

PRODUCT MONOGRAPH

<sup>Pr</sup>VINORELBINE TARTRATE FOR INJECTION

Vinorelbine tartrate for injection

10 mg vinorelbine per mL

Antineoplastic Agent

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Toronto, Canada  
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## PRODUCT MONOGRAPH

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Vinorelbine tartrate for injection

### **PART I: HEALTH PROFESSIONAL INFORMATION**

#### **SUMMARY PRODUCT INFORMATION**

| <b>Route of Administration</b> | <b>Dosage Form/Strength</b>             | <b>Clinically Relevant Nonmedicinal Ingredients</b>                                       |
|--------------------------------|---|---|
| Intravenous                    | Injection / 10 mg<br>Vinorelbine per mL | None<br><i>For a complete listing see Dosage Forms, Composition and Packaging section</i> |

#### **INDICATIONS AND CLINICAL USE**

VINORELBINE TARTRATE FOR INJECTION (vinorelbine tartrate) is indicated for:

- treatment of advanced non-small cell lung cancer (NSCLC), as a single agent or in combination.
- treatment of patients with metastatic breast cancer who have failed standard first-line chemotherapy for metastatic disease.
- treatment of patients with metastatic breast cancer who have relapsed within 6 months of anthracycline-based adjuvant therapy.

**Geriatrics (≥ 65 years of age):** No overall differences in effectiveness or safety were observed between patients 65 years of age or greater and younger patients. Other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out (See WARNINGS AND PRECAUTIONS).

**Pediatrics:** Safety and effectiveness in children have not been established.

**CAUTION:**

**VINORELBINE TARTRATE FOR INJECTION (vinorelbine tartrate) IS A CYTOTOXIC DRUG AND SHOULD BE USED ONLY BY PHYSICIANS EXPERIENCED WITH CANCER CHEMOTHERAPEUTIC DRUGS. BLOOD COUNTS SHOULD BE TAKEN PRIOR TO EACH DOSE. THE DOSAGE SHOULD BE REDUCED OR THE DRUG DISCONTINUED UPON EVIDENCE OF ABNORMAL, DEPRESSION OF THE BONE MARROW.**

**This preparation is for intravenous administration only. Intrathecal administration of other vinca alkaloids has resulted in death. Syringes containing this product should be labelled "WARNING - FOR INTRAVENOUS USE ONLY. FATAL if given intrathecally."**

**CONTRAINDICATIONS**

- VINORELBINE TARTRATE FOR INJECTION (vinorelbine tartrate) is contraindicated in patients with known hypersensitivity to vinorelbine tartrate.
- As with other vinca alkaloids, VINORELBINE TARTRATE FOR INJECTION is contraindicated in patients who have drug-induced severe granulocytopenia or severe thrombocytopenia.

**WARNINGS AND PRECAUTIONS****Serious WARNINGS and PRECAUTIONS**

**VINORELBINE TARTRATE FOR INJECTION (vinorelbine tartrate) is a cytotoxic drug and should be used only by physicians experienced with cancer chemotherapeutic drugs. Blood counts should be taken prior to the next dose. Discontinue or reduce the dosage upon evidence of abnormal depression of the bone marrow.**

**General**

VINORELBINE TARTRATE FOR INJECTION is for intravenous use only. Vinorelbine tartrate is a moderate vesicant and can produce phlebitis or extravasation injury. Inadequate flushing of the vein after peripheral administration may increase the risk of phlebitis.

It is extremely important that the needle be properly positioned in the vein before this product is injected. If leakage into surrounding tissue should occur during intravenous administration of VINORELBINE TARTRATE FOR INJECTION, it may cause severe irritation. The injection should be discontinued immediately, and any remaining portion of the dose should then be introduced into another vein.

A low incidence of death (1 %) due to neutropenic sepsis has been reported (see ADVERSE REACTIONS). Bone marrow toxicity, specifically granulocytopenia, is dose-limiting. Complete blood counts with differentials should be performed and results reviewed prior to each dose of VINORELBINE TARTRATE FOR INJECTION. VINORELBINE TARTRATE FOR INJECTION should not be administered to patients with granulocyte counts  $<1000$  cells/mm<sup>3</sup>. Patients developing severe granulocytopenia should be monitored carefully for evidence of infection and/or fever (See DOSAGE AND ADMINISTRATION).

In all instances where the use of VINORELBINE TARTRATE FOR INJECTION (vinorelbine tartrate) is considered for chemotherapy, the physician must evaluate the need and usefulness of the drug against the risk of adverse events. Most drug-related adverse reactions are reversible. If severe adverse events occur, the drug should be reduced in dosage or discontinued and appropriate corrective measures should be taken based on the clinical judgment of the physician. Reinstitution of therapy with VINORELBINE TARTRATE FOR INJECTION should be carried out with caution and alertness as to possible recurrence of toxicity.

Patients should be informed that VINORELBINE TARTRATE FOR INJECTION is a vesicant and can produce phlebitis or extravasation injury, and that the major acute toxicities of VINORELBINE TARTRATE FOR INJECTION are related to bone marrow toxicity, specifically granulocytopenia with increased susceptibility to infection, and neuropathy. They should also be advised to report fever or chills immediately. VINORELBINE TARTRATE FOR INJECTION should not be used in pregnancy unless the physician feels the potential benefit justifies the risk of potential harm to the fetus.

### **Hematologic**

VINORELBINE TARTRATE FOR INJECTION should be used with extreme caution in patients whose bone marrow reserve may have been compromised by prior irradiation or chemotherapy, or whose marrow function is recovering from previous chemotherapy.

Since dose-limiting clinical toxicity is the result of depression of the white blood cell count, it is imperative that complete blood counts with differentials be obtained prior to each dose of VINORELBINE TARTRATE FOR INJECTION (See ADVERSE REACTIONS, Hematologic).

### **Hepatic**

There is no evidence that the toxicity of vinorelbine tartrate is enhanced in patients with elevated liver enzymes; no data are available for patients with severe baseline cholestasis. However, pharmacologic evidence suggests that the liver plays an important role in the metabolism of vinorelbine tartrate. Although there are no data available from patients with severe liver disease, caution should be exercised when administering vinorelbine tartrate to patients with severe hepatic injury or impairment.

### **Neurologic**

Patients with a prior history or pre-existing neuropathy, regardless of etiology, should be monitored for new or worsening signs and symptoms of neuropathy while receiving VINORELBINE TARTRATE FOR INJECTION.

### **Ophthalmologic**

Care must be exercised to avoid contamination of the eye with VINOELBINE TARTRATE FOR INJECTION. Accidental exposure should be treated immediately with a large volume of irrigation solution (water or sodium chloride).

### **Radiation**

Administration of VINOELBINE TARTRATE FOR INJECTION to patients with prior radiation therapy may result in radiation recall reactions (see ADVERSE REACTIONS and DRUG INTERACTIONS).

### **Respiratory**

Acute shortness of breath and severe bronchospasm have been reported infrequently following the administration of vinorelbine tartrate and of other vinca alkaloids. These events have been encountered most commonly when the vinca alkaloid was used in combination with mitomycin and may require aggressive treatment, particularly when there is pre-existing pulmonary dysfunction. Bronchodilators, steroids and/or oxygen have produced symptomatic relief.

### **Sensitivity**

VINOELBINE TARTRATE FOR INJECTION should be used with extreme caution in patients whose bone marrow reserve may have been compromised by prior irradiation or chemotherapy, or whose marrow function is recovering from previous chemotherapy.

Administration of VINOELBINE TARTRATE FOR INJECTION to patients with prior radiation therapy may result in radiation recall reactions (see ADVERSE REACTIONS and DRUG INTERACTIONS).

### **Special Populations**

**Pregnant Women:** There are no studies in pregnant women. Vinorelbine has been shown to be embryotoxic and/or fetotoxic in animals (see TOXICOLOGY). VINOELBINE TARTRATE FOR INJECTION should not be used in pregnancy.

**Nursing Women:** It is not known whether the drug is excreted in human milk. Because many drugs are excreted in human milk and because of its potential for serious adverse reactions in nursing infants, it is recommended that nursing be discontinued in women who are receiving therapy with VINOELBINE TARTRATE FOR INJECTION.

**Pediatrics:** Safety and effectiveness in children have not been established.

**Geriatrics:** Of the total number of patients in North American clinical studies of intravenous vinorelbine tartrate, approximately one-third were 65 years of age or greater. No overall differences in effectiveness or safety were observed between these patients and younger patients. Other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out.

## **ADVERSE REACTIONS**

### **Adverse Drug Reaction Overview**

Data in the following tables are based on the experience of 365 patients (143 patients with NSCLC; 222 patients with advanced breast cancer) for whom a complete safety database was available and who were treated with vinorelbine tartrate as a single agent in three North American trials (one NSCLC trial and two advanced breast cancer trials). Patients treated for breast cancer were allowed to have received adjuvant chemotherapy in both trials, and in one, up to two prior regimens for advanced disease. The dosing schedule was 30 mg/m<sup>2</sup> intravenous vinorelbine tartrate on a weekly basis.

### **Clinical Trial Adverse Drug Reactions**

*Because clinical trials are conducted under very specific conditions the adverse reaction rates observed in the clinical trials may not reflect the rates observed in practice and should not be compared to the rates in the clinical trials of another drug. Adverse drug reaction information from clinical trials is useful for identifying drug-related adverse events and for approximating rates.*

**Table 1**  
**Summary of Adverse Events Occurring in ≥5% of 365 Patients Receiving Single-Agent Vinorelbine Tartrate that are Possibly Attributable to the Study Medication<sup>a,b</sup>**

| Adverse Event                 | % Incidence All Grades |                | % Incidence Grade 3 |                | % Incidence Grade 4 |                |
|-------------------------------|------------------------|----------------|---------------------|----------------|---------------------|----------------|
|                               | ABC<br>n=222           | NSCLC<br>n=143 | ABC<br>n=222        | NSCLC<br>n=143 | ABC<br>n=222        | NSCLC<br>n=143 |
| <b>General</b>                |                        |                |                     |                |                     |                |
| Injection site reaction       | 21                     | 38             | 1                   | 5              | 0                   | 0              |
| Asthenia                      | 41                     | 25             | 8                   | 5              | 0                   | 0              |
| Pain                          | 16                     | 15             | 3                   | 2              | 0                   | 0              |
| Pain injection site           | 18                     | 13             | 3                   | 1              | 0                   | 0              |
| Fever                         | 19                     | 10             | 1                   | 0              | 0                   | 0              |
| Pain Abdomen                  | 12                     | 6              | 1                   | 1              | 0                   | 0              |
| Pain Chest                    | 8                      | 5              | 1                   | 2              | 0                   | 0              |
| Phlebitis                     | 5                      | 10             | 0                   | 1              | 0                   | 0              |
| <b>Digestive System</b>       |                        |                |                     |                |                     |                |
| Nausea                        | 50                     | 33             | 3                   | 1              | 0                   | 0              |
| Constipation                  | 38                     | 28             | 3                   | 2              | 0                   | 0              |
| Anorexia                      | 19                     | 16             | <1                  | 2              | 0                   | 0              |
| Stomatitis                    | 16                     | 15             | 0                   | 0              | 0                   | 0              |
| Vomiting                      | 23                     | 14             | 2                   | 1              | 0                   | 0              |
| Diarrhea                      | 20                     | 13             | <1                  | 1              | 0                   | 0              |
| <b>Musculoskeletal System</b> |                        |                |                     |                |                     |                |
| Myasthenia                    | 9                      | 5              | 2                   | 1              | <1                  | 0              |
| <b>Nervous System</b>         |                        |                |                     |                |                     |                |
| Paresthesia                   | 20                     | 11             | 0                   | 1              | 0                   | 0              |
| Hypesthesia                   | 11                     | 10             | <1                  | 0              | <1                  | 0              |
| <b>Respiratory System</b>     |                        |                |                     |                |                     |                |
| Dyspnea                       | 9                      | 3              | 1                   | 2              | 1                   | 0              |
| <b>Skin and Appendages</b>    |                        |                |                     |                |                     |                |
| Alopecia                      | 12                     | 12             | 0                   | 1              | 0                   | 0              |
| Rash                          | 5                      | 5              | 0                   | 0              | 0                   | 0              |

ABC=Advanced Breast Cancer    NSCLC=Non-Small Cell Lung Cancer

<sup>a</sup> Grade based on modified criteria of the National Cancer Institute

<sup>b</sup> Patients with NSCLC had not received prior chemotherapy. The majority of patients with advanced breast cancer had received prior chemotherapy

### Cardiovascular

Chest pain was reported in 5% of NSCLC and 8% of breast cancer patients. Most reports of chest pain were in patients who had either a history of cardiovascular disease or tumor within the chest. There have been rare reports of myocardial infarction; however, these have not been shown definitely attributable to vinorelbine tartrate.

### Dermatologic

Alopecia was reported in only 12% of patients and was usually mild.

Vinorelbine tartrate injection is a moderate vesicant. Injection site reactions, including erythema, pain at injection site, and vein discoloration occurred in approximately one-third of all patients; 2% were severe. Chemical phlebitis along the vein proximal to the site of injection was reported.



### **Gastrointestinal**

Mild or moderate nausea occurred in 32% of NSCLC and 47% of breast cancer patients treated with vinorelbine tartrate. Severe nausea was infrequent (1% and 3% in NSCLC and breast cancer patients respectively). Prophylactic administration of antiemetics was not routine in patients treated with single-agent vinorelbine tartrate. Constipation occurred in approximately 28% of NSCLC and 38% of breast cancer patients, with paralytic ileus occurring in less than 2% of patients. Vomiting, diarrhea, anorexia, and stomatitis were usually mild or moderate and occurred in less than 20% of patients.

### **Hepatic**

Transient elevations of liver enzymes were reported without clinical symptoms.

### **Neurologic**

Mild to moderate peripheral neuropathy manifested by paresthesia and hypesthesia were the most frequently reported neurologic toxicities (10% to 20%, see Table 2). Loss of deep tendon reflexes occurred in less than 5% of patients. The development of severe peripheral neuropathy was unusual.

### **Pulmonary**

Shortness of breath was reported in 3% of NSCLC and 9% of breast cancer patients; and was severe in 2% of each patient population. Interstitial pulmonary changes have been documented in a few patients.

### **Other**

Asthenia occurred in approximately 25% of patients with NSCLC and 41% of patients with breast cancer. It was usually mild or moderate but tended to increase with cumulative dosing.

Other toxicities that have been reported in  $\leq 5\%$  of patients include jaw pain, myalgia, arthralgia, headache, dysphagia, and rash. Hemorrhagic cystitis and the syndrome of inappropriate ADH secretion were each reported in 4% of patients. The treatment of these entities are mainly symptomatic. The treatment of hemorrhagic cystitis is i.v. fluids for forced diuresis and/or irrigation of bladder. For the treatment of SIADH, please refer to the major textbooks of medicine.

## **Abnormal Hematologic and Clinical Chemistry Findings**

### **Hematologic**

Granulocytopenia was the major dose-limiting toxicity with vinorelbine tartrate; it was generally reversible and not cumulative over time. Granulocyte nadirs occurred 7 to 10 days after the dose and usually recovered within the following 7 to 14 days. Granulocytopenia resulted in hospitalizations for fever and/or sepsis in 8% of NSCLC and 9% of breast cancer patients. Septic deaths occurred in approximately 1% of patients.

Grade 3 or 4 anemia occurred in 1% of lung cancer and 14% of breast cancer patients. Blood products were administered to 18% of patients who received vinorelbine tartrate. The incidence of Grade 3 and 4 thrombocytopenia was less than 1%.

**Table 2**  
**Hematologic Adverse Events and Clinical Chemistry Elevations in 365 Patients Receiving Single-Agent Vinorelbine Tartrate that are Possibly Attributable to the Study Medication<sup>a,b</sup>**

| Hematology  |                               | ABC (%) | NSCLC (%) |
|---|-------------------------------|---------|-----------|
| Granulocytopenia                                      | <2,000 cells/mm <sup>3</sup>  | 96      | 80        |
|   | <500 cells/mm <sup>3</sup>    | 41      | 28        |
| Leukopenia  | <4,000 cells/mm <sup>3</sup>  | 99      | 81        |
|   | <1,000 cells/mm <sup>3</sup>  | 16      | 12        |
| Thrombocytopenia                                      | <100,000cells/mm <sup>3</sup> | 6       | 4         |
|   | <50,000 cells/mm <sup>3</sup> | <1      | 1         |
| Anemia  | <11 g/dL                      | 87      | 77        |
|   | <8 g/dL                       | 14      | 1         |
| Hospitalization due to granulocytopenic complications |                               | 9       | 8         |

| Chemical Chemistry Elevations | % Incidence All Grades |       | % Incidence Grade 3 |       | % Incidence Grade 4 |       |
|-------------------------------|------------------------|-------|---------------------|-------|---------------------|-------|
|                               | ABC                    | NSCLC | ABC                 | NSCLC | ABC                 | NSCLC |
| Total Bilirubin               |                        |       |                     |       |                     |       |
| NSCLC; n=137                  | 14                     | 9     | 4                   | 3     | 3                   | 2     |
| ABC: n=214                    |                        |       |                     |       |                     |       |
| SGOT                          |                        |       |                     |       |                     |       |
| NSCLC: n=133                  | 74                     | 54    | 7                   | 2     | <1                  | 1     |
| ABC: n=213                    |                        |       |                     |       |                     |       |

ABC = Advanced Breast Cancer                      NSCLC = Non-Small Cell Lung Cancer

<sup>a</sup> Grade based on modified criteria of the National Cancer Institute

<sup>b</sup> Patients with NSCLC had not received prior chemotherapy. The majority of patients with advanced breast cancer had received prior chemotherapy.

**Observed During Clinical Practice:**

In a randomized study in NSCLC patients, 206 patients received treatment with vinorelbine tartrate plus cisplatin and 206 patients received single-agent vinorelbine tartrate. The incidence of severe nausea and vomiting was 30% for vinorelbine tartrate/cisplatin compared to <2% for single-agent vinorelbine tartrate. Cisplatin did not appear to increase the incidence of neurotoxicity observed with single-agent vinorelbine tartrate. However, myelosuppression, specifically Grade 3 and 4 granulocytopenia, was greater with the combination of vinorelbine tartrate/cisplatin (79%) than with single-agent vinorelbine tartrate (53%). The incidence of fever and infection may be increased with the combination.

**Post-Market Adverse Drug Reactions:**

In addition to adverse events reported from clinical trials, the following events have been identified during post marketing use of vinorelbine tartrate. Because they are reported voluntarily from a population of unknown size, estimates of frequency cannot be made. These events have been chosen for inclusion due to combination of their seriousness, frequency of reporting, or potential causal connection to vinorelbine tartrate or a combination of these factors.

**Body as a Whole:** Systemic allergic reactions reported as anaphylaxis, pruritis, urticaria and angioedema, flushing and radiation recall events such as dermatitis and esophagitis (see WARNINGS AND PRECAUTIONS) have been reported.

**Cardiovascular:** Hypertension, hypotension, vasodilation, tachycardia, and pulmonary edema have been reported.

**Gastrointestinal:** Dysphagia and mucositis have been reported.

**Hematologic:** Thromboembolic events including pulmonary embolus and deep venous thrombosis have been reported primarily in seriously ill and debilitated patients with known predisposing risk factors for these events.

**Musculoskeletal:** Headache has been reported with and without other musculoskeletal aches and pains.

**Neurologic:** Peripheral neurotoxicities such as, but not limited to, muscle weakness and disturbance of gait have been observed in patients with and without prior symptoms. Vestibular and auditory deficits have been observed with vinorelbine tartrate, usually when used in combination with cisplatin. There may be increased potential for neurotoxicity in patients with pre-existing neuropathy, regardless of etiology, who receive vinorelbine tartrate. Patients who receive vinorelbine tartrate and paclitaxel, either concomitantly or sequentially, should be monitored for signs and symptoms of neuropathy (see WARNINGS AND PRECAUTIONS).

**Pulmonary:** Pneumonia has been reported.

Vinorelbine can produce acute and subacute pulmonary reactions. The acute reaction usually resembles an allergic event and may respond to bronchodilators. Subacute pulmonary reactions occur shortly after drug administration and may be characterized by cough, dyspnea, hypoxemia, and interstitial infiltration. Subacute pulmonary reactions may respond to corticosteroid therapy.

**Skin:** Injection site reactions, including localised rash and urticaria, blister formation and skin sloughing have been observed in clinical practice. Some of these reactions may be delayed in appearance.

**Other:** Pain in tumour-containing tissue, back pain and abdominal pain have been reported. Electrolyte abnormalities including hyponatremia consistent with the syndrome of inappropriate ADH secretion, have been reported in seriously ill and debilitated patients.

**Combination Use:** Patients with prior exposure to paclitaxel and who have demonstrated neuropathy should be monitored closely for new or worsening neuropathy. Patients who have experienced neuropathy with previous drug regimens should be monitored for symptoms of neuropathy while receiving VINORELBINE TARTRATE FOR INJECTION. VINORELBINE TARTRATE FOR INJECTION may result in radiosensitizing effects with prior or concomitant radiation therapy (see WARNINGS AND PRECAUTIONS).

## DRUG INTERACTIONS

### **Drug-Drug Interactions**

Acute pulmonary reactions have been reported with vinorelbine tartrate and other vinca alkaloids used in conjunction with mitomycin (see WARNINGS AND PRECAUTIONS, General). VINORELBINE TARTRATE FOR INJECTION should be administered with caution in combination with mitomycin. Although the pharmacokinetics of vinorelbine are not influenced by the concurrent administration of cisplatin, the incidence of toxicities, specifically granulocytopenia, high frequency hearing loss and tinnitus, with the combination of vinorelbine tartrate and cisplatin are higher than with single-agent vinorelbine tartrate.

Patients who receive vinorelbine tartrate and paclitaxel, either concomitantly or sequentially, should be monitored for signs and symptoms of neuropathy.

Administration of VINORELBINE TARTRATE FOR INJECTION to patients with prior or concomitant radiation therapy may result in radiosensitizing effects.

### **Drug-Food Interactions**

Interactions with food have not been established.

### **Drug-Herb Interactions**

Interactions with herbal products have not been established.

### **Drug-Laboratory Interactions**

Interactions with laboratory tests have not been established.

## DOSAGE AND ADMINISTRATION

### **Dosing Considerations**

**This preparation is for intravenous administration only. It should be administered by individuals experienced in the administration of cancer chemotherapeutic drugs.**

### **Recommended Dose and Dosage Adjustment**

The usual initial dose of VINORELBINE TARTRATE FOR INJECTION (vinorelbine tartrate) is 30 mg/m<sup>2</sup> administered weekly. The recommended method of administration is an intravenous injection over 6 to 10 minutes. In controlled trials, single-agent vinorelbine tartrate was given weekly until progression or dose-limiting toxicity.

No dose adjustments are required for renal insufficiency. If moderate or severe neurotoxicity develops, VINORELBINE TARTRATE FOR INJECTION should be discontinued. The dosage should be adjusted according to hematologic toxicity or hepatic insufficiency.

**Dose Modifications for Hematologic Toxicity:** Granulocyte counts should be  $\geq 1000$  cells/mm<sup>3</sup> prior to the administration of VINORELBINE TARTRATE FOR INJECTION. In the referenced North American trial, in which hematologic adverse events were observed, the following dose adjustment scheme was employed and should be followed in patients receiving VINORELBINE TARTRATE FOR INJECTION.

**TABLE 3**  
**Dose Adjustments Based on Granulocyte Counts**

| Granulocytes (cells/mm <sup>3</sup> )<br>On days of Treatment  | Dose of VINORELBINE TARTRATE FOR INJECTION<br>(mg/m <sup>2</sup> )   |
|--|--|
| $\geq 1500$  | 30   |
| 1000 to 1499   | 15   |
| <1000  | Do not administer. Repeat granulocyte count in 1 week. If granulocyte count is <1000 cells/mm <sup>3</sup> for >3 weeks, discontinue VINORELBINE TARTRATE FOR INJECTION. |
| Note: For patients who, during treatment with VINORELBINE TARTRATE FOR INJECTION, have experienced fever and/or sepsis while granulocytopenic or required a delay in dosing of up to 3 weeks due to granulocytopenia, the dose of VINORELBINE TARTRATE INJECTION should be:<br>22.5 mg/m <sup>2</sup> for granulocytes $\geq 1500$ cells/m <sup>3</sup><br>11.25 mg/m <sup>2</sup> for granulocytes 1000 to 1499cells/m <sup>3</sup> |  |

VINORELBINE TARTRATE FOR INJECTION should be administered with caution to patients with hepatic insufficiency. In patients who develop hyperbilirubinemia during treatment with VINORELBINE TARTRATE FOR INJECTION, the dose should be adjusted for total bilirubin.

**Administration**

VINORELBINE TARTRATE FOR INJECTION must be administered intravenously. It is extremely important that the intravenous needle or catheter be properly positioned before any VINORELBINE TARTRATE FOR INJECTION is injected. Leakage into surrounding tissue during intravenous administration of VINORELBINE TARTRATE FOR INJECTION may cause considerable irritation, local tissue necrosis and/or thrombophlebitis. If extravasation occurs, the injection should be discontinued immediately, and any remaining portion of the dose should then be introduced into another vein. The application of moderate heat to the area of leakage in the form of warm compress applied for 15 to 20 minutes at least four times per day for the first 24 to 48 hours in addition to rest and elevation of the affected site for 48 -72 hours has been reported to help disperse drug and minimize discomfort associated with the extravasation of other vinca alkaloids.

As with other toxic compounds, caution should be exercised in handling and preparing the solution of VINORELBINE TARTRATE FOR INJECTION. Skin reactions may occur with accidental exposure. The use of gloves is recommended. If the solution of VINORELBINE TARTRATE FOR INJECTION contacts the skin or mucosa, immediately wash the skin or mucosa thoroughly with soap and water. Severe irritation of the eye has been reported with accidental contamination of the eye with another vinca alkaloid. If this happens with VINORELBINE TARTRATE FOR INJECTION, the eye should be washed with water immediately and thoroughly.

**Preparation for Administration:** VINOURELBINE TARTRATE FOR INJECTION must be diluted in either a syringe or I.V. bag using one of the recommended solutions. The diluted VINOURELBINE TARTRATE FOR INJECTION should be administered over 6 to 10 minutes into the side port of a free-flowing I.V. followed by flushing with at least 75 to 125 mL of one of the solutions. For diluents that may be used, see below.

**Syringe:** The calculated dose of VINOURELBINE TARTRATE FOR INJECTION should be diluted to a concentration between 1.5 and 3.0 mg/mL.

**I.V. Bag:** The calculated dose of VINOURELBINE TARTRATE FOR INJECTION should be diluted to a concentration between 0.5 and 2.0 mg/mL.

### **Reconstituted Solutions**

**Syringe:** VINOURELBINE TARTRATE FOR INJECTION diluted to a concentration between 1.5 and 3.0 mg/mL may be used for up to 24 hours when stored in polypropylene syringes at 5° to 30°C. The following solutions may be used for dilution:

5% Dextrose Injection, USP  
0.9% Sodium Chloride Injection, USP

**I.V. Bag:** VINOURELBINE TARTRATE FOR INJECTION diluted to a concentration between 0.5 and 2.0 mg/mL may be used for up to 24 hours when stored in polyvinylchloride bags at 5° to 30°C. The following solutions may be used for dilution:

5% Dextrose Injection, USP  
0.9% Sodium Chloride Injection, USP  
0.45% Sodium Chloride Injection, USP  
5% Dextrose and 0.45% Sodium Chloride Injection, USP  
Ringer's Injection, USP  
Lactated Ringer's Injection, USP

Potassium chloride injection solutions are found to be compatible with vinorelbine tartrate.

As with all the parenteral drug products, intravenous admixtures should be inspected visually for clarity, particulate matter, discoloration and leakage prior to administration, whenever solution and container permit. Any unused portion should be discarded.

### **OVERDOSAGE**

The primary anticipated complications of overdosage would consist of bone marrow suppression and peripheral neurotoxicity.

There is no known antidote for VINOURELBINE TARTRATE FOR INJECTION overdose. Overdoses involving quantities up to ten times the recommended dose (30 mg/m<sup>2</sup>) have been reported. The toxicities described were consistent with those listed in the Adverse Reactions section including paralytic ileus, stomatitis, and esophagitis. Bone marrow aplasia, sepsis, and paresis have also been reported. Fatalities have occurred following overdose of vinorelbine tartrate. If overdose occurs, general supportive measures together with appropriate blood transfusions, growth factors and antibiotics should be instituted as deemed necessary by the physician.

## **ACTION AND CLINICAL PHARMACOLOGY**

### **Mechanism of Action**

Vinorelbine tartrate is a novel vinca alkaloid which interferes with microtubule assembly. Vinca alkaloids are structurally similar compounds comprising two multiringed units, vindoline and catharanthine. Vinorelbine is a vinca alkaloid in which the catharanthine unit is the site of structural modification. This structural change imparts unique pharmacologic properties which may translate into clinical benefits for patients with various malignancies. The antitumour activity of vinorelbine is thought to be due primarily to inhibition of mitosis at metaphase through its interaction with tubulin. Vinorelbine may also interfere with amino acid, cyclic AMP, and glutathione metabolism; calmodulin-dependent Ca<sup>++</sup>-transport ATPase activity; cellular respiration; and nucleic acid and lipid biosynthesis.

### **Pharmacokinetics**

Following intravenous administration, vinorelbine concentration in plasma decays in a triphasic manner. The initial rapid decline represents distribution of drug to peripheral compartments and metabolism of the drug. The prolonged terminal phase is due to relatively slow efflux of vinorelbine from peripheral compartments. The terminal phase half-life averaged 27.7 to 43.6 hours; the mean plasma clearances ranged from 0.97 to 1.26 L/hr/kg; and steady state volume of distribution (V<sub>ss</sub>) values ranged from 25.4 to 40.1 L/kg.

The disposition of radiolabelled vinorelbine has been studied in a limited number of patients. Approximately 18% of the administered dose was recovered in the urine and 46% in the feces. Incomplete recovery in humans is consistent with results in animals. A separate study of the urinary excretion of vinorelbine showed that 10.9% ±0.7% of a 30 mg/m<sup>2</sup> intravenous dose was excreted unchanged in the urine.

One metabolite of vinorelbine, deacetylvinorelbine, has been shown to possess antitumour activity. This metabolite has been detected but not quantified in human plasma. The effects of renal or hepatic dysfunction on the disposition of vinorelbine have not been assessed.

The pharmacokinetics of vinorelbine are not influenced by the concurrent administration of cisplatin with vinorelbine (see Drug Interactions).

## **Special Populations and Conditions**

**Pediatrics:** Pharmacokinetics of common name have not been studied in the pediatric population.

**Geriatrics:** Pharmacokinetics of common name have not been studied in the geriatric population.

**Gender:** Differences in pharmacokinetics based on gender have not been established.

**Race:** Differences in pharmacokinetics based on race have not been established.

**Hepatic Insufficiency:** Differences in pharmacokinetics based on hepatic function have not been established.

**Renal Insufficiency:** Differences in pharmacokinetics based on renal function have not been established.

**Genetic Polymorphism:** Differences in pharmacokinetics based on genetic polymorphism have not been established.

## **STORAGE AND STABILITY**

### **Stability and Storage Recommendations**

Store VINOURELBINE TARTRATE FOR INJECTION vials under refrigeration (2°C to 8°C) in the original package. Protect from light and freezing. Single use vials. Discard unused portion.

VINOURELBINE TARTRATE FOR INJECTION is initially clear and colourless to pale yellow, but may develop a slightly darker yellow to light amber colour in time. This does not indicate a change which should preclude its use. Parenteral drug products should be visually inspected for particulate matter and discoloration prior to administration whenever solution and container permit. If particulate matter is seen, VINOURELBINE TARTRATE FOR INJECTION should not be administered.

## **SPECIAL HANDLING INSTRUCTIONS**

Since vinorelbine tartrate is a cytostatic agent, established procedures specific to the handling and use of such agents must be followed.

## **DOSAGE FORMS, COMPOSITION AND PACKAGING**

### **Availability of Dosage Forms**

VINOURELBINE TARTRATE FOR INJECTION is supplied in clear glass vials as a solution of 10 mg/mL vinorelbine base in 1 mL, and 5 mL single-dose vials.



**Composition**

VINOURELBINE TARTRATE FOR INJECTION consists of an aqueous solution of vinorelbine tartrate, equivalent to 10 mg vinorelbine base per millilitre of solution. No other preservatives or other additives are present. VINOURELBINE TARTRATE FOR INJECTION is a clear colorless to pale yellow solution in Water for Injection.

## PART II: SCIENTIFIC INFORMATION

### PHARMACEUTICAL INFORMATION

#### Drug Substance

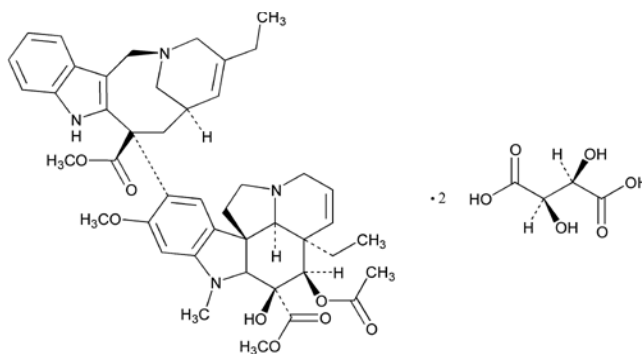
Common Name: vinorelbine tartrate

Chemical Name: 3',4'-didehydro-4'-deoxy-8'-norvincaleukoblastine-L-(+)-tartrate (1:2)  
(salt)

Molecular Formula:  $C_{45}H_{54}N_4O_8 \cdot 2C_4H_6O_6$

Molecular Weight: 1079.11

Structural Formula:



Description: Vinorelbine tartrate is a white to almost white hygroscopic powder, having a melting point of 210°C with decomposition. It is soluble in water, in ethanol and practically insoluble in hexane.

## CLINICAL TRIALS

### *Advanced Non-Small Cell Lung Cancer (NSCLC)*

Data from two controlled clinical studies (612 + 211 patients), as well as additional data from more than 100 patients enrolled in two uncontrolled clinical trials, support the use of vinorelbine tartrate in patients with advanced non-small cell lung cancer (NSCLC). One randomized, three-arm trial in 612 Stage III or IV NSCLC patients compared treatment with single-agent vinorelbine tartrate (30 mg/m<sup>2</sup>/week), vinorelbine tartrate (30 mg/m<sup>2</sup>/week) plus cisplatin (120 mg/m<sup>2</sup> days 1 and 29, then every six weeks), and vindesine (3 mg/m<sup>2</sup>/week for 7 weeks, then every other week) plus cisplatin (120 mg/m<sup>2</sup> days 1 and 29, then every 6 weeks). Vinorelbine tartrate, as a single agent, was well-tolerated and resulted in a median survival of 31 weeks and a response rate of 14%. The combination of vinorelbine tartrate plus cisplatin produced a median survival of 40 weeks and a response rate of 28%. The results achieved with vinorelbine tartrate as a single agent were comparable to those seen with vindesine plus cisplatin (median survival 32 weeks and response rate of 19%), but significantly less severe nausea, vomiting, and neurotoxicity were observed in patients treated with single-agent vinorelbine tartrate. In the subgroup of patients with Stage IV disease, vinorelbine tartrate plus cisplatin produced longer survival than vindesine plus cisplatin (36 weeks vs 27 weeks).

The results with single-agent vinorelbine tartrate noted in the above trial were confirmed in a second randomized, two-arm study (211 patients) which compared treatment with single-agent vinorelbine tartrate (30 mg/m<sup>2</sup> weekly) to a control drug, 5-fluorouracil (5FU) (425 mg/m<sup>2</sup> IV bolus) plus leucovorin (LV) (20 mg/m<sup>2</sup> IV bolus) administered five consecutive days every four weeks. Compared to 5FU/LV, vinorelbine tartrate improved survival. The median survival for patients treated with vinorelbine tartrate was 30 weeks versus 22 weeks for 5FU/LV. The median survival for similar patients given best supportive care is reported to range from 9 to 21 weeks. The one year survival rates were 24% (54% S.E.) for vinorelbine tartrate and 16% (± 5% S.E.) for 5FU/LV, using the Kaplan-Meier product-limit estimates. The response rates for vinorelbine tartrate and 5FU/LV were 14% and 5%, respectively.

In an uncontrolled study in 78 patients with inoperable NSCLC treated with single-agent vinorelbine tartrate (30 mg/m<sup>2</sup>/week), the median survival was 33 weeks. The response rate was 33%. A Phase I/II dose-ranging study of vinorelbine tartrate (20, 25, or 30 mg/m<sup>2</sup>/week) plus cisplatin (120 mg/m<sup>2</sup> days 1 and 29, then every 6 weeks) in 32 patients with NSCLC demonstrated a median survival of 44 weeks. There were no responses at the lowest dose level; the response rate was 33% in the 21 patients treated at the two highest dose levels.

### *Advanced Breast Cancer*

Data from one randomized, controlled clinical study (179 patients) and three uncontrolled studies (302 patients) support the effectiveness of vinorelbine tartrate in patients with advanced breast cancer. The randomized, controlled trial compared vinorelbine tartrate (30 mg/m<sup>2</sup>/week) to intravenous melphalan (25 mg/m<sup>2</sup>/every 4 weeks) in patients who had progressed on one or two prior Chemotherapy regimens for advanced disease, with one regimen containing an anthracycline.

Patients who relapsed during or within 6 months of treatment with an anthracycline-containing adjuvant chemotherapy regimen were also eligible. Melphalan was chosen as a Phase II comparator because of the lack of a commonly accepted standard treatment in this patient population.

Treatment with vinorelbine tartrate resulted in significantly longer time to disease progression, time to treatment failure, and survival compared to melphalan. Median time to disease progression was 12 weeks for the vinorelbine tartrate patients and 8 weeks for the melphalan arm ( $p < 0.001$ ). Median time to treatment failure was 11 weeks and 8 weeks respectively, for the vinorelbine tartrate and melphalan groups ( $p < 0.001$ ). The median survival was 35 weeks for the group receiving vinorelbine tartrate and 31 weeks for the melphalan arm ( $p = 0.03$ ). The 1-year survival rates were 36% and 22% respectively, for the vinorelbine tartrate and melphalan groups. Although the proportion of patients who responded to vinorelbine tartrate (16%) was greater than those responding to melphalan (9%), the difference was not significant ( $p = 0.42$ ). However, when objective responses and stabilization were combined, the difference approached significance in favor of vinorelbine tartrate (47% vs 28%,  $p = 0.06$ ). Disease-related symptoms improved or remained stable compared to baseline in the majority of patients in both groups.

An uncontrolled study conducted in the U.S. was designed to determine the safety and efficacy of vinorelbine tartrate (30 mg/m<sup>2</sup>/week) used as first-line or second-line therapy in the treatment of patients with advanced breast cancer. Patients were not previously treated with an anthracycline-containing regimen. The overall response rate was 35% for 60 first-line patients and 32% for 47 second-line patients. There were 9 (15%) complete responses and 12 (20%) partial responses among the first-line patients. The median duration of response was 34 weeks for both first- and second-line patients. There were 3 (6%) complete responses and 12 (26%) partial responses among second-line patients. The estimated median duration of complete response for first- and second-line patients combined exceeds 1 year.

A total of 195 patients were treated with single-agent vinorelbine tartrate (30 mg/m<sup>2</sup>/week) in two European Phase II clinical trials. The patients in both trials had no previous cytotoxic therapy for advanced breast cancer. In one trial, the objective response rate was 41% in 145 evaluable patients. In the other trial, an objective response rate of 50% was observed in 50 evaluable patients.

## DETAILED PHARMACOLOGY

### Pharmacodynamics

**Antitumour Activity:** *In vitro*: Vinorelbine tartrate was a potent inhibitor of tumour cell growth with broad spectrum activity comparable to vincristine (VCR) and vinblastine (VLB). Vinorelbine was shown to participate in both multi-level drug resistance (MDR) and non-MDR forms of resistance. In combination studies, an additive effect was noted when cells were exposed sequentially to vinorelbine and then to cisplatin.

*In vivo*: Vinorelbine tartrate demonstrated antitumour activity in both murine and human tumour xenograft models that have been previously shown to be sensitive to either VLB or VCR. Vinorelbine was active by the intraperitoneal (IP), oral (PO) and intravenous (IV) routes on several administration schedules against IP, IV and subcutaneous (SC) implants of various murine tumours.

Vinorelbine when administered IV, was also active against SC implants of lung, mammary and stomach human tumour xenografts in nude mice. Vinorelbine plus either etoposide or cisplatin provided a significant advantage in increased life span (ILS) over that of comparably dosed single agents.

**Antitubulin Activity:** *In vitro*: In cultured mouse embryos, vinorelbine tartrate was active against all classes of mitotic microtubules (the antitumour target), while it was least active against axonal microtubules (the neurotoxic target). At pharmacologic concentrations in cell-free systems, vinorelbine was much less effective than VLB or VCR at inducing spiralization of microtubules (a potential toxicity endpoint). Vinorelbine, VLB and VCR were equipotent in inhibiting assembly regardless of isotubulins or microtubule associated proteins (MAPS).

**Cell Cycle Arrest:** At physiologic concentrations, vinorelbine tartrate was similar to other vinca alkaloids in its effect on tumour cell cycle kinetics, producing mitotic arrest (block in M phase without altering G2 phase) and polyploidy. Polyploid cells are usually non-viable and this probably plays a role in the mechanism of antitumour activity.

**Neuropharmacological Effect in Mice and Rats:** Neuropharmacologically, vinorelbine tartrate presented the same hypothermic and acute neurotoxicity profile expected of the vinca alkaloids. Mice treated intravenously with vinorelbine experienced only slight hypothermia, which, although statistically significant, was within standard pharmacological limits. No characteristic signs that typically accompany hypothermia (e.g., ptosis, piloerection, or tremors) were noted in the vinorelbine tartrate-treated animals. Vinorelbine produced neurotoxic effects in rats after acute IV administration, similar to those that occurred with VCR. However, unlike VCR, vinorelbine did not produce limb paralysis. And, although mortalities occurred after both IV vinorelbine and VCR administration, a 10-fold greater dose of vinorelbine than VCR was required to produce the same effect.

**Cardiovascular/Respiratory Effect in Dogs:** Cardiovascular and respiratory studies of IV vinorelbine tartrate in anesthetized dogs indicate that vinorelbine (along with two other vinca alkaloids studied) has no effect on hemodynamics, respiratory function, or the incidence of cardiac arrhythmias.

**Gastrointestinal Effects in Mice and Rats:** Possible gastrointestinal (GI) effects of vinorelbine tartrate were explored using models of GI transit, GI tolerance, and gastric secretion. In mice, IV treatment with vinorelbine had no effect on the GI transit time in a standard charcoal meal test. In mice and rats, IV vinorelbine showed excellent GI tolerance, with no evidence of ulcers or bleeding in the esophagus, stomach or intestine. Vinorelbine was found to inhibit gastric secretion after IV administration in rats. This effect, however, occurred at one half the LD<sub>50</sub> dose.

**Urinary System Effects in Rats:** Studies with vinorelbine tartrate on renal function indicate a moderate diuretic effect in rats after IV administration. Additionally, a pronounced increase in electrolyte elimination occurred. And, although there was evidence of hemolyzed blood in the urine after high IV doses of vinorelbine, examination of the kidneys and bladder revealed no histologic changes.

**Hemobiologic Effects in Rats:** Hemobiologic studies with vinorelbine tartrate showed a platelet antiaggregating property *in vitro*, but only at the very high concentration of 1.0 mM, which at minimum is 1000-fold the therapeutic plasma concentration.

### **Pharmacokinetics**

*In vitro* studies have shown that vinorelbine is rapidly and highly distributed into cells. Studies of vinorelbine binding to human blood constituents revealed high binding to platelets and lymphocytes. The free fraction was ~0.11 in pooled human plasma over a concentration range of 234 to 1169 ng/mL. The binding to plasma constituents in cancer patients ranged from 79.6% to 91.2%. Vinorelbine binding was not altered in the presence of cisplatin, 5-fluorouracil, or doxorubicin.

**Absorption and Disposition:** In all animal species studied (mouse, rat, dog, monkey), vinorelbine tartrate plasma concentration declined in a multi-exponential manner with an initial rapid decay followed by a slower terminal phase. Half-life values, after intravenous administration, were 7.3 hours in the mouse and 9.5 hours in the rat. Half-lives were considerably longer in the dog (ranging from 13 to 42 hours after various oral doses) and the monkey (16.6 to 35.5 hours after various oral and intravenous doses). Plasma clearances, estimated after intravenous administration in the rat and monkey, were 2 L/h/kg and 0.54 L/h/kg, respectively. Vinorelbine was shown to be rapidly absorbed after oral administration in all species studied with  $T_{max}$  values ranging from 1 to 2 hours after administration. The bioavailability of radioactivity in the mouse was 25% following a radiolabelled dose, while absorption of radioactivity was essentially complete after oral administration to the monkey. Absolute bioavailability in the rat, determined using immunoassay methodology, was found to be 16%.

**Tissue Distribution:** In tissue distribution studies of radiolabelled vinorelbine tartrate, radioactivity was widely distributed throughout the animals studied (mouse, rat, and monkey) with the highest amounts of radioactivity typically found in organs of elimination such as liver and kidneys. Minimal amounts of radioactivity were found in the heart and brain tissue.

**Elimination and Metabolism:** Vinorelbine tartrate was primarily eliminated in the feces in all species studied (mouse, rat and monkey). Typically, 50% to 80% of an administered dose was recovered, regardless of the route of administration. A small percentage of the dose was excreted in the urine (1% to 19%, usually < 10%) and the majority of the amount excreted was recovered as unchanged drug. Evidence for substantial metabolism exists, and excretion via the bile appears to be a significant pathway for metabolites and parent drug. Three metabolites were isolated from perfused rat liver preparations, but not in sufficient quantity for identification. *In vivo* isolation and identification of metabolites was hindered because of the low quantities of metabolites present in animals administered non-toxic doses and the inadequate sensitivity of analytical methodology.

## **TOXICOLOGY**

### **Animals**

#### **Acute Toxicity**

**Rodents:** Single-dose lethality values calculated from the results of mouse and rat studies are listed below. The combined male/female value is given, as no sex differences were apparent.

**TABLE 4**  
**Acute Toxicity Vinorelbine**

| Species/Strain     | Route | LD <sub>10</sub><br>(mg/kg) | LD <sub>50</sub><br>(mg/kg) | LD <sub>90</sub><br>(mg/kg) |
|--------------------|-------|-----------------------------|-----------------------------|-----------------------------|
| Mouse/CD-1         | IV    | 21.9                        | 36.1                        | 59.3                        |
| Mouse/OF1          | IV    | 30.4                        | 36.6                        | 43.8                        |
| Rat/Sprague Dawley | IV    | 10.1                        | 11.2                        | 12.4                        |
| Rat/Sprague Dawley | IV    | 11.2                        | 14.1                        | 17.6                        |
| Mouse/CD-1         | Oral  | 56.4                        | 82.8                        | 121.5                       |
| Rat/Sprague Dawley | Oral  | 23.6                        | 30                          | 38.1                        |
| Mouse/CD-1         | IP    | 16.6                        | 24.5                        | 39.3                        |
| Mouse OF1          | IP    | 22.7                        | 35.5                        | 55.5                        |
| Rat/Sprague Dawley | IP    | 6                           | 10.1                        | 17.1                        |
| Rat/Sprague Dawley | IP    | 2.6                         | 6.2                         | 14.7                        |

Ataxia, convulsions and respiratory difficulty were noted almost immediately after dosing in animals treated intravenously at the highest doses. Deaths occurred as early as 15 minutes postdose. Clinical signs seen in animals treated by all three routes included lethargy and piloerection in mice and rats and diarrhea, chromodacryorrhea, edema of the muzzle, and prostration in rats. Swollen abdomens and evidence of peritonitis were noted in some animals treated by the intraperitoneal route. Deaths occurred from day 1 to as late as 16 and 29 days postdose in mice and rats respectively.

Lethality studies using daily doses for 5 days were conducted in mice (IV) and rats (oral). The 5-day cumulative mg/kg values calculated were as follows:

**TABLE 5**  
**Lethality Studies**

| Species/Strain     | Route | LD <sub>10</sub><br>(mg/kg) | LD <sub>50</sub><br>(mg/kg) | LD <sub>90</sub><br>(mg/kg) |
|--------------------|-------|-----------------------------|-----------------------------|-----------------------------|
| Mouse/OF1          | IV    | 31.6                        | 39.8                        | 49.9                        |
| Rat/Sprague-Dawley | Oral  | -                           | 14                          | -                           |

Mortality occurred from day 6 to 23 in mice and day 4 to 21 in rats, with clinical signs first noted on days 5 or 6. Piloerection, muzzle or facial edema, and subdued behavior were seen in both species. In addition, skin paleness was noted in mice and diarrhea, chromorhinorrhea, and vaginal bleeding were seen in rats. Thus single and cumulative intravenous 5-dose LD<sub>50</sub>s in mice were essentially the same (36 and 40 mg/kg) and the cumulative oral 5-dose LD<sub>50</sub> in rats was the same as the intravenous single-dose LD<sub>50</sub> in rats (14 and 14.1 mg/kg).

**Beagle dogs:** The beagle dog was the most susceptible of any species tested in single dose studies. An oral dose of 2.0 mg/kg and an intravenous dose of 1.0 mg/kg were lethal. Toxic effects included leukopenia, enteritis, elevated liver enzymes with or without histopathological evidence of hepatic necrosis or biliary hyperplasia, bone marrow hypoplasia and lymphoid depletion of spleen/lymph

nodes. The lowest dose where one or more toxic effects were recorded was 0.5 mg/kg (oral and IV).

**Monkeys:** Acute toxic effects in rhesus and cynomolgus monkeys were observed after oral doses of 36 mg/kg (only dose tested) and 20 mg/kg (lowest dose) respectively and were similar to those seen in beagle dogs.



**TABLE 6**  
**Subchronic/Chronic Toxicity**

| Species/Strain                      | No per Group | Route | Dose (mg/kg)                            | Frequency                  | Duration  | Drug-Related Findings (Lowest Dose where Effect Noted)   |
|-------------------------------------|--------------|-------|---|----------------------------|-----------|--|
| Rat/<br>Sprague-Dawley <sup>a</sup> | 5M, 5F       | IV    | 1.0, 2.0, 5.0                           | 1xwk                       | 9 wk      | 1.0 Decreased WC/RBC, elevated liver enzymes, infections, injection site irritation<br>2.0 Decreased body weight<br>5.0 Mortality  |
| Dog/Beagle                          | 2M, 2F       | IV    | 0.25, 0.50, 0.75                        | 1xwk                       | 13 wk     | 0.25 Injection site irritation<br>0.50 Decreased WBC, thymic involution, injection site irritation<br>0.75 Mortality, decreased RBC, increased hepatic enzymes, decreased body weight, infections              |
| Monkey<br>Rhesus                    | 1M, 1F       | IV    | 0.75, 1.0, 1.50, 2.0                    | 1xwk                       | 29-39 wk  | 0.75 Decreased WBC/RBC, injection site irritation<br>1.50 Enteritis, decreased body weight<br>2.00 Bone marrow hypoplasia  |
|                                     | 1M, 1F       | IV    | 1.0                                     | 2xwk                       | 5 wk      | Decreased WC/RBC, decreased body weight, thymic involution   |
|                                     | 1M, 1F       | IV    | 0.20-0.80 escalating dose <sup>b</sup>  | 5xwk, off 2 wks, (1 cycle) | 15 cycles | Mortality, decreased WBC/RBC, thymic Involution and bone marrow hypoplasia following completion of the dosage regimen  |
|                                     | 1M, 1F       | IV    | 2.0-4.0 cyclic <sup>c</sup>             | 1xwk                       | 4 wk      | Mortality, enteritis, decreased WC/RBC, decreased body weight, bone marrow hypoplasia  |
| Rat/<br>Sprague-Dawley <sup>a</sup> | 6M, 6F       | Oral  | 5.0, 10.0                               | 2xwk                       | 4 wk      | 5.0 Decreased RBC<br>10.0 Mortality, decreased WC, increased hepatic enzymes, decreased body weight, infections<br>15.0 Mortality, decreased RBC, increased hepatic enzymes, decreased body weight, infections |
|                                     | 6M, 0F       | Oral  | 15.0, 20.0                              | 1xwk                       | 4 wk      | 20.0 Decreased WBC   |
| Rat/<br>Sprague-Dawley <sup>a</sup> | 10M, 10F     | Oral  | 1.0, 2.0, 4.0                           | Daily                      | 42 days   | 2.0 Increased hepatic enzymes<br>4.0 Mortality, decreased WBC/RBC, reduced body weight, thymic involution, bone marrow hypoplasia  |
|                                     | 10M, 10F     | Oral  | 7.0, 14.0                               | 1x wk                      | 6 wk      | 7.0 Decreased WC/RBC <sup>d</sup><br>14.0 Mortality, increased hepatic enzymes, reduced body weight, thymic involution, bone marrow hypoplasia   |
| Monkey/Rhesus                       | 1M, 1F       | Oral  | 4.0 – 70.0 escalating dose <sup>e</sup> | 1xwk                       | 13 wk     | Enteritis, decreased WBC/RBC, increased hepatic enzymes, thymic involution, bone marrow hypoplasia   |
| Monkey/Rhesus                       | 2M, 2F       | Oral  | 4.0, 10.0                               | 1xwk                       | 13 wk     | 4.0 decreased WC, increased hepatic enzymes  |

<sup>a</sup> - as noted in previous studies, affected rats showed signs of piloerection, decreased activity and muzzle swelling

<sup>b</sup> - 0.20 mg/kg (3 cycles), 0.40 mg/kg (6 cycles), 0.60 mg/kg (3 cycles), 0.80 mg/kg (3 cycles)

<sup>c</sup> - 4.0 mg/kg for 3 weeks followed by 2.0 mg/kg for 1 week (3.0 mg/kg for 4 weeks after washout in 1 animal)

<sup>d</sup> - splenic extramedullary hematopoiesis - 7 mg/kg once weekly dose only

<sup>e</sup> - 4.0 mg/kg escalating to 6.0, 8.0, 10.0, 12.0, 14.0, 20.0, 30.0, 40.0, 40.0, 50.0, 70.0, 70.0 (weeks 2-13)

## Mutagenicity

Vinorelbine tartrate was shown to be mutagenic in a mouse micronucleus assay and an *in vivo* cytogenetics study in which bone marrow cells from treated Chinese hamsters were examined. The effect seen, polyploidy, is one that the Ames and mouse lymphoma mutagenesis assays do not detect and these assays were negative or equivocal with vinorelbine tartrate.

## Reproduction and Teratology

**Reproduction:** No deleterious effects on maternal or fetal parameters were seen in an intravenous rat fertility reproduction study in which males were treated once weekly for 9 weeks and females once weekly for 4 weeks with a dose of 1.5 mg/kg vinorelbine tartrate.

**Teratology:** Vinorelbine tartrate was found to be embryotoxic when given to mice once during gestation at 1 to 5 mg/kg intravenously but not at 0.5 mg/kg.

## Other Studies

The *in vitro* hemolysis and protein flocculation test with human blood revealed a 10 mg/mL solution of vinorelbine tartrate to be unlikely to exert any hemolytic or protein flocculation problems when used clinically.

An acute study of 17 deacetyl vinorelbine sulfate (a vinorelbine tartrate degradation product) resulted in a LD<sub>50</sub> of 23.0 mg/kg. Clinical signs of toxicity included subdued behaviour, prostration, piloerection and clonic convulsions. In a mouse micronucleus mutagenicity study, 17 deacetyl vinorelbine produced an increase in the incidence in micronuclei in mice sampled 24 or 48 hours postdose. Bromo- 12-vinorelbine sulfate (a vinorelbine tartrate process impurity) was negative in the same assay.

**TABLE 7**  
**Teratology**

| Species | No./Group | Route | Dose (mg/kg) and Frequency   | Drug-Related Findings   |
|---------|-----------|-------|--|---|
| Mouse   | 10F       | IV    | 0.5, 1.0, 3.0, 5.0<br>One dose on day 9 of gestation   | Embryotoxicity at doses 1.0-5.0 mg/kg. Fetotoxicity (delayed ossification) at 1.0 mg/kg.  |
| Rat     | 25F       | IV    | 0.10, 0.26, 0.70<br>Every 3 days for 2 weeks and then through mating and until gestation day 7   | Decreased weight gain and enlarged spleens in dams receiving 0.70 mg/kg. External and/or visceral abnormalities were observed in 4 fetuses at the 0.10 mg/kg dose level. Skeletal abnormalities were observed in all dose groups.   |
| Rat     | 35F       | IV    | 0.10, 0.22, 0.50<br>Dosed on gestational days 7, 10, 13 and 16   | A low incidence of skeletal abnormalities were observed in F <sub>1</sub> fetuses in the 0.50 mg/kg dose group.   |
| Rat     | 25F       | IV    | 0.10, 0.32, 1.00<br>Dosed every 3 days starting at day 17 of gestation and continuing until day 21 of lactation  | Decreased weight gain was observed in female neonates during suckling and male neonates up to 7 weeks of age at the 1.00 mg/kg dose only. No other deleterious effects observed.  |
| Rabbit  | 6F        | IV    | 0.10, 0.25, 0.50, 0.75<br>Dosed on gestation days 6, 12 and 18   | Decreased mean fetal weight and increased number of small fetuses, increased incidence of blood in fetal cochleas and discoloration of fetal lens observed in the 0.75 mg/kg dose group.  |
| Rabbitt | 6F        | IV    | 0.10, 0.25, 0.50, 0.75<br>Dosed on gestation days 6, 9, 12, 15 and 18  | Reduced fetal weight was observed in the 0.25 and 0.50 mg/kg dose groups. Embryotoxicity was observed at doses of 0.50 and 0.75 mg/kg. Vinorelbine tartrate was maternally lethal at 0.75 mg/kg when given for 5 but not 3 days. No terata was seen at any dose level.                |
| Rabbitt | 15F       | IV    | 0.22, 0.40, 0.70<br>Dosed on gestation days 6, 9, 12, 15, 18<br>0.70 dosed on gestation days 7, 10, 13, 16<br>0.70 dosed on gestation days 8, 11, 14, 17 | Vinorelbine tartrate was severely maternally toxic at the 0.70 mg/kg dose level and resulted in maternal clinical signs, reduced body weight and food intake, abortions, and deaths with an increased incidence of external and visceral anomalies in the few live fetuses remaining. |

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**PART III: CONSUMER INFORMATION**

**Pr VINORELBINE TARTRATE FOR INJECTION**  
**Vinorelbine tartrate for injection**

This leaflet is part III of a three-part "Product Monograph" published when VINORELBINE TARTRATE FOR INJECTION was approved for sale in Canada and is designed specifically for Consumers. This leaflet is a summary and will not tell you everything about VINORELBINE TARTRATE FOR INJECTION. Contact your doctor or pharmacist if you have any questions about the drug.

**ABOUT THIS MEDICATION**

What the medication is used for:  
 VINORELBINE TARTRATE FOR INJECTION has been prescribed to you for the treatment of lung and/or breast cancer.

What it does:  
 Vinorelbine interferes with the growth of rapidly dividing cells, like cancer cells, and eventually causes cell death.

When it should not be used:  
 VINORELBINE TARTRATE FOR INJECTION should not be used if you:

- are allergic to vinorelbine tartrate or
- have severe granulocytopenia (reduced number of white blood cells) or severe thrombocytopenia (reduced number of platelets. Platelets help to form blood clots).

What the medicinal ingredient is:  
 Vinorelbine Tartrate

What the nonmedicinal ingredients are:  
 Water for Injection

What dosage forms it comes in:  
 Injection 10 mg/mL

**WARNINGS AND PRECAUTIONS**

**Serious Warnings and Precautions**

- **The preparation and administration of VINORELBINE TARTRATE FOR INJECTION (vinorelbine tartrate) is only carried out by trained healthcare professionals**
- **Before each administration of VINORELBINE TARTRATE FOR INJECTION, a blood sample will be taken for analysis of its components**
- **If the results of this analysis are not satisfactory, your treatment may be delayed or the dose reduced and further checks may be made**

BEFORE you use VINORELBINE TARTRATE FOR INJECTION talk to your doctor or pharmacist if:

- you have any other medical problems, especially any infections such as chickenpox (including recent exposure) or Herpes zoster (shingles)
- you are taking any medications, prescription and non-prescription medicines
- you have had any other therapy for cancer including other drugs or radiation therapy.
- you are pregnant or if you intend to have children. Vinorelbine may cause birth defects if either the male or female is receiving it at the time of conception or if it is taken during pregnancy
- you intend to breast-feed during treatment with vinorelbine. Vinorelbine may cause serious side effects in nursing babies.
- you have ever had any unusual or allergic reaction to vinorelbine

**INTERACTIONS WITH THIS MEDICATION**

Tell your doctor about all medications that you are taking. It is especially important that your doctor knows if you are taking mitomycin, cisplatin or paclitaxel.

You may experience radiosensitivity effects if you take vinorelbine tartrate injection prior or along with radiation therapy.

**PROPER USE OF THIS MEDICATION**

VINORELBINE TARTRATE FOR INJECTION is for intravenous administration only. It should be administered by individuals experienced in the administration of cancer chemotherapeutic drugs.

Usual dose:  
 The dose of vinorelbine will be different for different patients. The dose that is used may depend on a number of things, including what the medicine is being used for, your body size, and whether or not other medicines are also being taken.

Overdose:  
 In the case of an overdose your doctor will stop the therapy and treat the symptoms. You may have to have additional medical treatment.

Missed Dose:  
 Your doctor will set the times at which you are to receive this medicine. It is important not to miss a dose. Let your prescriber or health care professional know if you are unable to keep an appointment. Contact your doctor as soon as possible.

**SIDE EFFECTS AND WHAT TO DO ABOUT THEM**

Any medicine may have unwanted effects. Tell your doctor about any unusual sign or symptom whether listed or not.

Some side-effects that have been reported following treatment with vinorelbine tartrate are listed below.

- Constipation, rarely becoming intestinal obstruction
- Diarrhea
- Nausea and occasionally vomiting.
- Breathing difficulties or skin reaction as a result of an allergic reaction.
- Alopecia (hair loss).
- Jaw pain.
- A burning feeling and inflammation at the site of injection may occur. VINORELBINE TARTRATE FOR INJECTION is a vesicant (can cause skin blistering) and can produce phlebitis (inflammation of a vein) or extravasation (escape of drug and or blood, from a vessel into the surrounding tissue) injury. If you notice pain, swelling, burning or any unusual feeling around the site of your injection, tell your health care professional immediately.
- Decrease in white blood cells, red blood cells and platelets. The major toxicities of vinorelbine tartrate are related to bone marrow toxicity, specifically granulocytopenia (decrease in white blood cells) with increased susceptibility to infection. Contact your doctor immediately if you experience fever or chills.
- Neuropathy (suppression of some reflex reactions or altered touch awareness).
- Asthenia (The lack or loss of strength and energy, weakness)

**SERIOUS SIDE EFFECTS, HOW OFTEN THEY HAPPEN AND WHAT TO DO ABOUT THEM**

| Symptom / effect |                                  | Talk with your doctor or pharmacist |              | Stop taking drug and call your doctor or pharmacist |
|------------------|----------------------------------|-------------------------------------|--------------|---|
|                  |                                  | Only if severe                      | In all cases |   |
| Common           | Fever, chills                    |                                     | ✓            |   |
|                  | Diarrhea and Constipation        |                                     | ✓            |   |
|                  | Numbness of finger tips and toes |                                     | ✓            |   |
|                  | <u>At injection site</u>         |                                     |              |   |
|                  | Pain                             |                                     | ✓            |   |
|                  | Swelling                         |                                     | ✓            |   |
|                  | Burning                          |                                     | ✓            |   |

*This is not a complete list of side effects. For any unexpected effects while taking VINORELBINE TARTRATE FOR INJECTION, contact your doctor or pharmacist.*

**HOW TO STORE IT**

Store VINORELBINE TARTRATE FOR INJECTION vials in refrigerator (2°C to 8°C) in the original package protected from light. Do not freeze.

Keep Out of the Reach of Children.

**REPORTING SUSPECTED SIDE EFFECTS**

You can report any suspected adverse reactions associated with the use of health products to the Canada Vigilance Program by one of the following 3 ways:

- Report online at [www.healthcanada.gc.ca/medeffect](http://www.healthcanada.gc.ca/medeffect)
- Call toll-free at 1-866-234-2345
- Complete a Canada Vigilance Reporting Form and:
  - Fax toll-free to 1-866-678-6789, or
  - Mail to: Canada Vigilance Program  
Health Canada  
Postal Locator 0701E  
Ottawa, Ontario  
K1A 0K9

Postage paid labels, Canada Vigilance Reporting Form and the adverse reaction reporting guidelines are available on the MedEffect™ Canada Web site at [www.healthcanada.gc.ca/medeffect](http://www.healthcanada.gc.ca/medeffect).

*NOTE: Should you require information related to the management of side effects, contact your health professional. The Canada Vigilance Program does not provide medical advice.*

**MORE INFORMATION**

This document plus the full product monograph, prepared for health professionals can be found by contacting the sponsor, Teva Canada Limited at:  
1-800-268-4127 ext. 1255005  
or [druginfo@tevacanada.com](mailto:druginfo@tevacanada.com)

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