or inhibitors of CYP2C8 and/or CYP3A4.

Excretion

After a 30-minute infusion of 260 mg/m² doses of protein bound paclitaxel, the mean values for cumulative urinary recovery of unchanged drug (4%) indicated extensive non renal clearance. Less than 1% of the total administered dose was excreted in urine as the metabolites 6a-hydroxypaclitaxel and 3'-p-hydroxypaclitaxel. Fecal excretion was approximately 20% of the total dose administered.

INDICATIONS AND USAGE

Paclitaxel Protein-Bound Particles for Injectable suspension is indicated for the treatment of:

- Metastatic breast cancer, after failure of combination chemotherapy for metastatic disease or relapse within 6 months of adjuvant chemotherapy. Prior therapy should have included an anthracycline unless clinically contraindicated.
- Locally advanced or metastatic non-small cell lung cancer (NSCLC), as first-line treatment in combination with carboplatin, in patients who are not candidates for curative surgery or radiation therapy.
- Metastatic adenocarcinoma of the pancreas as first-line treatment, in combination with gemcitabine.

DOSAGE AND ADMINISTRATION**Important Administration Instructions**

DO NOT SUBSTITUTE FOR OR WITH OTHER PACLITAXEL FORMULATIONS.

Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) has different dosage and administration instructions from other paclitaxel products.

front

WARNINGS AND PRECAUTIONS
Severe Myelosuppression

Closely monitor the infusion site for extravasation or drug infiltration during administration.

Limiting the infusion of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) to 30 minutes may reduce the risk of infusion-related reactions.

Consider premedication in patients who have had prior hypersensitivity reactions to Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound).

Do not re-challenge patients who experience a severe hypersensitivity reaction to Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound).

Recommended Dosage for Metastatic Breast Cancer

After failure of combination chemotherapy for metastatic breast cancer or relapse within 6 months of adjuvant chemotherapy, the recommended regimen for Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is 260 mg/m² administered intravenously over 30 minutes every 3 weeks.

Recommended Dosage for Non-Small Cell Lung Cancer

The recommended dose of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is 100 mg/m² administered as an intravenous infusion over 30 minutes on Days 1, 8, and 15 of each 21-day cycle.

Administer carboplatin on Day 1 of each 21-day cycle immediately after Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound).

Recommended Dosage for Adenocarcinoma of the Pancreas

The recommended dose of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is 125 mg/m² administered as an intravenous infusion over 30-40 minutes on Days 1, 8 and 15 of each 28-day cycle. Administer gemcitabine immediately after Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) on Days 1, 8 and 15 of each 28 day cycle.

Dosage Modifications for Hepatic Impairment

For patients with moderate or severe hepatic impairment, reduce the starting dose of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) as shown in Table 1.

Table 1: Recommendations for Starting Dose in Patients with Moderate and Severe Hepatic Impairment

	AST Levels	Bilirubin Levels	Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) Dose ^a			
			MBC	NSCLC ^b	Adenocarcinoma of Pancreas ^c	
Moderate	< 10 x ULN	AND	> 1.5 to \leq 3 x ULN	200 mg/m ² ^b	80 mg/m ² ^b	not recommended
Severe	< 10 x ULN	AND	> 3 to \leq 5 x ULN	200 mg/m ² ^b	80 mg/m ² ^b	not recommended
	> 10 x ULN	OR	> 5 x ULN	not recommended	not recommended	recommended

AST = Aspartate Aminotransferase; MBC = Metastatic Breast Cancer; NSCLC = Non-Small Cell Lung Cancer; ULN = Upper limit of normal.

^aDosage recommendations are for the first course of therapy. The need for further dose adjustments in subsequent courses should be based on individual tolerance.

^bDo a dose increase to 260 mg/m² for patients with metastatic breast cancer or 100 mg/m² for patients with non small cell lung cancer in subsequent courses should be considered if the patient tolerates the reduced dose for two cycles.

^cPatients with bilirubin levels above the upper limit of normal were excluded from clinical trials for pancreatic or lung cancer.

Preparation for Intravenous Administration

Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is a hazardous drug. Follow applicable special handling and disposal procedures. The use of gloves is recommended. If Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) (lyophilized cake or reconstituted suspension) contacts the skin, wash the skin immediately and thoroughly with soap and water. Following topical exposure to paclitaxel, events may include tingling, burning and redness. If Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) contacts mucous membranes, the membranes should be flushed thoroughly with water.

Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is supplied as a sterile lyophilized powder for reconstitution before use. Read the entire preparation instructions prior to reconstitution.

1. Aseptically, reconstitute each vial by injecting 20 mL of 0.9% Sodium Chloride Injection, IP.
2. Slowly inject the 20 mL of 0.9% Sodium Chloride Injection, IP, over a minimum of 1 minute, using the sterile syringe to direct the solution flow onto the INSIDE WALL OF THE VIAL.



3. DO NOT INJECT the 0.9% Sodium Chloride Injection, IP, directly onto the lyophilized cake as this will result in foaming.

4. Once the injection is complete, allow the vial to sit for a minimum of 5 minutes to ensure proper wetting of the lyophilized cake/powder.

5. Gently swirl and/or invert the vial slowly for at least 2 minutes until complete dissolution of any cake/powder occurs. Avoid generation of foam.

6. If foaming or clumping occurs, stand solution for at least 15 minutes until foam subsides.

Each mL of the reconstituted formulation will contain 5 mg/mL paclitaxel. The reconstituted suspension should be milky and homogeneous without visible particulates. If particulates or settling are visible, the vial should be gently inverted again to ensure complete resuspension prior to use. Discard the reconstituted suspension if precipitates are observed. Discard any unused portion.

Calculate the exact total dosing volume of 5 mg/mL suspension required for the patient and slowly withdraw the dosing volume of the reconstituted suspension from the vial(s) into a syringe:

Dosing volume (mL)=Total dose (mg)/5 (mg/mL).

Inject the appropriate amount of reconstituted Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) into an empty, sterile intravenous bag [plasticized polyvinyl chloride (PVC) containers, PVC or non-PVC type intravenous bag]. The use of specialized DEHP-free solution containers or administration sets is not necessary to prepare or administer Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) infusions. The use of medical devices containing silicone oil as a lubricant (i.e., syringes and intravenous bags) to reconstitute and administer Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) may result in the formation of proteinaceous strands.

Visually inspect the reconstituted Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) suspension in the intravenous bag prior to administration. Discard the reconstituted suspension if proteinaceous strands, particulate matter or discoloration are observed.

CONTRAINDICATIONS

- Neutrophil counts of $< 1,500$ cells/mm³.
- Severe hypersensitivity reactions to Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound).

WARNINGS AND PRECAUTIONS

Severe Myelosuppression

Severe myelosuppression (primarily neutropenia) is dose-dependent and a dose-limiting toxicity of protein bound paclitaxel. In clinical studies, Grade 3-4 neutropenia occurred in 34% of patients with metastatic breast cancer (MBC), 47% of patients with non-small cell lung cancer (NSCLC), and 38% of patients with pancreatic cancer. Monitor for severe neutropenia and thrombocytopenia by performing complete blood count frequently, including prior to dosing on Day 1 (for MBC) and Days 1, 8, and 15 (for NSCLC and for pancreatic cancer). Do not administer Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) to patients with baseline absolute neutrophil counts (ANC) of less than 1,500 cells/mm³. In the case of severe neutropenia (< 500 cells/mm³) for seven days or more) during a course of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) therapy, reduce the dose of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) in subsequent courses in patients with either MBC or NSCLC.

In patients with MBC, resume treatment with every-3-week cycles of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) after ANC recovers to a level $> 1,500$ cells/mm³. In patients with NSCLC, resume treatment if recommended at permanently reduced doses for both weekly Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) and every-3-week carboplatin after ANC recovers to at least 1500 cells/mm³ and platelet count of at least 100,000 cells/mm³ on Day 1 or to an ANC of at least 500 cells/mm³ and platelet count of at least 50,000 cells/mm³ on Days 8 or 15 of the cycle. In patients with adenocarcinoma of the pancreas, withhold Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) and gemcitabine if the ANC is less than 500 cells/mm³ or platelets are less than 50,000 cells/mm³ and delay initiation of the next cycle if the ANC is less than 1500 cells/mm³ or platelet count is less than 100,000 cells/mm³ on Day 1 of the cycle. Resume treatment with appropriate dose reduction if recommended.

Severe Neuropathy

Sensory neuropathy is dose- and schedule-dependent. If \geq Grade 3 sensory neuropathy develops, withhold Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) treatment until resolution to Grade 1 or 2 for metastatic breast cancer or until resolution to \leq Grade 1 for NSCLC and pancreatic cancer followed by a dose reduction for all subsequent courses of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound).

Sepsis

Sepsis occurred in 5% of patients with or without neutropenia who received protein bound paclitaxel in combination with gemcitabine. Biliary obstruction or presence of biliary stent were risk factors for severe or fatal sepsis.

If a patient becomes febrile (regardless of ANC) initiate treatment with broad spectrum antibiotics. For febrile neutropenia, interrupt Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) and gemcitabine until fever resolves and ANC \geq 1500, then resume treatment at reduced dose levels.

Pneumonitis

Pneumonitis, including some cases that were fatal, occurred in 4% of patients receiving protein bound paclitaxel in combination with gemcitabine.

Monitor patients for signs and symptoms of pneumonitis and interrupt Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) and gemcitabine during evaluation of suspected pneumonitis. After ruling out infectious etiology and upon making a diagnosis of pneumonitis, permanently discontinue treatment with Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) and gemcitabine.

Severe Hypersensitivity

Severe and sometimes fatal hypersensitivity reactions, including anaphylactic reactions, have been reported. Do not rechallenge patients who experience a severe hypersensitivity reaction to Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) with this drug.

Cross-hypersensitivity between protein bound paclitaxel and other taxane products has been reported and may include severe reactions such as anaphylaxis. Closely monitor patients with a previous history of hypersensitivity to other taxanes during initiation of Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) therapy.

Use in Patients with Hepatic Impairment

The exposure and toxicity of paclitaxel can be increased in patients with hepatic impairment. Closely monitor patients with hepatic impairment for severe myelosuppression. Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is not recommended in patients who have total bilirubin > 5 x ULN or AST > 10 x ULN. In addition, Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) is not recommended in patients with metastatic adenocarcinoma of the pancreas who have moderate to severe hepatic impairment (total bilirubin > 1.5 x ULN and AST > 10 x ULN). Reduce the starting dose for patients with moderate or severe hepatic impairment.

Albinio (Human)

Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) contains albumin (human), a derivative of human blood. Based on effective donor screening and product manufacturing processes, it carries a remote risk for transmission of viral diseases. A theoretical risk for transmission of Creutzfeldt-Jakob Disease (CJD) also is considered extremely remote. No cases of transmission of viral diseases or CJD have ever been identified for albumin.

Embryo-Fetal Toxicity

Based on mechanism of action and findings in animals, Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) can cause fetal harm when administered to a pregnant woman. In animal reproduction studies, administration of protein bound paclitaxel to rats during pregnancy at doses lower than the maximum recommended human dose, based on body surface area, caused embryo-fetal toxicities, including intrauterine mortality, increased resorptions, reduced numbers of live fetuses, and malformations. Advise females of reproductive potential of the potential risk to a fetus. Advise females of reproductive potential to use effective contraception and avoid becoming pregnant during treatment with Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) and for at least six months after the last dose.

Based on findings from genetic toxicity and animal reproduction studies, advise male patients with female partners of reproductive potential to use effective contraception and avoid fathering a child during treatment with Paclitaxel Protein-Bound Particles for Injectable Suspension (Albumin Bound) and for at least three months after