

# PegIntron® (Peginterferon alfa-2b) Powder for Subcutaneous Injection

## PRODUCT INFORMATION

## PegIntron® (Peginterferon alfa-2b) Powder for Subcutaneous Injection

### HIGHLIGHTS OF PRESCRIBING INFORMATION

These highlights do not include all the information needed to use PegIntron safely and effectively. See full prescribing information for PegIntron.

PegIntron (Peginterferon alfa-2b) Injection, Powder for Solution for Subcutaneous Use  
Initial U.S. Approval: 2001

#### WARNING: RISK OF SERIOUS DISORDERS AND RIBAVIRIN-ASSOCIATED EFFECTS

See full prescribing information for complete boxed warning.

- May cause or aggravate fatal or life-threatening neuropsychiatric, autoimmune, ischemic, and infectious disorders. Monitor closely and withdraw therapy with persistently severe or worsening signs or symptoms of the above disorders. (5)

#### Use with Ribavirin

- Ribavirin may cause birth defects and fetal death; avoid pregnancy in female patients and female partners of male patients. (5.1)
- Ribavirin is a potential carcinogen. (5.1, 13.1)

#### RECENT MAJOR CHANGES

Warnings and Precautions, Endocrine Disorders (5.4)	[1/2010]
Warnings and Precautions, Ophthalmologic Disorders (5.5)	[8/2009]
Warnings and Precautions, Pulmonary Disorders (5.11)	[8/2009]
Warnings and Precautions, Peripheral Neuropathy (5.19)	[8/2009]

#### INDICATIONS AND USAGE

PegIntron is an antiviral indicated for

- **Combination therapy with REBETOL (ribavirin):** Chronic Hepatitis C (CHC) in patients  $\geq 3$  years with compensated liver disease. (1.1)  
Patients with the following characteristics are less likely to benefit from re-treatment after failing a course of therapy: previous nonresponse, previous pegylated interferon treatment, significant bridging fibrosis or cirrhosis, and genotype 1 infection. (1.1)
- **Monotherapy:** CHC in patients ( $\geq 18$  years) with compensated liver disease previously untreated with interferon alpha. (1.1)

#### DOSAGE AND ADMINISTRATION

- PegIntron is administered by subcutaneous injection.

	PegIntron Dose (Adults)*	PegIntron Dose (Pediatric Patients)	REBETOL Dose* (Adults)	REBETOL Dose (Pediatric Patients)
<b>PegIntron/REBETOL Combination Therapy (2.1)</b>	1.5 mcg/kg/week	60 mcg/m <sup>2</sup> /week	800-1400 mg orally daily with food	15 mg/kg/day orally with food in 2 divided doses

\* Refer to Tables 1-7 of the full prescribing information.

- Dose reduction is recommended in patients experiencing certain adverse reactions or renal dysfunction. (2.3, 2.5)

#### DOSAGE FORMS AND STRENGTHS

Single-use vial (with 1.25 mL diluent) and REDIPEN® (3):

- 50 mcg per 0.5 mL, 80 mcg per 0.5 mL, 120 mcg per 0.5 mL, 150 mcg per 0.5 mL.

#### CONTRAINDICATIONS

- Known hypersensitivity reactions, such as urticaria, angioedema, bronchoconstriction, anaphylaxis, Stevens-Johnson syndrome, and toxic epidermal necrolysis to interferon alpha or any other product component. (4)
- Autoimmune hepatitis. (4)
- Hepatic decompensation (Child-Pugh score  $>6$  [class B and C]) in cirrhotic CHC patients before or during treatment. (4)

#### Additional contraindications for combination therapy with ribavirin:

- Pregnant women and men whose female partners are pregnant. (4, 8.1)
- Hemoglobinopathies (e.g., thalassemia major, sickle-cell anemia). (4)
- Creatinine clearance  $<50$  mL/min. (4)

#### WARNINGS AND PRECAUTIONS

- Birth defects and fetal death with ribavirin: Patients must have a negative pregnancy test prior to therapy, use at least 2 forms of contraception, and undergo monthly pregnancy tests. (5.1)  
Patients exhibiting the following conditions should be closely monitored and may require dose reduction or discontinuation of therapy:
  - Hemolytic anemia with ribavirin. (5.1)
  - Neuropsychiatric events. (5.2)
  - History of significant or unstable cardiac disease. (5.3)
  - Hypothyroidism, hyperthyroidism, hyperglycemia, diabetes mellitus that cannot be effectively treated by medication. (5.4)
  - New or worsening ophthalmologic disorders. (5.5)
  - Ischemic and hemorrhagic cerebrovascular events. (5.6)
  - Severe decreases in neutrophil or platelet counts. (5.7)
  - History of autoimmune disorders. (5.8)
  - Pancreatitis and ulcerative or hemorrhagic/ischemic colitis and pancreatitis. (5.9, 5.10)
  - Pulmonary infiltrates or pulmonary function impairment. (5.11)
  - Child-Pugh score  $>6$  (class B and C). (4, 5.12)
  - Increased creatinine levels in patients with renal insufficiency. (5.13)
  - Serious, acute hypersensitivity reactions and cutaneous eruptions. (5.14)
  - Dental/periodontal disorders reported with combination therapy. (5.16)
  - Hypertriglyceridemia may result in pancreatitis (e.g., triglycerides  $>1000$  mg/dL). (5.17)
  - Weight loss and growth inhibition reported with combination therapy in pediatric patients. (5.18)
  - Peripheral neuropathy when used in combination with telbivudine. (5.19)

#### ADVERSE REACTIONS

Most common adverse reactions ( $>40\%$ ) in adult patients receiving either PegIntron or PegIntron/REBETOL are injection-site inflammation/reaction, fatigue/asthenia, headache, rigors, fevers, nausea, myalgia, and anxiety/emotional lability/irritability. (6.1) Most common adverse reactions ( $>25\%$ ) in pediatric patients receiving PegIntron/REBETOL are pyrexia, headache, neutropenia, fatigue, anorexia, injection-site erythema, vomiting. (6.1)

To report SUSPECTED ADVERSE REACTIONS, contact Schering Corporation at 1-800-526-4099 or FDA at 1-800-FDA-1088 or [www.fda.gov/medwatch](http://www.fda.gov/medwatch).

#### DRUG INTERACTIONS

- Drug metabolized by CYP450: Caution with drugs metabolized by CYP2C8/9 (e.g., warfarin, phenytoin) or CYP2D6 (e.g., flecainide). (7.1)
- Methadone: Monitor for increased narcotic effect. (7.2)
- Nucleoside analogues: Closely monitor for toxicities. Discontinue nucleoside reverse transcriptase inhibitors or reduce dose or discontinue interferon, ribavirin, or both with worsening toxicities. (7.3)
- Didanosine: Concurrent use with REBETOL is not recommended. (7.3)

#### USE IN SPECIFIC POPULATIONS

- Ribavirin Pregnancy Registry: 1-800-593-2214. (8.1)
- Pediatrics: Safety and efficacy in pediatrics  $<3$  years old have not been established. (8.4)
- Geriatrics: Neuropsychiatric, cardiac, pulmonary, GI, and systemic (flu-like) adverse reactions may be more severe. (8.5)
- Organ transplant: Safety and efficacy have not been studied. (8.6)
- HIV or HBV coinfection: Safety and efficacy have not been established. (8.7)

See 17 for PATIENT COUNSELING INFORMATION.

Revised: 1/2010

### FULL PRESCRIBING INFORMATION: CONTENTS\*

#### WARNING: RISK OF SERIOUS DISORDERS AND RIBAVIRIN-ASSOCIATED EFFECTS

#### 1 INDICATIONS AND USAGE

##### 1.1 Chronic Hepatitis C

#### 2 DOSAGE AND ADMINISTRATION

##### 2.1 PegIntron/REBETOL Combination Therapy

##### 2.2 PegIntron Monotherapy

##### 2.3 Dose Reduction

##### 2.4 Discontinuation of Dosing

##### 2.5 Renal Function

##### 2.6 Preparation and Administration

#### 3 DOSAGE FORMS AND STRENGTHS

#### 4 CONTRAINDICATIONS

#### 5 WARNINGS AND PRECAUTIONS

##### 5.1 Use with Ribavirin

##### 5.2 Neuropsychiatric Events

##### 5.3 Cardiovascular Events

##### 5.4 Endocrine Disorders

##### 5.5 Ophthalmologic Disorders

##### 5.6 Cerebrovascular Disorders

##### 5.7 Bone Marrow Toxicity

##### 5.8 Autoimmune Disorders

##### 5.9 Pancreatitis

##### 5.10 Colitis

##### 5.11 Pulmonary Disorders

##### 5.12 Hepatic Failure

**FULL PRESCRIBING INFORMATION: CONTENTS\*** (cont)

- 5 WARNINGS AND PRECAUTIONS** (cont)
  - 5.13 Patients with Renal Insufficiency
  - 5.14 Hypersensitivity
  - 5.15 Laboratory Tests
  - 5.16 Dental and Periodontal Disorders
  - 5.17 Triglycerides
  - 5.18 Impact on Growth – Pediatric Use
  - 5.19 Peripheral Neuropathy
- 6 ADVERSE REACTIONS**
  - 6.1 Clinical Trials Experience
  - 6.2 Immunogenicity
  - 6.3 Postmarketing Experience
- 7 DRUG INTERACTIONS**
  - 7.1 Drugs Metabolized by Cytochrome P-450
  - 7.2 Methadone
  - 7.3 Use with Ribavirin (Nucleoside Analogues)
- 8 USE IN SPECIFIC POPULATIONS**
  - 8.1 Pregnancy
  - 8.3 Nursing Mothers
  - 8.4 Pediatric Use
  - 8.5 Geriatric Use

- 8.6 Organ Transplant Recipients
- 8.7 HIV or HBV Coinfection
- 10 OVERDOSAGE**
- 11 DESCRIPTION**
- 12 CLINICAL PHARMACOLOGY**
  - 12.1 Mechanism of Action
  - 12.2 Pharmacodynamics
  - 12.3 Pharmacokinetics
  - 12.4 Microbiology
- 13 NONCLINICAL TOXICOLOGY**
  - 13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility
- 14 CLINICAL STUDIES**
  - 14.1 Chronic Hepatitis C in Adults
  - 14.2 Chronic Hepatitis C in Pediatrics
- 16 HOW SUPPLIED/STORAGE AND HANDLING**
- 17 PATIENT COUNSELING INFORMATION**
  - 17.1 Medication Guide
  - 17.2 Pregnancy
  - 17.3 HCV Transmission
  - 17.4 Laboratory Evaluations, Hydration, “Flu-like” Symptoms

\*Sections or subsections omitted from the full prescribing information are not listed.

**FULL PRESCRIBING INFORMATION**

**WARNING: RISK OF SERIOUS DISORDERS AND RIBAVIRIN-ASSOCIATED EFFECTS**  
 Alpha interferons, including PegIntron, may cause or aggravate fatal or life-threatening neuropsychiatric, autoimmune, ischemic, and infectious disorders. Patients should be monitored closely with periodic clinical and laboratory evaluations. Patients with persistently severe or worsening signs or symptoms of these conditions should be withdrawn from therapy. In many, but not all cases, these disorders resolve after stopping PegIntron therapy [see Warnings and Precautions (5) and Adverse Reactions (6.1)].

**Use with Ribavirin**  
 Ribavirin may cause birth defects and death of the unborn child. Extreme care must be taken to avoid pregnancy in female patients and in female partners of male patients. Ribavirin causes hemolytic anemia. The anemia associated with REBETOL therapy may result in a worsening of cardiac disease. Ribavirin is genotoxic and mutagenic and should be considered a potential carcinogen. [See REBETOL package insert.]

**1 INDICATIONS AND USAGE**

**1.1 Chronic Hepatitis C**

**Combination therapy:** PegIntron® in combination with REBETOL® (ribavirin) is indicated for the treatment of chronic hepatitis C in patients 3 years of age and older with compensated liver disease.

The following points should be considered when initiating therapy with PegIntron in combination with REBETOL:

- These indications are based on achieving undetectable HCV-RNA after treatment for 24 or 48 weeks and maintaining a Sustained Virologic Response (SVR) 24 weeks after the last dose.
- Patients with the following characteristics are less likely to benefit from re-treatment after failing a course of therapy: previous nonresponse, previous pegylated interferon treatment, significant bridging fibrosis or cirrhosis, and genotype 1 infection [see Clinical Studies (14)].
- No safety and efficacy data are available for treatment of longer than 1 year.

**Monotherapy (for patients who are intolerant to ribavirin):** PegIntron (Peginterferon alfa-2b) is indicated for use alone for the treatment of chronic hepatitis C in patients with compensated liver disease previously untreated with interferon alpha and who are at least 18 years of age.

- The following point should be considered when initiating therapy with PegIntron alone:
- Combination therapy with REBETOL is preferred over PegIntron monotherapy unless there are contraindications to or significant intolerance of REBETOL. Combination therapy provides substantially better response rates than monotherapy [see Clinical Studies (14)].

**2 DOSAGE AND ADMINISTRATION**

**2.1 PegIntron/REBETOL Combination Therapy**

REBETOL should be taken with food. REBETOL should not be used in patients with creatinine clearance <50 mL/min.

**Adults:** The recommended dose of PegIntron is 1.5 mcg/kg/week subcutaneously in combination with 800 to 1400 mg of REBETOL orally based on patient body weight. The volume of PegIntron to be injected depends on the strength of PegIntron and patient’s body weight (see Table 1).

**Duration of Treatment – Interferon Alpha-naïve Patients:** The treatment duration for patients with genotype 1 is 48 weeks. Discontinuation of therapy should be considered in patients who do not achieve at least a 2 log<sub>10</sub> drop or loss of HCV-RNA at 12 weeks, or if HCV-RNA remains detectable after 24 weeks of therapy. Patients with genotype 2 and 3 should be treated for 24 weeks.

**Duration of Treatment – Re-treatment with PegIntron/REBETOL of Prior Treatment Failures:** The treatment duration for patients who previously failed therapy is 48 weeks, regardless of HCV genotype.

Re-treated patients who fail to achieve undetectable HCV-RNA at Week 12 of therapy, or whose HCV-RNA remains detectable after 24 weeks of therapy, are highly unlikely to achieve SVR and discontinuation of therapy should be considered [see Clinical Studies (14.1)].

**TABLE 1: Recommended PegIntron Combination Therapy Dosing (Adults)**

Body weight kg (lbs)	PegIntron REDIPEN® or Vial Strength to Use	Amount of PegIntron (mcg) to Administer	Volume (mL)* of PegIntron to Administer	REBETOL Daily Dose	REBETOL Number of Capsules
<40 (<88)	50 mcg per 0.5 mL	50	0.5	800 mg/day	2 x 200 mg capsules a.m. 2 x 200 mg capsules p.m.
		64	0.4	800 mg/day	2 x 200 mg capsules a.m. 2 x 200 mg capsules p.m.
40-50 (88-111)	80 mcg per 0.5 mL	80	0.5	800 mg/day	2 x 200 mg capsules a.m. 2 x 200 mg capsules p.m.
		96	0.4	800 mg/day	2 x 200 mg capsules a.m. 2 x 200 mg capsules p.m.
61-65 (134-144)	120 mcg per 0.5 mL	96	0.4	1000 mg/day	2 x 200 mg capsules a.m. 3 x 200 mg capsules p.m.
		120	0.5	1000 mg/day	2 x 200 mg capsules a.m. 3 x 200 mg capsules p.m.
66-75 (145-166)	150 mcg per 0.5 mL	120	0.5	1200 mg/day	3 x 200 mg capsules a.m. 3 x 200 mg capsules p.m.
		150	0.5	1200 mg/day	3 x 200 mg capsules a.m. 3 x 200 mg capsules p.m.
76-80 (167-177)	†	†	†	1400 mg/day	3 x 200 mg capsules a.m. 4 x 200 mg capsules p.m.
		†	†	†	†

\* When reconstituted as directed.

† For patients weighing >105 kg (>231 pounds), the PegIntron dose of 1.5 mcg/kg/week should be calculated based on the individual patient weight. Two vials of PegIntron may be necessary to provide the dose.

**Pediatric Patients:** Dosing for pediatric patients is determined by body surface area for PegIntron and by body weight for REBETOL. The recommended dose of PegIntron is 60 mcg/m<sup>2</sup>/week subcutaneously in combination with 15 mg/kg/day of REBETOL orally in 2 divided doses (see Table 2) for pediatric patients ages 3 to 17 years. Patients who reach their 18th birthday while receiving PegIntron/REBETOL should remain on the pediatric dosing regimen. The treatment duration for patients with genotype 1 is 48 weeks. Patients with genotypes 2 and 3 should be treated for 24 weeks.

**TABLE 2: Recommended REBETOL\* Dosing in Combination Therapy (Pediatrics)**

Body weight kg (lbs)	REBETOL Daily Dose	REBETOL Number of Capsules
<47 (<103)	15 mg/kg/day	Use REBETOL Oral Solution†
47-59 (103-131)	800 mg/day	2 x 200 mg capsules a.m. 2 x 200 mg capsules p.m.
60-73 (132-162)	1000 mg/day	2 x 200 mg capsules a.m. 3 x 200 mg capsules p.m.
>73 (>162)	1200 mg/day	3 x 200 mg capsules a.m. 3 x 200 mg capsules p.m.

\* REBETOL to be used in combination with PegIntron 60 mcg/m<sup>2</sup> weekly.

† REBETOL Oral Solution may be used for any patient regardless of body weight.

## 2.2 PegIntron Monotherapy

The recommended dose of PegIntron regimen is 1 mcg/kg/week subcutaneously for 1 year administered on the same day of the week. Discontinuation of therapy should be considered in patients who do not achieve at least a 2 log<sub>10</sub> drop or loss of HCV-RNA at 12 weeks of therapy, or whose HCV-RNA levels remain detectable after 24 weeks of therapy. The volume of PegIntron to be injected depends on patient weight (see Table 3).

**TABLE 3: Recommended PegIntron Monotherapy Dosing**

Body weight kg (lbs)	PegIntron REDIPEN or Vial Strength to Use	Amount of PegIntron (mcg) to Administer	Volume (mL)* of PegIntron to Administer
≤45 (≤100)	50 mcg per 0.5 mL	40	0.4
46-56 (101-124)		50	0.5
57-72 (125-159)	80 mcg per 0.5 mL	64	0.4
73-88 (160-195)		80	0.5
89-106 (196-234)	120 mcg per 0.5 mL	96	0.4
107-136 (235-300)		120	0.5
137-160 (301-353)	150 mcg per 0.5 mL	150	0.5

\* When reconstituted as directed.

## 2.3 Dose Reduction

If a serious adverse reaction develops during the course of treatment [see Warnings and Precautions (5)] discontinue or modify the dosage of PegIntron and REBETOL until the adverse event abates or decreases in severity. If persistent or recurrent serious adverse events develop despite adequate dosage adjustment, discontinue treatment. For guidelines for dose modifications and discontinuation based on depression or laboratory parameters, see Tables 4 and 5. Dose reduction of PegIntron in adult patients on PegIntron/REBETOL combination therapy is accomplished in a two-step process from the original starting dose of 1.5 mcg/kg/week, to 1 mcg/kg/week, then to 0.5 mcg/kg/week, if needed. Dose reduction in patients on PegIntron monotherapy is accomplished by reducing the original starting dose of 1 mcg/kg/week to 0.5 mcg/kg/week. Dose reduction of PegIntron in adults may be accomplished by utilizing a lower dose strength or administering a lesser volume as shown in Table 6 or 7.

In the adult combination therapy Study 2, dose reductions occurred in 42% of subjects receiving PegIntron 1.5 mcg/kg plus REBETOL 800 mg daily, including 57% of those subjects weighing 60 kg or less. In Study 4, 16% of subjects had a dose reduction of PegIntron to 1 mcg/kg in combination with REBETOL, with an additional 4% requiring the second dose reduction of PegIntron to 0.5 mcg/kg due to adverse events [see Adverse Reactions (6.1)].

Dose reduction in pediatric patients is accomplished by modifying the recommended dose in a 2-step process from the original starting dose of 60 mcg/m<sup>2</sup>/week, to 40 mcg/m<sup>2</sup>/week, then to 20 mcg/m<sup>2</sup>/week, if needed (see Tables 4 and 5). In the pediatric combination therapy trial, dose reductions occurred in 25% of subjects receiving PegIntron 60 mcg/m<sup>2</sup> weekly plus REBETOL 15 mg/kg daily.

**TABLE 4: Guidelines for Modification or Discontinuation of PegIntron or PegIntron/REBETOL and for Scheduling Visits for Patients With Depression**

Depression Severity*	Initial Management (4-8 weeks)		Depression Status		
	Dose Modification	Visit Schedule	Remains Stable	Improves	Worsens
Mild	No change	Evaluate once weekly by visit or phone.	Continue weekly visit schedule.	Resume normal visit schedule.	See moderate or severe depression
Moderate	Adults: Adjust Dose* Pediatrics: Decrease dose to 40 mcg/m <sup>2</sup> /week, then to 20 mcg/m <sup>2</sup> /week, if needed	Evaluate once weekly (office visit at least every other week).	Consider psychiatric consultation. Continue reduced dosing.	If symptoms improve and are stable for 4 weeks, may resume normal visit schedule. Continue reduced dosing or return to normal dose.	See severe depression
Severe	Discontinue PegIntron/REBETOL permanently.	Obtain immediate psychiatric consultation.	Psychiatric therapy as necessary		

\* See DSM-IV for definitions. For patients on PegIntron/REBETOL combination therapy: 1st dose reduction of PegIntron is to 1 mcg/kg/week, 2nd dose reduction (if needed) of PegIntron is to 0.5 mcg/kg/week. For patients on PegIntron monotherapy: decrease PegIntron dose to 0.5 mcg/kg/week.

**TABLE 5: Guidelines for Dose Modification and Discontinuation of PegIntron or PegIntron/REBETOL Based on Laboratory Parameters in Adults and Pediatrics**

Laboratory Values	PegIntron		REBETOL	
	Adults	Pediatrics	Adults	Pediatrics
Hgb <10 g/dL	For patients with cardiac disease, reduce by 50%*	See footnote*	Adjust Dose†	1st reduction to 12 mg/kg/day 2nd reduction to 8 mg/kg/day
WBC <1.5 x 10 <sup>9</sup> /L Neutrophils <0.75 x 10 <sup>9</sup> /L Platelets <50 x 10 <sup>9</sup> /L (Adults) <70 x 10 <sup>9</sup> /L (Pediatrics)	Adjust Dose‡	1st reduction to 40 mcg/m <sup>2</sup> /week 2nd reduction to 20 mcg/m <sup>2</sup> /week	No dose change	No dose change
Hgb <8.5 g/dL WBC <1 x 10 <sup>9</sup> /L Neutrophils <0.5 x 10 <sup>9</sup> /L Platelets <25 x 10 <sup>9</sup> /L (Adults) <50 x 10 <sup>9</sup> /L (Pediatrics) Creatinine >2 mg/dL (Pediatrics)	Permanently discontinue	Permanently discontinue	Permanently discontinue	Permanently discontinue

\* For adult patients with a history of stable cardiac disease receiving PegIntron in combination with ribavirin, the PegIntron dose should be reduced by half and the ribavirin dose by 200 mg/day if a >2 g/dL decrease in hemoglobin is observed during any 4-week period. Both PegIntron and ribavirin should be permanently discontinued if patients have hemoglobin levels <12 g/dL after this ribavirin dose reduction. Pediatric patients who have pre-existing cardiac conditions and experience a hemoglobin decrease ≥2 g/dL during any 4-week period during treatment should have weekly evaluations and hematology testing.

† 1st dose reduction of REBETOL is by 200 mg/day, except in patients receiving the 1400 mg dose it is by 400 mg/day; 2nd dose reduction of REBETOL (if needed) is by an additional 200 mg/day.

‡ For patients on PegIntron/REBETOL combination therapy: 1st dose reduction of PegIntron is to 1 mcg/kg/week, 2nd dose reduction (if needed) of PegIntron is to 0.5 mcg/kg/week. For patients on PegIntron monotherapy: decrease PegIntron dose to 0.5 mcg/kg/week.

**TABLE 6: Reduced PegIntron Dose (0.5 mcg/kg) for (1 mcg/kg) Monotherapy in Adults**

Body weight kg (lbs)	PegIntron REDIPEN/ Vial Strength to Use	Amount of PegIntron (mcg) to Administer	Volume (mL)† of PegIntron to Administer
≤45 (≤100)	50 mcg per 0.5 mL*	20	0.2
46-56 (101-124)		25	0.25
57-72 (125-159)	50 mcg per 0.5 mL	30	0.3
73-88 (160-195)		40	0.4
89-106 (196-234)	50 mcg per 0.5 mL	50	0.5
107-136 (235-300)	80 mcg per 0.5 mL	64	0.4
≥137 (≥301)		80	0.5

\* Must use vial. Minimum delivery for REDIPEN 0.3 mL.

† When reconstituted as directed.

**TABLE 7: Two-Step Dose Reduction of PegIntron in Combination Therapy in Adults**

First Dose Reduction to PegIntron 1 mcg/kg				Second Dose Reduction to PegIntron 0.5 mcg/kg			
Body weight kg (lbs)	PegIntron REDIPEN/ Vial Strength to Use	Amount of PegIntron (mcg) to Administer	Volume (mL)† of PegIntron to Administer	Body weight kg (lbs)	PegIntron REDIPEN/ Vial Strength to Use	Amount of PegIntron (mcg) to Administer	Volume (mL)† of PegIntron to Administer
<40 (<88)	50 mcg per 0.5 mL	35	0.35	<40 (<88)	50 mcg per 0.5 mL*	20	0.2
40-50 (88-111)		45	0.45	40-50 (88-111)		25	0.25
51-60 (112-133)	80 mcg per 0.5 mL	50	0.5	51-60 (112-133)	50 mcg per 0.5 mL	30	0.3
61-75 (134-166)		64	0.4	61-75 (134-166)		35	0.35
76-85 (167-187)	80	0.5	0.5	76-85 (167-187)	45	0.45	0.45

\* Must use vial. Minimum delivery for REDIPEN 0.3 mL.

† When reconstituted as directed.

TABLE 7: Two-Step Dose Reduction of PegIntron in Combination Therapy in Adults (cont)

First Dose Reduction to PegIntron 1 mcg/kg				Second Dose Reduction to PegIntron 0.5 mcg/kg			
Body weight kg (lbs)	PegIntron REDIPEN/Vial Strength to Use	Amount of PegIntron (mcg) to Administer	Volume (mL) <sup>†</sup> of PegIntron to Administer	Body weight kg (lbs)	PegIntron REDIPEN/Vial Strength to Use	Amount of PegIntron (mcg) to Administer	Volume (mL) <sup>†</sup> of PegIntron to Administer
86-104 (188-230)	120 mcg per 0.5 mL	96	0.4	86-104 (188-230)	50 mcg per 0.5 mL	50	0.5
105-125 (231-275)		108	0.45	105-125 (231-275)	80 mcg per 0.5 mL	64	0.4
>125 (>275)	150 mcg per 0.5 mL	135	0.45	>125 (>275)			72

\* Must use vial. Minimum delivery for REDIPEN 0.3 mL.

† When reconstituted as directed.

## 2.4 Discontinuation of Dosing

**Adults:** It is recommended that HCV genotype 1 interferon-alfa-naïve patients receiving PegIntron, alone or in combination with ribavirin, be discontinued from therapy if there is not at least a 2 log<sub>10</sub> drop or loss of HCV-RNA at 12 weeks of therapy, or whose HCV-RNA levels remain detectable after 24 weeks of therapy. Regardless of genotype, previously treated patients who have detectable HCV-RNA at Week 12 or 24, are highly unlikely to achieve SVR and discontinuation of therapy should be considered.

**Pediatrics (3-17 years of age):** It is recommended that patients receiving PegIntron/REBETOL combination (excluding those with HCV genotype 2 and 3) be discontinued from therapy at 12 weeks if their treatment Week 12 HCV-RNA dropped <2 log<sub>10</sub> compared to pretreatment or at 24 weeks if they have detectable HCV-RNA at treatment Week 24.

## 2.5 Renal Function

In patients with moderate renal dysfunction (creatinine clearance 30-50 mL/min), the PegIntron dose should be reduced by 25%. Patients with severe renal dysfunction (creatinine clearance 10-29 mL/min), including those on hemodialysis, should have the PegIntron dose reduced by 50%. If renal function decreases during treatment, PegIntron therapy should be discontinued. When PegIntron is administered in combination with REBETOL, subjects with impaired renal function or those over the age of 50 should be more carefully monitored with respect to the development of anemia. PegIntron/REBETOL should not be used in patients with creatinine clearance <50 mL/min.

## 2.6 Preparation and Administration

**PegIntron REDIPEN:** PegIntron REDIPEN consists of a dual-chamber glass cartridge with sterile, lyophilized peginterferon alfa-2b in the active chamber and Sterile Water for Injection USP in the diluent chamber. The PegIntron in the glass cartridge should appear as a white to off-white tablet-shaped solid that is whole or in pieces, or powder.

To reconstitute the lyophilized peginterferon alfa-2b in the REDIPEN:

- Hold the REDIPEN upright (dose button down) and press the 2 halves of the pen together until there is an audible click.
- Gently invert the pen to mix the solution. **DO NOT SHAKE.** The reconstituted solution has a concentration of either 50 mcg per 0.5 mL, 80 mcg per 0.5 mL, 120 mcg per 0.5 mL, or 150 mcg per 0.5 mL for a single subcutaneous injection.
- Visually inspect the solution for particulate matter and discoloration prior to administration. The reconstituted solution should be clear and colorless. Do not use the solution if it is discolored or not clear, or if particulates are present.

Keeping the pen upright, attach the supplied needle and select the appropriate PegIntron dose by pulling back on the dosing button until the dark bands are visible and turning the button until the dark band is aligned with the correct dose. The prepared PegIntron solution is to be injected subcutaneously.

The PegIntron REDIPEN is a single-use pen and does not contain a preservative. The reconstituted solution should be used immediately and cannot be stored for more than 24 hours at 2°-8°C [see How Supplied/Storage and Handling (16)]. **DO NOT REUSE THE REDIPEN.** The sterility of any remaining product can no longer be guaranteed. **DISCARD THE UNUSED PORTION.** Pooling of unused portions of some medications has been linked to bacterial contamination and morbidity.

**PegIntron Vials:** Two BD® Safety-Lok® syringes are provided in the package; one syringe is for the reconstitution steps and one for the patient injection. There is a plastic safety sleeve to be pulled over the needle after use. The syringe locks with an audible click when the green stripe on the safety sleeve covers the red stripe on the needle. Instructions for the preparation and administration of PegIntron Powder for Injection are provided below.

- Reconstitute the PegIntron lyophilized product with only 0.7 mL of the 1.25 mL of supplied diluent (Sterile Water for Injection USP). The diluent vial is for single use only. The remaining diluent should be discarded.** No other medications should be added to solutions containing PegIntron, and PegIntron should not be reconstituted with other diluents.
- Swirl gently to hasten complete dissolution of the powder. The reconstituted solution should be clear and colorless.
- Visually inspect the solution for particulate matter and discoloration prior to administration. The solution should not be used if discolored or cloudy, or if particulates are present.
- The appropriate PegIntron dose should be withdrawn and injected subcutaneously. PegIntron vials are for single use only and do not contain a preservative.

The reconstituted solution should be used immediately and cannot be stored for more than 24 hours at 2°-8°C [see How Supplied/Storage and Handling (16)]. **DO NOT REUSE THE VIAL.** The

sterility of any remaining product can no longer be guaranteed. **DISCARD THE UNUSED PORTION.** Pooling of unused portions of some medications has been linked to bacterial contamination and morbidity.

## 3 DOSAGE FORMS AND STRENGTHS

- Single-use vial: 1.25 mL diluent vial: 50 mcg per 0.5 mL, 80 mcg per 0.5 mL, 120 mcg per 0.5 mL, 150 mcg per 0.5 mL.
- Single-use REDIPEN: 50 mcg per 0.5 mL, 80 mcg per 0.5 mL, 120 mcg per 0.5 mL, 150 mcg per 0.5 mL.

## 4 CONTRAINDICATIONS

PegIntron is contraindicated in patients with:

- known hypersensitivity reactions, such as urticaria, angioedema, bronchoconstriction, anaphylaxis, Stevens-Johnson syndrome, and toxic epidermal necrolysis to interferon alpha or any other component of the product
  - autoimmune hepatitis
  - hepatic decompensation (Child-Pugh score >6 [class B and C]) in cirrhotic CHC patients before or during treatment
- PegIntron/REBETOL combination therapy is additionally contraindicated in:
- women who are pregnant. REBETOL may cause fetal harm when administered to a pregnant woman. REBETOL is contraindicated in women who are or may become pregnant. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug the patient should be apprised of the potential hazard to a fetus [see Use in Specific Populations (8.1)].
  - men whose female partners are pregnant
  - patients with hemoglobinopathies (e.g., thalassemia major, sickle-cell anemia)
  - patients with creatinine clearance <50 mL/min

## 5 WARNINGS AND PRECAUTIONS

Patients should be monitored for the following serious conditions, some of which may become life threatening. Patients with persistently severe or worsening signs or symptoms should be withdrawn from therapy.

### 5.1 Use with Ribavirin

**Pregnancy:** REBETOL may cause birth defects and death of the unborn child. REBETOL therapy should not be started until a report of a negative pregnancy test has been obtained immediately prior to planned initiation of therapy. Patients should use at least 2 forms of contraception and have monthly pregnancy tests [see BOXED WARNING, Contraindications (4), Patient Counseling Information (17), and REBETOL package insert].

**Anemia:** Ribavirin caused hemolytic anemia in 10% of PegIntron/REBETOL-treated subjects within 1 to 4 weeks of initiation of therapy. Complete blood counts should be obtained pretreatment and at Week 2 and Week 4 of therapy or more frequently if clinically indicated. Anemia associated with REBETOL therapy may result in a worsening of cardiac disease. Decrease in dosage or discontinuation of REBETOL may be necessary [see Dosage and Administration (2.3) and REBETOL package insert].

### 5.2 Neuropsychiatric Events

Life-threatening or fatal neuropsychiatric events, including suicide, suicidal and homicidal ideation, depression, relapse of drug addiction/overdose, and aggressive behavior sometimes directed towards others have occurred in patients with and without a previous psychiatric disorder during PegIntron treatment and follow-up. Psychoses, hallucinations, bipolar disorders, and mania have been observed in patients treated with interferon alpha. PegIntron should be used with extreme caution in patients with a history of psychiatric disorders. Patients should be advised to report immediately any symptoms of depression or suicidal ideation to their prescribing physicians. Physicians should monitor all patients for evidence of depression and other psychiatric symptoms. If patients develop psychiatric problems, including clinical depression, it is recommended that the patients be carefully monitored during treatment and in the 6-month follow-up period. If psychiatric symptoms persist or worsen, or suicidal ideation or aggressive behavior towards others is identified, it is recommended that treatment with PegIntron be discontinued, and the patient followed, with psychiatric intervention as appropriate. In severe cases, PegIntron should be stopped immediately and psychiatric intervention instituted [see Dosage and Administration (2.3)]. Cases of encephalopathy have been observed in some patients, usually elderly, treated at higher doses of PegIntron.

### 5.3 Cardiovascular Events

Cardiovascular events, which include hypotension, arrhythmia, tachycardia, cardiomyopathy, angina pectoris, and myocardial infarction, have been observed in patients treated with PegIntron. PegIntron should be used cautiously in patients with cardiovascular disease. Patients with a history of myocardial infarction and arrhythmic disorder who require PegIntron therapy should be closely monitored [see Warnings and Precautions (5.15)]. Patients with a history of significant or unstable cardiac disease should not be treated with PegIntron/REBETOL combination therapy [see REBETOL package insert].

### 5.4 Endocrine Disorders

PegIntron causes or aggravates hypothyroidism and hyperthyroidism. Hyperglycemia has been observed in patients treated with PegIntron. Diabetes mellitus, including cases of new onset Type 1 diabetes, has been observed in patients treated with alpha interferons, including PegIntron. Patients with these conditions who cannot be effectively treated by medication should not begin PegIntron therapy. Patients who develop these conditions during treatment and cannot be controlled with medication should not continue PegIntron therapy.

### 5.5 Ophthalmologic Disorders

Decrease or loss of vision, retinopathy including macular edema, retinal artery or vein thrombosis, retinal hemorrhages and cotton wool spots, optic neuritis, papilledema, and serous retinal detachment may be induced or aggravated by treatment with peginterferon alfa-2b or other alpha interferons. All patients should receive an eye examination at baseline. Patients with preexisting ophthalmologic disorders (e.g., diabetic or hypertensive retinopathy) should receive periodic ophthalmologic exams during interferon alpha treatment. Any patient who develops ocular symptoms should receive a prompt and complete eye examination. Peginterferon alfa-2b treatment should be discontinued in patients who develop new or worsening ophthalmologic disorders.

### 5.6 Cerebrovascular Disorders

Ischemic and hemorrhagic cerebrovascular events have been observed in patients treated with interferon alfa-based therapies, including PegIntron. Events occurred in patients with few or no reported risk factors for stroke, including patients less than 45 years of age. Because these are spontaneous reports, estimates of frequency cannot be made, and a causal relationship between interferon alfa-based therapies and these events is difficult to establish.

### 5.7 Bone Marrow Toxicity

PegIntron suppresses bone marrow function, sometimes resulting in severe cytopenias. PegIntron should be discontinued in patients who develop severe decreases in neutrophil or platelet counts [see *Dosage and Administration* (2.3)]. Ribavirin may potentiate the neutropenia induced by interferon alpha. Very rarely alpha interferons may be associated with aplastic anemia.

### 5.8 Autoimmune Disorders

Development or exacerbation of autoimmune disorders (e.g., thyroiditis, thrombotic thrombocytopenic purpura, idiopathic thrombocytopenic purpura, rheumatoid arthritis, interstitial nephritis, systemic lupus erythematosus, and psoriasis) have been observed in patients receiving PegIntron.

PegIntron should be used with caution in patients with autoimmune disorders.

### 5.9 Pancreatitis

Fatal and nonfatal pancreatitis have been observed in patients treated with alpha interferon. PegIntron therapy should be suspended in patients with signs and symptoms suggestive of pancreatitis and discontinued in patients diagnosed with pancreatitis.

### 5.10 Colitis

Fatal and nonfatal ulcerative or hemorrhagic/ischemic colitis have been observed within 12 weeks of the start of alpha interferon treatment. Abdominal pain, bloody diarrhea, and fever are the typical manifestations. PegIntron treatment should be discontinued immediately in patients who develop these signs and symptoms. The colitis usually resolves within 1 to 3 weeks of discontinuation of alpha interferons.

### 5.11 Pulmonary Disorders

Dyspnea, pulmonary infiltrates, pneumonia, bronchiolitis obliterans, interstitial pneumonitis, pulmonary hypertension, and sarcoidosis, some resulting in respiratory failure or patient deaths, may be induced or aggravated by PegIntron or alpha interferon therapy. Recurrence of respiratory failure has been observed with interferon rechallenge. PegIntron combination treatment should be suspended in patients who develop pulmonary infiltrates or pulmonary function impairment. Patients who resume interferon treatment should be closely monitored.

### 5.12 Hepatic Failure

Chronic hepatitis C (CHC) patients with cirrhosis may be at risk of hepatic decompensation and death when treated with alpha interferons, including PegIntron. Cirrhotic CHC patients coinfecting with HIV receiving highly active antiretroviral therapy (HAART) and alpha interferons with or without ribavirin appear to be at increased risk for the development of hepatic decompensation compared to patients not receiving HAART. During treatment, patients' clinical status and hepatic function should be closely monitored, and PegIntron treatment should be immediately discontinued if decompensation (Child-Pugh score >6) is observed [see *Contraindications* (4)].

### 5.13 Patients with Renal Insufficiency

Increases in serum creatinine levels have been observed in patients with renal insufficiency receiving interferon alpha products, including PegIntron. Patients with impaired renal function should be closely monitored for signs and symptoms of interferon toxicity, including increases in serum creatinine, and PegIntron dosing should be adjusted accordingly or discontinued [see *Clinical Pharmacology* (12.3) and *Dosage and Administration* (2.3)]. PegIntron monotherapy should be used with caution in patients with creatinine clearance <50 mL/min; the potential risks should be weighed against the potential benefits in these patients. Combination therapy with REBETOL must not be used in patients with creatinine clearance <50 mL/min [see *REBETOL Package Insert*].

### 5.14 Hypersensitivity

Serious, acute hypersensitivity reactions (e.g., urticaria, angioedema, bronchoconstriction, anaphylaxis) and cutaneous eruptions (Stevens-Johnson syndrome, toxic epidermal necrolysis) have been rarely observed during alpha interferon therapy. If such a reaction develops during treatment with PegIntron, discontinue treatment and institute appropriate medical therapy immediately. Transient rashes do not necessitate interruption of treatment.

### 5.15 Laboratory Tests

PegIntron alone or in combination with ribavirin may cause severe decreases in neutrophil and platelet counts, and hematologic, endocrine (e.g., TSH), and hepatic abnormalities. Transient elevations in ALT (2- to 5-fold above baseline) were observed in 10% of subjects treated with PegIntron, and were not associated with deterioration of other liver functions. Triglyceride levels are frequently elevated in patients receiving alpha interferon therapy including PegIntron and should be periodically monitored.

Patients on PegIntron or PegIntron/REBETOL combination therapy should have hematology and

blood chemistry testing before the start of treatment and then periodically thereafter. In the adult clinical trial CBC (including hemoglobin, neutrophil, and platelet counts) and chemistries (including AST, ALT, bilirubin, and uric acid) were measured during the treatment period at Weeks 2, 4, 8, and 12, and then at 6-week intervals or more frequently if abnormalities developed. In pediatric subjects, the same laboratory parameters were evaluated with additional assessment of hemoglobin at treatment Week 6. TSH levels were measured every 12 weeks during the treatment period. HCV-RNA should be measured periodically during treatment [see *Dosage and Administration* (2)].

Patients who have pre-existing cardiac abnormalities should have electrocardiograms done before treatment with PegIntron/REBETOL.

### 5.16 Dental and Periodontal Disorders

Dental and periodontal disorders have been reported in patients receiving PegIntron/REBETOL combination therapy. In addition, dry mouth could have a damaging effect on teeth and mucous membranes of the mouth during long-term treatment with the combination of REBETOL and PegIntron. Patients should brush their teeth thoroughly twice daily and have regular dental examinations. If vomiting occurs, patients should be advised to rinse out their mouth thoroughly afterwards.

### 5.17 Triglycerides

Elevated triglyceride levels have been observed in patients treated with interferon alpha, including PegIntron therapy. Hypertriglyceridemia may result in pancreatitis [see *Warnings and Precautions* (5.9)]. Elevated triglyceride levels should be managed as clinically appropriate. Discontinuation of PegIntron therapy should be considered for patients with symptoms of potential pancreatitis, such as abdominal pain, nausea, or vomiting, and persistently elevated triglycerides (e.g., triglycerides >1000 mg/dL).

### 5.18 Impact on Growth – Pediatric Use

Data on the effects of PegIntron plus REBETOL on growth come from an open-label study in subjects 3 through 17 years of age, and weight and height changes are compared to US normative population data. In general, the weight and height gain of pediatric subjects treated with PegIntron plus REBETOL lags behind that predicted by normative population data for the entire length of treatment. After about 6 months posttreatment (follow-up Week 24), subjects had weight gain rebounds and regained their weight to 53rd percentile, above the average of the normative population and similar to that predicted by their average baseline weight (57th percentile). After about 6 months posttreatment, height gain stabilized, and subjects treated with PegIntron plus REBETOL had an average height percentile of 44th percentile, which was less than the average of the normative population and less than their average baseline height (51st percentile). Severely inhibited growth velocity (<3rd percentile) was observed in 70% of the subjects while on treatment. Of the subjects experiencing severely inhibited growth, 20% had continued inhibited growth velocity (<3rd percentile) after 6 months of follow-up.

Among the boys studied, the age groups of 3 to 11 years old and 12 to 17 years old had similar height percentile decreases of approximately 5 percentiles after 6 months posttreatment; weight gain continued to be similar to their average baseline percentile. Girls who were 3 to 11 years old and treated for 48 weeks had the largest average drop in height and weight percentiles (13 percentiles and 7 percentiles, respectively), whereas girls 12 to 17 years old continued along their average baseline height and weight percentiles after 6 months posttreatment.

### 5.19 Peripheral Neuropathy

Peripheral neuropathy has been reported when alpha interferons were given in combination with telbivudine. In one clinical trial, an increased risk and severity of peripheral neuropathy was observed with the combination use of telbivudine and pegylated interferon alfa-2a as compared to telbivudine alone. The safety and efficacy of telbivudine in combination with interferons for the treatment of chronic hepatitis B has not been demonstrated.

## 6 ADVERSE REACTIONS

Clinical trials with PegIntron alone or in combination with REBETOL have been conducted in over 6900 subjects from 3 to 75 years of age.

Serious adverse reactions have occurred in approximately 12% of subjects in clinical trials with PegIntron with or without REBETOL [see *BOXED WARNING, Warnings and Precautions* (5)]. The most common serious events occurring in subjects treated with PegIntron and REBETOL were depression and suicidal ideation [see *Warnings and Precautions* (5.2)], each occurring at a frequency of less than 1%. The most common fatal events occurring in subjects treated with PegIntron and REBETOL were cardiac arrest, suicidal ideation, and suicide attempt [see *Warnings and Precautions* (5.2, 5.5)], all occurring in less than 1% of subjects.

Greater than 96% of all subjects in clinical trials experienced one or more adverse events. The most commonly reported adverse reactions in adult subjects receiving either PegIntron or PegIntron/REBETOL were injection-site inflammation/reaction, fatigue/asthenia, headache, rigors, fevers, nausea, myalgia, and emotional lability/irritability. The most common adverse events in pediatric subjects, ages 3 and older, were pyrexia, headache, vomiting, neutropenia, fatigue, anorexia, injection-site erythema, and abdominal pain.

### 6.1 Clinical Trials Experience

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in clinical practice.

**Adults:** Study 1 compared PegIntron monotherapy with INTRON® A monotherapy. Study 2 compared combination therapy of PegIntron/REBETOL with combination therapy with INTRON A/REBETOL. In these studies, nearly all study subjects in clinical trials experienced one or more adverse reactions. Study 3 compared a PegIntron/weight-based REBETOL combination to a PegIntron/flat-dose REBETOL regimen. Study 4 compared 2 PegIntron (1.5 mcg/kg/week and 1 mcg/kg/week

doses in combination with REBETOL and a third treatment group receiving Pegasys® (180 mcg/week)/Copegus® (1000-1200 mg/day).

Adverse reactions that occurred in Studies 1 and 2 at >5% incidence are provided in Table 8 by treatment group. Due to potential differences in ascertainment procedures, adverse reaction rate comparisons across studies should not be made. Table 9 summarizes the treatment-related/treatment-emergent adverse reactions in Study 4 that occurred at a ≥10% incidence.

TABLE 8: Adverse Reactions Occurring in >5% of Subjects

Adverse Reactions	Percentage of Subjects Reporting Adverse Reactions*			
	Study 1		Study 2	
	PegIntron 1 mcg/kg (n=297)	INTRON A 3 MIU (n=303)	PegIntron 1.5 mcg/kg/REBETOL (n=511)	INTRON A/REBETOL (n=505)
<b>Application Site</b>				
Injection Site Inflammation/Reaction	47	20	75	49
<b>Autonomic Nervous System</b>				
Dry Mouth	6	7	12	8
Increased Sweating	6	7	11	7
Flushing	6	3	4	3
<b>Body as a Whole</b>				
Fatigue/Asthenia	52	54	66	63
Headache	56	52	62	58
Rigors	23	19	48	41
Fever	22	12	46	33
Weight Loss	11	13	29	20
Right Upper Quadrant Pain	8	8	12	6
Chest Pain	6	4	8	7
Malaise	7	6	4	6
<b>Central/Peripheral Nervous System</b>				
Dizziness	12	10	21	17
<b>Endocrine</b>				
Hypothyroidism	5	3	5	4
<b>Gastrointestinal</b>				
Nausea	26	20	43	33
Anorexia	20	17	32	27
Diarrhea	18	16	22	17
Vomiting	7	6	14	12
Abdominal Pain	15	11	13	13
Dyspepsia	6	7	9	8
Constipation	1	3	5	5
<b>Hematologic Disorders</b>				
Neutropenia	6	2	26	14
Anemia	0	0	12	17
Leukopenia	<1	0	6	5
Thrombocytopenia	7	<1	5	2
<b>Liver and Biliary System</b>				
Hepatomegaly	6	5	4	4
<b>Musculoskeletal</b>				
Myalgia	54	53	56	50
Arthralgia	23	27	34	28
Musculoskeletal Pain	28	22	21	19
<b>Psychiatric</b>				
Insomnia	23	23	40	41
Depression	29	25	31	34
Anxiety/Emotional Lability/Irritability	28	34	47	47
Concentration Impaired	10	8	17	21
Agitation	2	2	8	5
Nervousness	4	3	6	6
<b>Reproductive, Female</b>				
Menstrual Disorder	4	3	7	6
<b>Resistance Mechanism</b>				
Viral Infection	11	10	12	12
Fungal Infection	<1	3	6	1
<b>Respiratory System</b>				
Dyspnea	4	2	26	24
Coughing	8	5	23	16
Pharyngitis	10	7	12	13
Rhinitis	2	2	8	6
Sinusitis	7	7	6	5

\* Subjects reporting one or more adverse reactions. A subject may have reported more than one adverse reaction within a body system/organ class category.

TABLE 8: Adverse Reactions Occurring in >5% of Subjects (cont)

Adverse Reactions	Percentage of Subjects Reporting Adverse Reactions*			
	Study 1		Study 2	
	PegIntron 1 mcg/kg (n=297)	INTRON A 3 MIU (n=303)	PegIntron 1.5 mcg/kg/REBETOL (n=511)	INTRON A/REBETOL (n=505)
<b>Skin and Appendages</b>				
Alopecia	22	22	36	32
Pruritus	12	8	29	28
Rash	6	7	24	23
Skin Dry	11	9	24	23
<b>Special Senses, Other</b>				
Taste Perversion	<1	2	9	4
<b>Vision Disorders</b>				
Vision Blurred	2	3	5	6
Conjunctivitis	4	2	4	5

\* Subjects reporting one or more adverse reactions. A subject may have reported more than one adverse reaction within a body system/organ class category.

TABLE 9: Summary of Treatment-related/Treatment-emergent Adverse Reactions (≥10% Incidence) By Descending Frequency

Adverse Reactions	Percentage of Patients Reporting Treatment-related/Treatment-emergent Adverse Reactions Study 4		
	PegIntron 1.5 mcg/kg with REBETOL (n=1019)	PegIntron 1 mcg/kg with REBETOL (n=1016)	Pegasys 180 mcg with Copegus (n=1035)
Fatigue	67	68	64
Headache	50	47	41
Nausea	40	35	34
Chills	39	36	23
Insomnia	38	37	41
Anemia	35	30	34
Pyrexia	35	32	21
Injection Site Reactions	34	35	23
Anorexia	29	25	21
Rash	29	25	34
Myalgia	27	26	22
Neutropenia	26	19	31
Irritability	25	25	25
Depression	25	19	20
Alopecia	23	20	17
Dyspnea	21	20	22
Arthralgia	21	22	22
Pruritus	18	15	19
Influenza-like Illness	16	15	15
Dizziness	16	14	13
Diarrhea	15	16	14
Cough	15	16	17
Weight Decreased	13	10	10
Vomiting	12	10	9
Unspecified Pain	12	13	9
Dry Skin	11	11	12
Anxiety	11	11	10
Abdominal Pain	10	10	10
Leukopenia	9	7	10

The adverse reaction profile in Study 3, which compared PegIntron/weight-based REBETOL combination to a PegIntron/flat-dose REBETOL regimen, revealed an increased rate of anemia with weight-based dosing (29% vs. 19% for weight-based vs. flat-dose regimens, respectively). However, the majority of cases of anemia were mild and responded to dose reductions.

The incidence of serious adverse reactions was comparable in all studies. In the PEG monotherapy trial (Study 1) the incidence of serious adverse reactions was similar (about 12%) in all treatment groups. In Study 2, the incidence of serious adverse reactions was 17% in the PegIntron/REBETOL groups compared to 14% in the INTRON A/REBETOL group. In Study 3, there was a similar incidence of serious adverse reactions reported for the weight-based REBETOL group (12%) and with the flat-dose REBETOL regimen.

In many but not all cases, adverse reactions resolved after dose reduction or discontinuation of therapy. Some subjects experienced ongoing or new serious adverse reactions during the 6-month follow-up period.

There have been 31 subject deaths which occurred during treatment or during follow-up in these clinical trials. In Study 1, there was 1 suicide in a subject receiving PegIntron monotherapy and 2 deaths among subjects receiving INTRON A monotherapy (1 murder/suicide and 1 sudden death). In Study 2, there was 1 suicide in a subject receiving PegIntron/REBETOL combination therapy, and 1 subject death in the INTRON A/REBETOL group (motor vehicle accident). In Study 3, there were 14 deaths, 2 of which were probable suicides, and 1 was an unexplained death in a person with a relevant medical history of depression. In Study 4, there were 12 deaths, 6 of which occurred in subjects who received PegIntron/REBETOL combination therapy, 5 in the PegIntron 1.5 mcg/REBETOL arm (N=1019) and 1 in the PegIntron 1 mcg/REBETOL arm (N=1016), and 6 of which occurred in subjects receiving Pegasys/Copegus (N=1035). There were 3 suicides which occurred during the off-treatment follow-up period in subjects who received PegIntron (1.5 mcg/kg)/REBETOL combination therapy.

In Studies 1 and 2, 10% to 14% of subjects receiving PegIntron, alone or in combination with REBETOL, discontinued therapy compared with 6% treated with INTRON A alone and 13% treated with INTRON A in combination with REBETOL. Similarly in Study 3, 15% of subjects receiving PegIntron in combination with weight-based REBETOL and 14% of subjects receiving PegIntron and flat-dose REBETOL discontinued therapy due to an adverse reaction. The most common reasons for discontinuation of therapy were related to known interferon effects of psychiatric, systemic (e.g., fatigue, headache), or gastrointestinal adverse reactions. In Study 4, 13% of subjects in the PegIntron 1.5 mcg/REBETOL arm, 10% in the PegIntron 1 mcg/REBETOL arm, and 13% in the Pegasys 180 mcg/Copegus arm discontinued due to adverse events.

In Study 2, dose reductions due to adverse reactions occurred in 42% of subjects receiving PegIntron (1.5 mcg/kg)/REBETOL and in 34% of those receiving INTRON A/REBETOL. The majority of subjects (57%) weighing 60 kg or less receiving PegIntron (1.5 mcg/kg)/REBETOL required dose reduction. Reduction of interferon was dose-related (PegIntron 1.5 mcg/kg > PegIntron 0.5 mcg/kg or INTRON A), 40%, 27%, 28%, respectively. Dose reduction for REBETOL was similar across all 3 groups, 33% to 35%. The most common reasons for dose modifications were neutropenia (18%) or anemia (9%). Other common reasons included depression, fatigue, nausea, and thrombocytopenia. In Study 3, dose modifications due to adverse reactions occurred more frequently with WBD compared to flat dosing (29% and 23%, respectively). In Study 4, 16% of subjects had a dose reduction of PegIntron to 1 mcg/kg in combination with REBETOL, with an additional 4% requiring the second dose reduction of PegIntron to 0.5 mcg/kg due to adverse events, compared to 15% of subjects in the Pegasys/Copegus arm, who required a dose reduction to 135 mcg/week with Pegasys, with an additional 7% in the Pegasys/Copegus arm requiring a second dose reduction to 90 mcg/week with Pegasys.

In the PegIntron/REBETOL combination trials the most common adverse reactions were psychiatric which occurred among 77% of subjects in Study 2 and 68% to 69% of subjects in Study 3. These psychiatric adverse reactions included most commonly depression, irritability, and insomnia, each reported by approximately 30% to 40% of subjects in all treatment groups. Suicidal behavior (ideation, attempts, and suicides) occurred in 2% of all subjects during treatment or during follow-up after treatment cessation [see *Warnings and Precautions* (5.2)]. In Study 4, psychiatric adverse reactions occurred in 58% of subjects in the PegIntron 1.5 mcg/REBETOL arm, 55% of subjects in the PegIntron 1 mcg/REBETOL arm, and 57% of subjects in the Pegasys 180 mcg/Copegus arm.

PegIntron induced fatigue or headache in approximately two-thirds of subjects, with fever or rigors in approximately half of the subjects. The severity of some of these systemic symptoms (e.g., fever and headache) tends to decrease as treatment continues. In Studies 1 and 2, application site inflammation and reaction (e.g., bruise, itchiness, and irritation) occurred at approximately twice the incidence with PegIntron therapies (in up to 75% of subjects) compared with INTRON A. However, injection-site pain was infrequent (2%-3%) in all groups. In Study 3 there was a 23% to 24% incidence overall for injection-site reactions or inflammation.

In Study 2, many subjects continued to experience adverse reactions several months after discontinuation of therapy. By the end of the 6-month follow-up period, the incidence of ongoing adverse reactions by body class in the PegIntron 1.5/REBETOL group was 33% (psychiatric), 20% (musculoskeletal), and 10% (for endocrine and for GI). In approximately 10% to 15% of subjects, weight loss, fatigue, and headache had not resolved.

Individual serious adverse reactions in Study 2 occurred at a frequency ≤1% and included suicide attempt, suicidal ideation, severe depression; psychosis, aggressive reaction, relapse of drug addiction/overdose; nerve palsy (facial, oculomotor); cardiomyopathy, myocardial infarction, angina, pericardial effusion, retinal ischemia, retinal artery or vein thrombosis, blindness, decreased visual acuity, optic neuritis, transient ischemic attack, supraventricular arrhythmias, loss of consciousness; neutropenia, infection (sepsis, pneumonia, abscess, cellulitis); emphysema, bronchiolitis obliterans, pleural effusion, gastroenteritis, pancreatitis, gout, hyperglycemia, hyperthyroidism and hypothyroidism, autoimmune thrombocytopenia with or without purpura, rheumatoid arthritis, interstitial nephritis, lupus-like syndrome, sarcoidosis, aggravated psoriasis; urticaria, injection-site necrosis, vasculitis, and phototoxicity.

Subjects receiving PegIntron/REBETOL as re-treatment after failing a previous interferon combination regimen reported adverse reactions similar to those previously associated with this regimen during clinical trials of treatment-naïve subjects.

**Pediatric Subjects:** In general, the adverse-reaction profile in the pediatric population was similar to that observed in adults. In the pediatric study, the most prevalent adverse reactions in all subjects were pyrexia (80%), headache (62%), neutropenia (33%), fatigue (30%), anorexia (29%), injection-site erythema (29%), and vomiting (27%). The majority of adverse reactions reported in the study were mild or moderate in severity. Severe adverse reactions were reported in 7% (8/107) of all subjects and included injection-site pain (1%), pain in extremity (1%), headache (1%), neutropenia (1%), and pyrexia (4%). Important adverse reactions that occurred in this subject population were nervousness (7%; 7/107),

aggression (3%; 3/107), anger (2%; 2/107), and depression (1%; 1/107). Five subjects received levothyroxine treatment; 3 with clinical hypothyroidism and 2 with asymptomatic TSH elevations.

Dose modifications were required in 25% of subjects, most commonly for anemia, neutropenia, and weight loss. Two subjects (2%; 2/107) discontinued therapy as the result of an adverse reaction.

Adverse reactions that occurred with a ≥10% incidence in the pediatric trial subjects are provided in **Table 10**.

**TABLE 10: Percentage of Pediatric Subjects With Treatment-emergent/Treatment-related Adverse Reactions (in at Least 10% of All Subjects)**

System Organ Class Preferred Term	All Subjects n=107
<b>Blood and Lymphatic System Disorders</b>	
Neutropenia	33%
Anemia	11%
Leukopenia	10%
<b>Gastrointestinal Disorders</b>	
Abdominal Pain	21%
Abdominal Pain Upper	12%
Vomiting	27%
Nausea	18%
<b>General Disorders and Administration Site Conditions</b>	
Pyrexia	80%
Fatigue	30%
Injection-site Erythema	29%
Chills	21%
Asthenia	15%
Irritability	14%
<b>Investigations</b>	
Weight Decreased	19%
<b>Metabolism and Nutrition Disorders</b>	
Anorexia	29%
Decreased Appetite	22%
<b>Musculoskeletal and Connective Tissue Disorders</b>	
Arthralgia	17%
Myalgia	17%
<b>Nervous System Disorders</b>	
Headache	62%
Dizziness	14%
<b>Skin and Subcutaneous Tissue Disorders</b>	
Alopecia	17%

**Laboratory Values: Adults:** Changes in selected laboratory values during treatment with PegIntron alone or in combination with REBETOL treatment are described below. **Decreases in hemoglobin, neutrophils, and platelets may require dose reduction or permanent discontinuation from therapy** [see *Dosage and Administration* (2.3) and *Warnings and Precautions* (5.1, 5.7)].

**Hemoglobin:** Hemoglobin levels decreased to <11 g/dL in about 30% of subjects in Study 2. In Study 3, 47% of subjects receiving WBD REBETOL and 33% on flat-dose REBETOL had decreases in hemoglobin levels <11 g/dL. Reductions in hemoglobin to <9 g/dL occurred more frequently in subjects receiving WBD compared to flat dosing (4% and 2%, respectively). In Study 2, dose modification was required in 9% and 13% of subjects in the PegIntron/REBETOL and INTRON A/REBETOL groups. In Study 4, patients receiving PegIntron (1.5 mcg/kg)/REBETOL had decreases in hemoglobin levels to between 8.5 to <10 g/dL (28%) and to <8.5 g/dL (3%), whereas in patients receiving Pegasys 180 mcg/Copegus these decreases occurred in 26% and 4% of subjects, respectively. Hemoglobin levels become stable by treatment Weeks 4 to 6 on average. The typical pattern observed was a decrease in hemoglobin levels by treatment Week 4 followed by stabilization and a plateau, which was maintained to the end of treatment. In the PegIntron monotherapy trial, hemoglobin decreases were generally mild, and dose modifications were rarely necessary [see *Dosage and Administration* (2.3)].

**Neutrophils:** Decreases in neutrophil counts were observed in a majority of subjects treated with PegIntron alone (70%) or as combination therapy with REBETOL in Study 2 (85%) and INTRON A/REBETOL (60%). Severe potentially life-threatening neutropenia (<0.5 x 10<sup>9</sup>/L) occurred in 1% of subjects treated with PegIntron monotherapy, 2% of subjects treated with INTRON A/REBETOL, and in approximately 4% of subjects treated with PegIntron/REBETOL in Study 2. Two percent of subjects receiving PegIntron monotherapy and 18% of subjects receiving PegIntron/REBETOL in Study 2 required modification of interferon dosage. Few subjects (<1%) required permanent discontinuation of treatment. Neutrophil counts generally return to pretreatment levels 4 weeks after cessation of therapy [see *Dosage and Administration* (2.3)].

**Platelets:** Platelet counts decreased to <100,000/mm<sup>3</sup> in approximately 20% of subjects treated with PegIntron alone or with REBETOL and in 6% of subjects treated with INTRON A/REBETOL. Severe decreases in platelet counts (<50,000/mm<sup>3</sup>) occur in <4% of subjects. Patients may require discontinuation or dose modification as a result of platelet decreases [see *Dosage and Administration* (2.3)]. In Study 2, 1% or 3% of subjects required dose modification of INTRON A or PegIntron, respectively.

Platelet counts generally returned to pretreatment levels 4 weeks after the cessation of therapy.

**Triglycerides:** Elevated triglyceride levels have been observed in patients treated with interferon alphas, including PegIntron [see *Warnings and Precautions* (5.17)].

**Thyroid Function:** Development of TSH abnormalities, with and without clinical manifestations, are associated with interferon therapies. In Study 2, clinically apparent thyroid disorders occur among subjects treated with either INTRON A or PegIntron (with or without REBETOL) at a similar incidence (5% for hypothyroidism and 3% for hyperthyroidism). Subjects developed new-onset TSH abnormalities while on treatment and during the follow-up period. At the end of the follow-up period, 7% of subjects still had abnormal TSH values [see *Warnings and Precautions* (5.4)].

**Bilirubin and Uric Acid:** In Study 2, 10% to 14% of subjects developed hyperbilirubinemia and 33% to 38% developed hyperuricemia in association with hemolysis. Six subjects developed mild to moderate gout.

**Pediatric Subjects: Decreases in hemoglobin, white blood cells, platelets, and neutrophils may require dose reduction or permanent discontinuation from therapy** [see *Dosage and Administration* (2.3)]. Changes in selected laboratory values during treatment of 107 pediatric subjects with PegIntron/REBETOL combination therapy are described in **Table 11**. Most of the changes in laboratory values in this study were mild or moderate.

**TABLE 11: Selected Hematological Abnormalities During Treatment Phase With PegIntron Plus REBETOL in Previously Untreated Pediatric Subjects**

Laboratory Parameter *	All Subjects (n=107)
<b>Hemoglobin (g/dL)</b>	
9.5 - <11.0	30%
8.0 - <9.5	2%
<b>WBC (x 10<sup>9</sup>/L)</b>	
2.0 - 2.9	39%
1.5 - <2.0	3%
<b>Platelets (x 10<sup>9</sup>/L)</b>	
70 - 100	1%
50 - <70	–
25 - <50	1%
<b>Neutrophils (x 10<sup>9</sup>/L)</b>	
1.0 - 1.5	35%
0.75 - <1.0	26%
0.5 - <0.75	13%
<0.5	3%
<b>Total Bilirubin</b>	
1.26 - 2.59 x N <sup>†</sup>	7%
Evidence of Hepatic Failure	–

\* The table summarizes the worst category observed within the period per subject per laboratory test. Only subjects with at least one treatment value for a given laboratory test are included.

† N=Upper limit of normal

## 6.2 Immunogenicity

As with all therapeutic proteins, there is potential for immunogenicity. Approximately 2% of subjects receiving PegIntron (32/1759) or INTRON A (11/728) with or without REBETOL developed low-titer (≤160) neutralizing antibodies to PegIntron or INTRON A. The clinical and pathological significance of the appearance of serum-neutralizing antibodies is unknown. The incidence of antibody formation is highly dependent on the sensitivity and specificity of the assay. Additionally, the observed incidence of antibody (including neutralizing antibody) positivity in an assay may be influenced by several factors, including assay methodology, sample handling, timing of sample collection, concomitant medications, and underlying disease. For these reasons, comparison of the incidence of antibodies to PegIntron with the incidence of antibodies to other products may be misleading.

## 6.3 Postmarketing Experience

The following adverse reactions have been identified during postapproval use of PegIntron therapy. Because these reactions are reported voluntarily from a population of uncertain size, it is not always possible to reliably estimate their frequency or establish a causal relationship to drug exposure.

### Blood and Lymphatic System Disorders

pure red cell aplasia, thrombotic thrombocytopenic purpura

### Cardiac Disorders

palpitations

### Ear and Labyrinth Disorders

hearing loss, vertigo, hearing impairment

### Endocrine disorders

diabetic ketoacidosis, diabetes

### Eye Disorders

Vogt-Koyanagi-Harada syndrome, serous retinal detachment

### Gastrointestinal Disorders

aphthous stomatitis

### General Disorders and Administration Site Conditions

asthenic conditions (including asthenia, malaise, fatigue)

### Immune System Disorders

cases of acute hypersensitivity reactions (including anaphylaxis, angioedema, urticaria); Stevens-Johnson syndrome, toxic epidermal necrolysis, systemic lupus erythematosus, erythema multiforme

### Infections and Infestations

bacterial infection including sepsis

### Metabolism and Nutrition Disorders

dehydration, hypertriglyceridemia

### Musculoskeletal and Connective Tissue Disorders

rhabdomyolysis, myositis

### Nervous System Disorders

seizures, memory loss, peripheral neuropathy, paraesthesia, migraine headache

### Psychiatric Disorders

homicidal ideation

### Respiratory, thoracic, and mediastinal disorders

Pulmonary hypertension

### Renal and Urinary Disorders

renal failure, renal insufficiency

### Skin and Subcutaneous Tissue Disorders

psoriasis

### Vascular Disorders

hypertension, hypotension

## 7 DRUG INTERACTIONS

### 7.1 Drugs Metabolized by Cytochrome P-450

When administering PegIntron with medications metabolized by CYP2C8/9 (e.g., warfarin and phenytoin) or CYP2D6 (e.g., flecainide), the therapeutic effect of these substrates may be decreased [see *Clinical Pharmacology* (12.3)].

### 7.2 Methadone

PegIntron may increase methadone concentrations [see *Clinical Pharmacology* (12.3)]. The clinical significance of this finding is unknown; however, patients should be monitored for the signs and symptoms of increased narcotic effect.

### 7.3 Use with Ribavirin (Nucleoside Analogues)

Hepatic decompensation (some fatal) has occurred in cirrhotic HIV/HCV coinfecting patients receiving combination antiretroviral therapy for HIV and interferon alpha and ribavirin. Adding treatment with alpha interferons alone or in combination with ribavirin may increase the risk in this patient subset. Patients receiving interferon with ribavirin and nucleoside reverse transcriptase inhibitors (NRTIs) should be closely monitored for treatment-associated toxicities, especially hepatic decompensation and anemia. Discontinuation of NRTIs should be considered as medically appropriate [see *Individual NRTI Product Information*]. Dose reduction or discontinuation of interferon, ribavirin, or both should also be considered if worsening clinical toxicities are observed, including hepatic decompensation (e.g., Child-Pugh >6).

**Stavudine, Lamivudine, and Zidovudine:** *In vitro* studies have shown ribavirin can reduce the phosphorylation of pyrimidine nucleoside analogues such as stavudine, lamivudine, and zidovudine. In a study with another pegylated interferon alpha, no evidence of a pharmacokinetic or pharmacodynamic (e.g., loss of HIV/HCV virologic suppression) interaction was seen when ribavirin was coadministered with zidovudine, lamivudine, or stavudine in HIV/HCV coinfecting subjects [see *Clinical Pharmacology* (12.3)].

HIV/HCV coinfecting subjects who were administered zidovudine in combination with pegylated interferon alpha and ribavirin developed severe neutropenia (ANC <500) and severe anemia (hemoglobin <8 g/dL) more frequently than similar subjects not receiving zidovudine.

**Didanosine:** Coadministration of REBETOL Capsules or Oral Solution and didanosine is not recommended. Reports of fatal hepatic failure, as well as peripheral neuropathy, pancreatitis, and symptomatic hyperlactatemia/lactic acidosis have been reported in clinical trials [see *Clinical Pharmacology* (12.3)].

## 8 USE IN SPECIFIC POPULATIONS

### 8.1 Pregnancy

**PegIntron Monotherapy: Pregnancy Category C:** Nonpegylated interferon alfa-2b has been shown to have abortifacient effects in *Macaca mulatta* (rhesus monkeys) at 15 and 30 million IU/kg (estimated human equivalent of 5 and 10 million IU/kg, based on body surface area adjustment for a 60-kg adult). PegIntron should be assumed to also have abortifacient potential. There are no adequate and well-controlled studies in pregnant women. PegIntron therapy is to be used during pregnancy only if the potential benefit justifies the potential risk to the fetus. Therefore, PegIntron is recommended for use in fertile women only when they are using effective contraception during the treatment period.

**Use with Ribavirin: Pregnancy Category X:** Significant teratogenic and/or embryocidal effects have been demonstrated in all animal species exposed to ribavirin. REBETOL therapy is contraindicated in women who are pregnant and in the male partners of women who are pregnant [see *Contraindications* (4) and the REBETOL Package Insert].

A Ribavirin Pregnancy Registry has been established to monitor maternal-fetal outcomes of pregnancies in female patients and female partners of male patients exposed to ribavirin during treatment and for 6 months following cessation of treatment. Physicians and patients are encouraged to report such cases by calling 1-800-593-2214.



### 8.3 Nursing Mothers

It is not known whether the components of PegIntron and/or REBETOL are excreted in human milk. Studies in mice have shown that mouse interferons are excreted in breast milk. Because of the potential for adverse reactions from the drug in nursing infants, a decision must be made whether to discontinue nursing or discontinue the PegIntron and REBETOL treatment, taking into account the importance of the therapy to the mother.

### 8.4 Pediatric Use

Safety and effectiveness in pediatric patients below the age of 3 years have not been established. Clinical trials in pediatric patients <3 years of age are not considered feasible due to the small proportion of patients in this age group requiring treatment for CHC.

### 8.5 Geriatric Use

In general, younger patients tend to respond better than older patients to interferon-based therapies. Clinical studies of PegIntron alone or in combination with REBETOL did not include sufficient numbers of subjects aged 65 and over, however, to determine whether they respond differently than younger subjects. Treatment with alpha interferons, including PegIntron, is associated with neuropsychiatric, cardiac, pulmonary, GI, and systemic (flu-like) adverse effects. Because these adverse reactions may be more severe in the elderly, caution should be exercised in the use of PegIntron in this population. This drug is known to be substantially excreted by the kidney. Because elderly patients are more likely to have decreased renal function, the risk of toxic reactions to this drug may be greater in patients with impaired renal function [see *Clinical Pharmacology* (12.3)]. When using PegIntron/REBETOL therapy, refer also to the REBETOL Package Insert.

### 8.6 Organ Transplant Recipients

The safety and efficacy of PegIntron alone or in combination with REBETOL for the treatment of hepatitis C in liver or other organ transplant recipients have not been studied. In a small (n=16) single-center, uncontrolled case experience, renal failure in renal allograft recipients receiving interferon alpha and ribavirin combination therapy was more frequent than expected from the center's previous experience with renal allograft recipients not receiving combination therapy. The relationship of the renal failure to renal allograft rejection is not clear.

### 8.7 HIV or HBV Coinfection

The safety and efficacy of PegIntron/REBETOL for the treatment of patients with HCV coinfecting with HIV or HBV have not been established.

## 10 OVERDOSAGE

There is limited experience with overdosage. In the clinical studies, a few subjects accidentally received a dose greater than that prescribed. There were no instances in which a participant in the monotherapy or combination therapy trials received more than 10.5 times the intended dose of PegIntron. The maximum dose received by any subject was 3.45 mcg/kg weekly over a period of approximately 12 weeks. The maximum known overdosage of REBETOL was an intentional ingestion of 10 g (fifty 200 mg capsules). There were no serious reactions attributed to these overdosages. In cases of overdosing, symptomatic treatment and close observation of the patient are recommended.

## 11 DESCRIPTION

PegIntron, peginterferon alfa-2b, Powder for Injection is a covalent conjugate of recombinant alfa-2b interferon with monomethoxy polyethylene glycol (PEG). The average molecular weight of the PEG portion of the molecule is 12,000 daltons. The average molecular weight of the PegIntron molecule is approximately 31,000 daltons. The specific activity of peginterferon alfa-2b is approximately  $0.7 \times 10^8$  IU/mg protein.

Interferon alfa-2b is a water-soluble protein with a molecular weight of 19,271 daltons produced by recombinant DNA techniques. It is obtained from the bacterial fermentation of a strain of *Escherichia coli* bearing a genetically engineered plasmid containing an interferon gene from human leukocytes.

**PegIntron is supplied in both vials and the REDIPEN for subcutaneous use.**

**Vials:** Each vial contains either 74 mcg, 118.4 mcg, 177.6 mcg, or 222 mcg of PegIntron as a white to off-white tablet-like solid that is whole/in pieces or as a loose powder, and 1.11 mg dibasic sodium phosphate anhydrous, 1.11 mg monobasic sodium phosphate dihydrate, 59.2 mg sucrose, and 0.074 mg polysorbate 80. Following reconstitution with 0.7 mL of the supplied Sterile Water for Injection USP, each vial contains PegIntron at strengths of either 50 mcg per 0.5 mL, 80 mcg per 0.5 mL, 120 mcg per 0.5 mL, or 150 mcg per 0.5 mL.

**REDIPEN:** REDIPEN is a dual-chamber glass cartridge containing lyophilized PegIntron as a white to off-white tablet or powder that is whole or in pieces in the sterile active chamber and a second chamber containing Sterile Water for Injection USP. Each PegIntron REDIPEN contains either 67.5 mcg, 108 mcg, 162 mcg, or 202.5 mcg of PegIntron, and 1.013 mg dibasic sodium phosphate anhydrous, 1.013 mg monobasic sodium phosphate dihydrate, 54 mg sucrose, and 0.0675 mg polysorbate 80. Each cartridge is reconstituted to allow for the administration of up to 0.5 mL of solution. Following reconstitution, each REDIPEN contains PegIntron at strengths of either 50 mcg per 0.5 mL, 80 mcg per 0.5 mL, 120 mcg per 0.5 mL, or 150 mcg per 0.5 mL for a single use. Because a small volume of reconstituted solution is lost during preparation of PegIntron, each REDIPEN contains an excess amount of PegIntron powder and diluent to ensure delivery of the labeled dose.

## 12 CLINICAL PHARMACOLOGY

### 12.1 Mechanism of Action

Pegylated recombinant human interferon alfa-2b is an inducer of the innate antiviral immune response [see *Clinical Pharmacology* (12.4)].

### 12.2 Pharmacodynamics

The pharmacodynamic effects of peginterferon alfa-2b include inhibition of viral replication in virus-infected cells, the suppression of cell cycle progression/cell proliferation, induction of apoptosis, anti-angiogenic activities, and numerous immunomodulating activities, such as enhancement of the phagocytic activity of macrophages, activation of NK cells, stimulation of cytotoxic T-lymphocytes, and the upregulation of the Th1 T-helper cell subset.

PegIntron raises concentrations of effector proteins such as serum neopterin and 2'5' oligoadenylate synthetase, raises body temperature, and causes reversible decreases in leukocyte and platelet counts. The correlation between the *in vitro* and *in vivo* pharmacologic and pharmacodynamic and clinical effects is unknown.

### 12.3 Pharmacokinetics

Following a single subcutaneous dose of PegIntron, the mean absorption half-life ( $t_{1/2 k_a}$ ) was 4.6 hours. Maximal serum concentrations ( $C_{max}$ ) occur between 15 and 44 hours postdose, and are sustained for up to 48 to 72 hours. The  $C_{max}$  and AUC measurements of PegIntron increase in a dose-related manner. After multiple dosing, there is an increase in bioavailability of PegIntron. Week 48 mean trough concentrations (320 pg/mL; range: 0, 2960) are approximately 3-fold higher than Week 4 mean trough concentrations (94 pg/mL; range: 0, 416). The mean PegIntron elimination half-life is approximately 40 hours (range: 22-60 hours) in patients with HCV infection. The apparent clearance of PegIntron is estimated to be approximately 22 mL/hr-kg. Renal elimination accounts for 30% of the clearance.

Pegylation of interferon alfa-2b produces a product (PegIntron) whose clearance is lower than that of nonpegylated interferon alfa-2b. When compared to INTRON A, PegIntron (1 mcg/kg) has approximately a 7-fold lower mean apparent clearance and a 5-fold greater mean half-life, permitting a reduced dosing frequency. At effective therapeutic doses, PegIntron has approximately 10-fold greater  $C_{max}$  and 50-fold greater AUC than interferon alfa-2b.

**Renal Dysfunction:** Following multiple dosing of PegIntron (1 mcg/kg subcutaneously given every week for 4 weeks) the clearance of PegIntron is reduced by a mean of 17% in subjects with moderate renal impairment (creatinine clearance 30-49 mL/min) and by a mean of 44% in subjects with severe renal impairment (creatinine clearance 10-29 mL/min) compared to subjects with normal renal function. Clearance was similar in subjects with severe renal impairment not on dialysis and subjects who are receiving hemodialysis. The dose of PegIntron for monotherapy should be reduced in patients with moderate or severe renal impairment [see *Dosage and Administration* (2.3) and *REBETOL Package Insert*]. REBETOL should not be used in patients with creatinine clearance <50 mL/min [see *REBETOL Package Insert, WARNINGS*].

**Gender:** During the 48-week treatment period with PegIntron, no differences in the pharmacokinetic profiles were observed between male and female subjects with chronic hepatitis C infection.

**Geriatric Patients:** The pharmacokinetics of geriatric subjects (>65 years of age) treated with a single subcutaneous dose of 1 mcg/kg of PegIntron were similar in  $C_{max}$ , AUC, clearance, or elimination half-life as compared to younger subjects (28-44 years of age).

**Pediatric Patients:** Population pharmacokinetics for PegIntron and REBETOL (Capsules and Oral Solution) were evaluated in pediatric subjects with chronic hepatitis C between 3 and 17 years of age. In pediatric patients receiving PegIntron 60 mcg/m<sup>2</sup>/week subcutaneously, exposure may be approximately 50% higher than observed in adults receiving 1.5 mcg/kg/week subcutaneously. The pharmacokinetics of REBETOL (dose-normalized) in this trial were similar to those reported in a prior study of REBETOL in combination with INTRON A in pediatric subjects and in adult subjects.

**Effect of Food on Absorption of Ribavirin:** Both AUC<sub>0-24</sub> and  $C_{max}$  increased by 70% when REBETOL Capsules were administered with a high-fat meal (841 kcal, 53.8 g fat, 31.6 g protein, and 57.4 g carbohydrate) in a single-dose pharmacokinetic study [see *Dosage and Administration* (2.2)].

**Drug Interactions: Drugs Metabolized by Cytochrome P-450:** The pharmacokinetics of representative drugs metabolized by CYP1A2 (caffeine), CYP2C8/9 (tolbutamide), CYP2D6 (dextromethorphan), CYP3A4 (midazolam), and N-acetyltransferase (dapson) were studied in 22 subjects with chronic hepatitis C who received PegIntron (1.5 mcg/kg) once weekly for 4 weeks. PegIntron treatment resulted in a 28% (mean) increase in a measure of CYP2C8/9 activity. PegIntron treatment also resulted in a 66% (mean) increase in a measure of CYP2D6 activity; however, the effect was variable as 13 subjects had an increase, 5 subjects had a decrease, and 4 subjects had no significant change [see *Drug Interactions* (7.1)].

No significant effect was observed on the pharmacokinetics of representative drugs metabolized by CYP1A2, CYP3A4, or N-acetyltransferase. The effects of PegIntron on CYP2C19 activity were not assessed.

**Methodone:** The pharmacokinetics of concomitant administration of methodone and PegIntron were evaluated in 18 PegIntron-naïve chronic hepatitis C subjects receiving 1.5 mcg/kg PegIntron subcutaneously weekly. All subjects were on stable methodone maintenance therapy receiving >40 mg/day prior to initiating PegIntron. Mean methodone AUC was approximately 16% higher after 4 weeks of PegIntron treatment as compared to baseline. In 2 subjects, methodone AUC was approximately double after 4 weeks of PegIntron treatment as compared to baseline [see *Drug Interactions* (7.2)].

**Use with Ribavirin: Zidovudine, Lamivudine, and Stavudine:** Ribavirin has been shown *in vitro* to inhibit phosphorylation of zidovudine, lamivudine, and stavudine. However, in a study with another pegylated interferon in combination with ribavirin, no pharmacokinetic (e.g., plasma concentrations or intracellular triphosphorylated active metabolite concentrations) or pharmacodynamic (e.g., loss of HIV/HCV virologic suppression) interaction was observed when ribavirin and lamivudine (n=18), stavudine (n=10), or zidovudine (n=6) were coadministered as part of a multi-drug regimen to HIV/HCV coinfecting subjects [see *Drug Interactions* (7.3)].

**Didanosine:** Exposure to didanosine or its active metabolite (dideoxyadenosine 5'-triphosphate) is increased when didanosine is coadministered with ribavirin, which could cause or worsen clinical toxicities [see *Drug Interactions (7.3)*].

**12.4 Microbiology**

**Mechanism of Action:** The biological activity of PegIntron is derived from its interferon alfa-2b moiety. Peginterferon alfa-2b binds to and activates the human type 1 interferon receptor. Upon binding, the receptor subunits dimerize, and activate multiple intracellular signal transduction pathways. Signal transduction is initially mediated by the JAK/STAT activation, which may occur in a wide variety of cells. Interferon receptor activation also activates NFκB in many cell types. Given the diversity of cell types that respond to interferon alfa-2b, and the multiplicity of potential intracellular responses to interferon receptor activation, peginterferon alfa-2b is expected to have pleiotropic biological effects in the body.

The mechanism by which ribavirin contributes to its antiviral efficacy in the clinic is not fully understood. Ribavirin has direct antiviral activity in tissue culture against many RNA viruses. Ribavirin increases the mutation frequency in the genomes of several viruses and ribavirin triphosphate inhibits HCV polymerase in a biochemical reaction.

**Antiviral Activity:** The anti-HCV activity of interferon was demonstrated in cell culture using self-replicating HCV-RNA (HCV-replicon cells) or HCV infection and resulted in an effective concentration (EC<sub>50</sub>) value of 1 to 10 IU/mL.

The antiviral activity of ribavirin in the HCV-replicon is not well understood and has not been defined because of the cellular toxicity of ribavirin.

**Resistance:** HCV genotypes show wide variability in their response to pegylated recombinant human interferon/ribavirin therapy. Genetic changes associated with the variable response have not been identified.

**Cross-resistance:** There is no reported cross-resistance between pegylated/nonpegylated interferons and ribavirin.

**13 NONCLINICAL TOXICOLOGY**

**13.1 Carcinogenesis, Mutagenesis, Impairment of Fertility**

**Carcinogenesis and Mutagenesis:** PegIntron has not been tested for its carcinogenic potential. Neither PegIntron nor its components, interferon or methoxypolyethylene glycol, caused damage to DNA when tested in the standard battery of mutagenesis assays, in the presence and absence of metabolic activation.

**Use with Ribavirin:** Ribavirin is genotoxic and mutagenic and should be considered a potential carcinogen. See REBETOL package insert for additional warnings relevant to PegIntron therapy in combination with ribavirin.

**Impairment of Fertility:** PegIntron may impair human fertility. Irregular menstrual cycles were observed in female cynomolgus monkeys given subcutaneous injections of 4239 mcg/m<sup>2</sup> PegIntron alone every other day for 1 month (approximately 345 times the recommended weekly human dose based upon body surface area). These effects included transiently decreased serum levels of estradiol and progesterone, suggestive of anovulation. Normal menstrual cycles and serum hormone levels resumed in these animals 2 to 3 months following cessation of PegIntron treatment. Every other day dosing with 262 mcg/m<sup>2</sup> (approximately 21 times the weekly human dose) had no effects on cycle duration or reproductive hormone status. The effects of PegIntron on male fertility have not been studied.

**14 CLINICAL STUDIES**

**14.1 Chronic Hepatitis C in Adults**

**PegIntron Monotherapy – Study 1:** A randomized study compared treatment with PegIntron (0.5, 1, or 1.5 mcg/kg once weekly subcutaneously) to treatment with INTRON A (3 million units 3 times weekly subcutaneously) in 1219 adults with chronic hepatitis from HCV infection. The subjects were not previously treated with interferon alpha, had compensated liver disease, detectable HCV-RNA, elevated ALT, and liver histopathology consistent with chronic hepatitis. Subjects were treated for 48 weeks and were followed for 24 weeks posttreatment.

Seventy percent of all subjects were infected with HCV genotype 1, and 74 percent of all subjects had high baseline levels of HCV-RNA (more than 2 million copies per mL of serum), 2 factors known to predict poor response to treatment.

Response to treatment was defined as undetectable HCV-RNA and normalization of ALT at 24 weeks posttreatment. The response rates to the 1 and 1.5 mcg/kg PegIntron doses were similar (approximately 24%) to each other and were both higher than the response rate to INTRON A (12%) (see **Table 12**).

**TABLE 12: Rates of Response to Treatment – Study 1**

	A PegIntron 0.5 mcg/kg (N=315)	B PegIntron 1 mcg/kg (N=298)	C INTRON A 3 MIU three times weekly (N=307)	B-C (95% CI) Difference between PegIntron 1 mcg/kg and INTRON A
Treatment Response (Combined Virologic Response and ALT Normalization)	17%	24%	12%	11 (5,18)
Virologic Response*	18%	25%	12%	12 (6,19)
ALT Normalization	24%	29%	18%	11 (5,18)

\* Serum HCV is measured by a research-based quantitative polymerase chain reaction assay by a central laboratory.

Subjects with both viral genotype 1 and high serum levels of HCV-RNA at baseline were less likely to respond to treatment with PegIntron. Among subjects with the 2 unfavorable prognostic variables, 8% (12/157) responded to PegIntron treatment and 2% (4/169) responded to INTRON A. Doses of PegIntron higher than the recommended dose did not result in higher response rates in these subjects. Subjects receiving PegIntron with viral genotype 1 had a response rate of 14% (28/199) while subjects with other viral genotypes had a 45% (43/96) response rate.

Ninety-six percent of the responders in the PegIntron groups and 100% of responders in the INTRON A group first cleared their viral RNA by Week 24 of treatment [see *Dosage and Administration (2)*].

The treatment response rates were similar in men and women. Response rates were lower in African-American and Hispanic subjects and higher in Asians compared to Caucasians. Although African Americans had a higher proportion of poor prognostic factors compared to Caucasians, the number of non-Caucasians studied (9% of the total) was insufficient to allow meaningful conclusions about differences in response rates after adjusting for prognostic factors.

Liver biopsies were obtained before and after treatment in 60% of subjects. A modest reduction in inflammation compared to baseline that was similar in all 4 treatment groups was observed.

**PegIntron/REBETOL Combination Therapy – Study 2:** A randomized study compared treatment with 2 PegIntron/REBETOL regimens [PegIntron 1.5 mcg/kg subcutaneously once weekly/REBETOL 800 mg orally daily (in divided doses); PegIntron 1.5 mcg/kg subcutaneously once weekly for 4 weeks then 0.5 mcg/kg subcutaneously once weekly for 44 weeks/REBETOL 1000 or 1200 mg orally daily (in divided doses)] with INTRON A [3 MIU subcutaneously thrice weekly/REBETOL 1000 or 1200 mg orally daily (in divided doses)] in 1530 adults with chronic hepatitis C. Interferon-naïve subjects were treated for 48 weeks and followed for 24 weeks posttreatment. Eligible subjects had compensated liver disease, detectable HCV-RNA, elevated ALT, and liver histopathology consistent with chronic hepatitis.

Response to treatment was defined as undetectable HCV-RNA at 24 weeks posttreatment. The response rate to the PegIntron 1.5 mcg/kg plus ribavirin 800 mg dose was higher than the response rate to INTRON A/REBETOL (see **Table 13**). The response rate to PegIntron 1.5→0.5 mcg/kg/REBETOL was essentially the same as the response to INTRON A/REBETOL (data not shown).

**TABLE 13: Rates of Response to Treatment – Study 2**

	PegIntron 1.5 mcg/kg once weekly REBETOL 800 mg daily	INTRON A 3 MIU three times weekly REBETOL 1000/1200 mg daily
Overall response*†	52% (264/511)	46% (231/505)
Genotype 1	41% (141/348)	33% (112/343)
Genotype 2-6	75% (123/163)	73% (119/162)

\* Serum HCV-RNA is measured with a research-based quantitative polymerase chain reaction assay by a central laboratory.

† Difference in overall treatment response (PegIntron/REBETOL vs. INTRON A/REBETOL) is 6% with 95% confidence interval of (0.18, 11.63) adjusted for viral genotype and presence of cirrhosis at baseline. Response to treatment was defined as undetectable HCV-RNA at 24 weeks posttreatment.

Subjects with viral genotype 1, regardless of viral load, had a lower response rate to PegIntron (1.5 mcg/kg)/REBETOL (800 mg) compared to subjects with other viral genotypes. Subjects with both poor prognostic factors (genotype 1 and high viral load) had a response rate of 30% (78/256) compared to a response rate of 29% (71/247) with INTRON A/REBETOL.

Subjects with lower body weight tended to have higher adverse reaction rates [see *Adverse Reactions (6.1)*] and higher response rates than subjects with higher body weights. Differences in response rates between treatment arms did not substantially vary with body weight.

Treatment response rates with PegIntron/REBETOL were 49% in men and 56% in women. Response rates were lower in African-American and Hispanic subjects and higher in Asians compared to Caucasians. Although African Americans had a higher proportion of poor prognostic factors compared to Caucasians, the number of non-Caucasians studied (11% of the total) was insufficient to allow meaningful conclusions about differences in response rates after adjusting for prognostic factors in this study.

Liver biopsies were obtained before and after treatment in 68% of subjects. Compared to baseline, approximately two-thirds of subjects in all treatment groups were observed to have a modest reduction in inflammation.

**PegIntron/REBETOL Combination Therapy – Study 3:** In a large United States community-based study (Study 3), 4913 subjects with chronic hepatitis C were randomized to receive PegIntron 1.5 mcg/kg subcutaneously once weekly in combination with a REBETOL dose of 800 to 1400 mg (weight-based dosing [WBD]) or 800 mg (flat) orally daily (in divided doses) for 24 or 48 weeks based on genotype. Response to treatment was defined as undetectable HCV-RNA (based on an assay with a lower limit of detection of 125 IU/mL) at 24 weeks posttreatment.

Treatment with PegIntron 1.5 mcg/kg and REBETOL 800 to 1400 mg resulted in a higher sustained virologic response compared to PegIntron in combination with a flat 800 mg daily dose of REBETOL. Subjects weighing >105 kg obtained the greatest benefit with WBD, although a modest benefit was also observed in subjects weighing >85 to 105 kg (see **Table 14**). The benefit of WBD in subjects weighing >85 kg was observed with HCV genotypes 1 through 3. Insufficient data were available to reach conclusions regarding other genotypes. Use of WBD resulted in an increased incidence of anemia [see *Adverse Reactions (6.1)*].

TABLE 14: SVR Rate by Treatment and Baseline Weight – Study 3

Treatment Group	Subject Baseline Weight			
	<65 kg (<143 lb)	65-85 kg (143-188 lb)	>85-105 kg (>188-231 lb)	>105 kg (>231 lb)
WBD*	50% (173/348)	45% (449/994)	42% (351/835)	47% (138/292)
Flat	51% (173/342)	44% (443/1011)	39% (318/819)	33% (91/272)

\* P=0.01, primary efficacy comparison (based on data from subjects weighing 65 kg or higher at baseline and utilizing a logistic regression analysis that includes treatment [WBD or Flat], genotype and presence/absence of advanced fibrosis, in the model).

A total of 1552 subjects weighing >65 kg in Study 3 had genotype 2 or 3 and were randomized to 24 or 48 weeks of therapy. No additional benefit was observed with the longer treatment duration.

**PegIntron/REBETOL Combination Therapy-Study 4:** A large randomized study compared the safety and efficacy of treatment for 48 weeks with 2 PegIntron/REBETOL regimens [PegIntron 1.5 mcg/kg and 1 mcg/kg subcutaneously once weekly both in combination with REBETOL 800 to 1400 mg PO daily (in 2 divided doses)] and Pegasys 180 mcg subcutaneously once weekly in combination with Copegus 1000 to 1200 mg PO daily (in 2 divided doses) in 3070 treatment-naïve adults with chronic hepatitis C genotype 1. In this study, lack of early virologic response by treatment Week 12 (subjects who do not achieve undetectable HCV-RNA or  $\geq 2 \log_{10}$  reduction from baseline) was the criteria for discontinuation of treatment. Sustained Virologic Response (SVR) to the treatment was defined as undetectable HCV-RNA (Roche COBAS TaqMan assay, a lower limit of quantitation of 27 IU/mL) at 24 weeks posttreatment (see Table 15).

TABLE 15: Response Rate by Treatment

Treatment Group	% (number) of Patients		
	PegIntron (1.5 mcg/kg)/REBETOL	PegIntron (1 mcg/kg)/REBETOL	Pegasys 180 mcg/Copegus
SVR	40 (406/1019)	38 (386/1016)	41 (423/1035)

In all 3 treatment groups, overall SVR rates were similar. In subjects with poor prognostic factors, subjects randomized to PegIntron (1.5 mcg/kg)/REBETOL or Pegasys/Copegus achieved higher SVR rates compared to those randomized to the PegIntron (1 mcg/kg)/REBETOL arm. In all arms, SVR rates were lower in subjects with poor prognostic factors compared to those without. For the PegIntron 1.5 mcg/kg plus REBETOL dose, SVR rates for those with and without, respectively, the following baseline factors were as follows: cirrhosis (10% vs. 42%), normal ALT levels (32% vs. 42%), baseline viral load >600,000 IU/mL (35% vs. 61%), >40 years old (38% vs. 50%), and African-American subjects (23% vs. 44%). In subjects with undetectable HCV-RNA at treatment Week 12 who received PegIntron (1.5 mcg/kg)/REBETOL, the SVR rate was 81% (328/407).

**PegIntron/REBETOL Combination Therapy in Prior Treatment Failures – Study 5:** In a noncomparative trial, 2293 patients with moderate to severe fibrosis who failed previous treatment with combination alpha interferon/ribavirin were re-treated with PegIntron, 1.5 mcg/kg subcutaneously, once weekly, in combination with weight-adjusted ribavirin. Eligible patients included prior nonresponders (patients who were HCV-RNA positive at the end of a minimum 12 weeks of treatment) and prior relapsers (patients who were HCV-RNA negative at the end of a minimum 12 weeks of treatment and subsequently relapsed after posttreatment follow-up). Patients who were negative at Week 12 were treated for 48 weeks and followed for 24 weeks posttreatment. Response to treatment was defined as undetectable HCV-RNA at 24 weeks posttreatment (measured using a research-based test, limit of detection 125 IU/mL). The overall response rate was 22% (497/2293) (99% CI: 19.5, 23.9). Patients with the following characteristics were less likely to benefit from re-treatment: previous nonresponse, previous pegylated interferon treatment, significant bridging fibrosis or cirrhosis, and genotype 1 infection.

The re-treatment sustained virologic response rates by baseline characteristics are summarized in Table 16.

TABLE 16: SVR Rates by Baseline Characteristics of Prior Treatment Failures

HCV Genotype/ Metavir Fibrosis Score	Overall SVR by Previous Response and Treatment			
	Nonresponder		Relapser	
	Alfa Interferon/ Ribavirin % (Number of Patients)	Peginterferon (2a and 2b Combined)/ Ribavirin % (Number of Patients)	Alfa Interferon/ Ribavirin % (Number of Patients)	Peginterferon (2a and 2b Combined)/ Ribavirin % (Number of Patients)
Overall	18 (158/903)	6 (30/476)	43 (130/300)	35 (113/344)
HCV 1	13 (98/761)	4 (19/431)	32 (67/208)	23 (56/243)
F2	18 (36/202)	6 (7/117)	42 (33/79)	32 (23/72)
F3	16 (38/233)	4 (4/112)	28 (16/58)	21 (14/67)
F4	7 (24/325)	4 (8/202)	26 (18/70)	18 (19/104)

TABLE 16: SVR Rates by Baseline Characteristics of Prior Treatment Failures (cont)

HCV Genotype/ Metavir Fibrosis Score	Overall SVR by Previous Response and Treatment			
	Nonresponder		Relapser	
	Alfa Interferon/ Ribavirin % (Number of Patients)	Peginterferon (2a and 2b Combined)/ Ribavirin % (Number of Patients)	Alfa Interferon/ Ribavirin % (Number of Patients)	Peginterferon (2a and 2b Combined)/ Ribavirin % (Number of Patients)
HCV 2/3	49 (53/109)	36 (10/28)	67 (54/81)	57 (52/92)
F2	68 (23/34)	56 (5/9)	76 (19/25)	61 (11/18)
F3	39 (11/28)	38 (3/8)	67 (18/27)	62 (18/29)
F4	40 (19/47)	18 (2/11)	59 (17/29)	51 (23/45)
HCV 4	17 (5/29)	7 (1/15)	88 (7/8)	50 (4/8)

Achievement of an undetectable HCV-RNA at treatment Week 12 was a strong predictor of sustained virologic response (SVR). In this trial, 1470 (64%) subjects did not achieve an undetectable HCV-RNA at treatment Week 12, and were offered enrollment into long-term treatment trials, due to an inadequate treatment response. Of the 823 (36%) subjects who were HCV-RNA undetectable at treatment Week 12, those infected with genotype 1 had an SVR of 48% (245/507), with a range of responses by fibrosis scores (F4-F2) of 39-55%. Subjects infected with genotype 2/3 who were HCV-RNA undetectable at treatment Week 12 had an overall SVR of 70% (196/281), with a range of responses by fibrosis scores (F4-F2) of 60-83%. For all genotypes, higher fibrosis scores were associated with a decreased likelihood of achieving SVR.

14.2 Chronic Hepatitis C in Pediatrics

**PegIntron/REBETOL Combination Therapy – Pediatric Study:** Previously untreated pediatric subjects 3 to 17 years of age with compensated chronic hepatitis C and detectable HCV-RNA were treated with REBETOL 15 mg/kg/day plus PegIntron 60 mcg/m<sup>2</sup> once weekly for 24 or 48 weeks based on HCV genotype and baseline viral load. All subjects were to be followed for 24 weeks posttreatment. A total of 107 subjects received treatment, of whom 52% were female, 89% were Caucasian, and 67% were infected with HCV genotype 1. Subjects infected with genotype 1, 4 or genotype 3 with HCV-RNA  $\geq 600,000$  IU/mL received 48 weeks of therapy while those infected with genotype 2 or genotype 3 with HCV-RNA <600,000 IU/mL received 24 weeks of therapy. The study results are summarized in Table 17.

TABLE 17: Sustained Virologic Response Rates by Genotype and Treatment Duration – Pediatric Study

Genotype	All Subjects n=107	
	24 Weeks	48 Weeks
	Virologic Response n*† (%)	Virologic Response n*† (%)
All	26/27 (96.3)	44/80 (55.0)
1	–	38/72 (52.8)
2	14/15 (93.3)	–
3‡	12/12 (100)	2/3 (66.7)
4	–	4/5 (80.0)

\* Response to treatment was defined as undetectable HCV-RNA at 24 weeks posttreatment.

† n=number of responders/number of subjects with given genotype, and assigned treatment duration.

‡ Subjects with genotype 3 low viral load (<600,000 IU/mL) were to receive 24 weeks of treatment while those with genotype 3 and high viral load were to receive 48 weeks of treatment.

16 HOW SUPPLIED/STORAGE AND HANDLING

PegIntron REDIPEN

Each PegIntron REDIPEN Package Contains:	
A box containing one 50 mcg per 0.5 mL PegIntron REDIPEN and 1 BD needle and 2 alcohol swabs.	(NDC 0085-1323-01)
A box containing one 80 mcg per 0.5 mL PegIntron REDIPEN and 1 BD needle and 2 alcohol swabs.	(NDC 0085-1316-01)
A box containing one 120 mcg per 0.5 mL PegIntron REDIPEN and 1 BD needle and 2 alcohol swabs.	(NDC 0085-1297-01)
A box containing one 150 mcg per 0.5 mL PegIntron REDIPEN and 1 BD needle and 2 alcohol swabs.	(NDC 0085-1370-01)

Each PegIntron REDIPEN PAK 4 Contains:	
A box containing four 50 mcg per 0.5 mL PegIntron REDIPEN Units, each containing 1 BD needle and 2 alcohol swabs.	(NDC 0085-1323-02)
A box containing four 80 mcg per 0.5 mL PegIntron REDIPEN Units, each containing 1 BD needle and 2 alcohol swabs.	(NDC 0085-1316-02)

<b>Each PegIntron REDIPEN PAK 4 Contains:</b> <i>(cont)</i>	
A box containing four 120 mcg per 0.5 mL PegIntron REDIPEN Units, each containing 1 BD needle and 2 alcohol swabs.	(NDC 0085-1297-02)
A box containing four 150 mcg per 0.5 mL PegIntron REDIPEN Units, each containing 1 BD needle and 2 alcohol swabs.	(NDC 0085-1370-02)

**PegIntron Vials**

<b>Each PegIntron Package Contains:</b>	
A box containing one 50 mcg per 0.5 mL vial of PegIntron Powder for Injection and one 1.25 mL vial of Diluent (Sterile Water for Injection USP), 2 BD Safety-Lok syringes with a safety sleeve and 2 alcohol swabs.	(NDC 0085-1368-01)
A box containing one 80 mcg per 0.5 mL vial of PegIntron Powder for Injection and one 1.25 mL vial of Diluent (Sterile Water for Injection USP), 2 BD Safety-Lok syringes with a safety sleeve and 2 alcohol swabs.	(NDC 0085-1291-01)
A box containing one 120 mcg per 0.5 mL vial of PegIntron Powder for Injection and one 1.25 mL vial of Diluent (Sterile Water for Injection USP), 2 BD Safety-Lok syringes with a safety sleeve and 2 alcohol swabs.	(NDC 0085-1304-01)
A box containing one 150 mcg per 0.5 mL vial of PegIntron Powder for Injection and one 1.25 mL vial of Diluent (Sterile Water for Injection USP), 2 BD Safety-Lok syringes with a safety sleeve and 2 alcohol swabs.	(NDC 0085-1279-01)

**Storage:** *PegIntron REDIPEN:* PegIntron REDIPEN should be stored at 2°-8°C (36°-46°F).

After reconstitution, the solution should be used immediately, but may be stored up to 24 hours at 2°-8°C (36°-46°F). The reconstituted solution contains no preservative, and is clear and colorless. **DO NOT FREEZE.**

**PegIntron Vials:** PegIntron should be stored at 25°C (77°F); excursions permitted to 15°-30°C (59°-86°F) [see USP Controlled Room Temperature]. After reconstitution with supplied Diluent the solution should be used immediately, but may be stored up to 24 hours at 2°-8°C (36°-46°F). The reconstituted solution contains no preservative, and is clear and colorless. **DO NOT FREEZE.**

**Disposal Instructions:** Patients should be thoroughly instructed in the importance of proper disposal. After preparation and administration of PegIntron for Injection, patients should be advised to use a puncture-resistant container for the disposal of used syringes, needles, and the REDIPEN. The full container should be disposed of in accordance with state and local laws. Patients should also be cautioned against reusing or sharing needles, syringes, or the REDIPEN.

**17 PATIENT COUNSELING INFORMATION**

A patient should self-inject PegIntron only if it has been determined that it is appropriate, the patient agrees to medical follow-up as necessary, and training in proper injection technique has been given to him/her.

**17.1 Medication Guide**

Patients receiving PegIntron alone or in combination with REBETOL should be directed in its appropriate use, informed of the benefits and risks associated with treatment, and referred to the MEDICATION GUIDES for PegIntron and, if applicable, REBETOL (ribavirin).

**17.2 Pregnancy**

Patients must be informed that REBETOL may cause birth defects and death of the unborn child. Extreme care must be taken to avoid pregnancy in female patients and in female partners of male patients during treatment with combination PegIntron/REBETOL therapy and for 6 months posttherapy. Combination PegIntron/REBETOL therapy should not be initiated until a report of a negative pregnancy test has been obtained immediately prior to initiation of therapy. It is recommended that patients undergo monthly pregnancy tests during therapy and for 6 months post-therapy [see *Contraindications (4)*, *Use in Specific Populations (8.1)*, and *REBETOL package insert*].

**17.3 HCV Transmission**

Inform patients that there are no data regarding whether PegIntron therapy will prevent transmission of HCV infection to others. Also, it is not known if treatment with PegIntron will cure hepatitis C or prevent cirrhosis, liver failure, or liver cancer that may be the result of infection with the hepatitis C virus.

**17.4 Laboratory Evaluations, Hydration, "Flu-like" Symptoms**

Patients should be advised that laboratory evaluations are required before starting therapy and periodically thereafter [see *Warnings and Precautions (5.15)*]. It is advised that patients be well-hydrated, especially during the initial stages of treatment. "Flu-like" symptoms associated with administration of PegIntron may be minimized by bedtime administration of PegIntron or by use of antipyretics.

Manufactured by Schering Corporation, a subsidiary of Schering-Plough Corporation, Kenilworth, NJ 07033 USA.

U.S. Patent Nos. 5,908,621; 5,951,974; 6,172,046; 6,177,074; 6,180,096; 6,461,605; 6,472,373; 6,524,570; 6,610,830.

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# PegIntron<sup>®</sup>

## (Peginterferon alfa-2b)

### Including appendix with instructions for using PegIntron<sup>®</sup> Powder for Injection

Read this Medication Guide carefully before you start taking PegIntron<sup>®</sup> (PegIn-tron) or PegIntron/REBETOL<sup>®</sup> (REB-eh-tole) combination therapy. Read the Medication Guide each time you refill your prescription because there may be new information. The information in this Medication Guide does not take the place of talking with your health care provider (doctor, nurse, nurse practitioner, or physician's assistant).

**If you are taking PegIntron/REBETOL combination therapy, also read the Medication Guide for REBETOL (ribavirin USP) Capsules and Oral Solution.**

#### **What is the most important information I should know about PegIntron and PegIntron/REBETOL combination therapy?**

PegIntron (peginterferon) is a treatment for some people who are infected with hepatitis C virus. However, PegIntron and PegIntron/REBETOL combination therapy can have serious side effects that may cause death in rare cases. Before you decide to start treatment, you should talk to your health care provider about the possible benefits and side effects of PegIntron or PegIntron/REBETOL combination therapy. If you begin treatment you will need to see your health care provider regularly for medical examinations and lab tests to make sure your treatment is working and to check for side effects.

**REBETOL may cause birth defects and/or death of an unborn child. If you are pregnant, you or your male partner must not take PegIntron/REBETOL combination therapy. You must not become pregnant while either you or your partner are being treated with the combination PegIntron/REBETOL therapy, or for 6 months after stopping therapy. Men and women should use birth control while taking the combination therapy and for 6 months afterwards. If you or your partner are being treated and you become pregnant either during treatment or within 6 months of stopping treatment, call your health care provider right away. There is a Ribavirin Pregnancy Registry that collects information about pregnancy outcomes in female patients and female partners of male patients exposed to ribavirin. You or your health care provider are encouraged to contact the Registry at 1-800-593-2214.**

**If you are taking PegIntron or PegIntron/REBETOL therapy you should call your health care provider immediately if you develop any of these symptoms: New or worsening mental health problems such as thoughts about killing or hurting yourself or others, trouble breathing, chest pain, severe stomach or lower back pain, bloody diarrhea or bloody bowel movements, high fever, bruising, bleeding, or decreased vision.**

The most serious possible side effects of PegIntron and PegIntron/REBETOL therapy include:

**Problems with Pregnancy. Combination PegIntron/REBETOL therapy can cause death, serious birth defects, or other harm to your unborn child. If you are a woman of childbearing age, you must not become pregnant during treatment and for 6 months after you have stopped therapy. You must have a negative pregnancy test immediately before beginning treatment, during treatment, and for 6 months after you have stopped therapy. Both male and female patients must use effective forms of birth control during treatment and for the 6 months after treatment is completed. Male patients should use a condom. If you are a female, you must use birth control even if you believe that you are not fertile or that your fertility is low. You should talk to your health care provider about birth control for you and your partner.**

**Mental health problems and suicide.** PegIntron and PegIntron/REBETOL therapies may cause patients to develop mood or behavioral problems. These can include irritability (getting easily upset) and depression (feeling low, feeling bad about yourself, or feeling hopeless). Some patients may have aggressive behavior. Former drug addicts may fall back into drug addiction or overdose. Some patients think about hurting or killing themselves or other people and some have killed (suicide) or hurt themselves or others. You must tell your health care provider if you are being treated for a mental illness or had treat-

ment in the past for any mental illness, including depression and suicidal behavior. You should tell your health care provider if you have ever been addicted to drugs or alcohol.

**Heart problems.** Some patients taking PegIntron or PegIntron/REBETOL therapy may develop problems with their heart, including low blood pressure, fast heart rate, and very rarely, heart attacks. Tell your health care provider if you have had any heart problems in the past.

**Blood problems.** PegIntron and PegIntron/REBETOL therapies commonly lower two types of blood cells (white blood cells and platelets). In some patients, these blood counts may fall to dangerously low levels. If your blood counts become very low, this could lead to infections or bleeding.

REBETOL therapy causes a decrease in the number of red blood cells you have (anemia). This can be dangerous, especially for patients who already have heart or circulatory (cardiovascular) problems. Talk with your health care provider before taking combination PegIntron/REBETOL therapy if you have or have ever had any cardiovascular problems.

**Body organ problems.** Certain symptoms like severe stomach pain may mean that your internal organs are being damaged. PegIntron may cause lung problems including: trouble breathing, pneumonia, inflammation of lung tissue, and new or worse high blood pressure of the lungs (pulmonary hypertension), which can be severe and may in some cases lead to death. Cases of weakness, loss of coordination, and numbness due to stroke have been reported in patients taking PegIntron, including patients with few or no reported risk factors for stroke.

**Eye problems.** Changes in vision such as a decrease or loss of vision (blindness) may happen in some patients. You should have an eye exam before you take PegIntron. If you have eye problems or have had them in the past, you may need eye exams while you are taking PegIntron. Tell your health care provider or eye doctor right away if you have changes in your vision while taking PegIntron.

*For other possible side effects, see "What are the possible side effects of PegIntron and PegIntron/REBETOL combination therapy?" in this Medication Guide.*

#### **What is PegIntron and PegIntron/REBETOL combination therapy?**

The PegIntron product is a drug used to treat adults who have a lasting (chronic) infection with hepatitis C virus and who show signs that the virus is damaging the liver. PegIntron/REBETOL combination therapy consists of two medications also used to treat hepatitis C infection in adults and children 3 years of age and older. Patients with hepatitis C have the virus in their blood and in their liver. PegIntron reduces the amount of virus in the body and helps the body's immune system fight the virus. REBETOL (ribavirin) is a drug that helps to fight the viral infection but does not work when used by itself to treat chronic hepatitis C.

It is not known if PegIntron or PegIntron/REBETOL therapies can cure hepatitis C (permanently eliminate the virus), or if it can prevent liver failure or liver cancer that is caused by hepatitis C infection.

It is also not known if PegIntron or PegIntron/REBETOL combination therapy will prevent one infected person from infecting another person with hepatitis C.

#### **Who should not take PegIntron or PegIntron/REBETOL therapy?**

Do not take PegIntron or PegIntron/REBETOL therapy if you:

- are pregnant, planning to get pregnant during treatment, or during the 6 months after treatment, or breastfeeding.
- are a male patient with a female sexual partner who is pregnant, or plans to become pregnant at any time while you are being treated with REBETOL, or during the 6 months after your treatment has ended.
- have hepatitis caused by your immune system attacking your liver (autoimmune hepatitis) or unstable liver disease.
- had an allergic reaction to another alpha interferon or are allergic to any of the ingredients in PegIntron or REBETOL Capsules or Oral Solution. If you have any doubts, ask your health care provider.
- Do not take PegIntron/REBETOL combination therapy if you have abnormal red blood cells such as is seen in sickle-cell anemia or thalassemia major.

**If you have any of the following conditions or serious medical problems,**

**discuss them with your health care provider before taking PegIntron or PegIntron/REBETOL therapy:**

- depression or anxiety
- sleep problems
- high blood pressure
- previous heart attack, or other heart problems
- liver problems (other than hepatitis C infection)
- any kind of autoimmune disease (where the body's immune system attacks the body's own cells), such as psoriasis, systemic lupus erythematosus, rheumatoid arthritis
- thyroid problems
- diabetes
- colitis (inflammation of the bowels)
- cancer
- hepatitis B infection
- HIV infection
- kidney problems
- bleeding problems
- alcoholism
- drug abuse or addiction
- body organ transplant and are taking medicine that keeps your body from rejecting your transplant (suppresses your immune system)

**Tell your health care provider about all the medicines you take**, including prescription and nonprescription medicines, vitamins, and herbal supplements. PegIntron and certain other medicines may affect each other and cause side effects.

**Especially tell your doctor if you take the anti-hepatitis B medicine telbivudine (Tyzeka®).** See “What are the possible side effects of PegIntron?”

**Know the medicines you take. Keep a list of them and show it to your health care provider and pharmacist when you get a new medicine.**

**How should I take PegIntron or PegIntron/REBETOL?**

Your health care provider will decide whether you will take PegIntron therapy alone or the combination of PegIntron/REBETOL, as well as the correct dose (for adults the dose of PegIntron is based on weight). For children 3 years of age and older, your health care provider will recommend the dose of PegIntron based on body surface area. PegIntron and PegIntron/REBETOL are given for up to 1 year. Take your prescribed dose of PegIntron **ONCE A WEEK**, on the same day of each week and at approximately the same time. Take the medicine for the full course of prescribed therapy and do not take more than the prescribed dose. REBETOL should be taken with food. When you take REBETOL with food, more of the medicine (70% more on average) is taken up by your body. You should take REBETOL the same way every day (twice a day with food) to keep the medicine in your body at a steady level. This will help your health care provider to decide how your treatment is working and how to change the dose of REBETOL you take if you have side effects from REBETOL.

**Be sure to read the Medication Guide for REBETOL (ribavirin USP) for complete instructions on how to take the REBETOL Capsules and Oral Solution.**

You should be completely comfortable with how to prepare PegIntron, how to set the dose you take, and how to inject yourself before you use PegIntron for the first time. PegIntron comes in two different forms, a powder in a single-use vial and a REDIPEN® single-use delivery system. See the attached appendix for detailed instructions for preparing and giving a dose of PegIntron.

If you miss a dose of the PegIntron product, take the missed dose as soon as possible during the same day or the next day, then continue on your regular dosing schedule. If several days go by after you miss a dose, check with your health care provider about what to do. Do not double the next dose or take more than one dose a week without talking to your health care provider. Call your health care provider right away if you take more than your prescribed PegIntron dose. Your health care provider may wish to examine you more closely, and take blood for testing.

If you miss a dose of REBETOL, take the missed dose as soon as possible during the same day. If an entire day has gone by, check with your health care

provider about what to do. Do not double the next dose.

You must get regular blood tests to help your health care provider check how the treatment is working and to check for side effects.

Tell your health care provider if you are taking or planning to take other prescription or nonprescription medicines, including vitamin and mineral supplements and herbal medicines.

**What should I avoid while taking PegIntron or PegIntron/REBETOL therapies?**

- If you are pregnant do not start taking PegIntron/REBETOL combination therapy.
- Avoid becoming pregnant while taking PegIntron or PegIntron/REBETOL. PegIntron and PegIntron/REBETOL may harm your unborn child (death or serious birth defects) or cause you to lose your baby (miscarry). **If you or your partner become pregnant during treatment or during the 6 months after treatment with PegIntron/REBETOL combination therapy, immediately report the pregnancy to your health care provider. You or your health care provider should call 1-800-593-2214.** By calling this number, information about you and/or your partner will be added to a pregnancy registry that will be used to help you and your health care provider make decisions about your treatment for hepatitis in the future. You, your partner, and/or your health care provider will be asked to provide follow-up information on the outcome of the pregnancy.
- Do not breastfeed your baby while taking PegIntron.

**What are the possible side effects of PegIntron and PegIntron/REBETOL combination therapy?**

**PegIntron may cause serious side effects including:**

- See “What is the most important information I should know about PegIntron and PegIntron/REBETOL combination therapy?”
- **Other body organ problems.** A few patients have inflammation of the kidney.
- **New or worsening autoimmune disease.** Some patients taking PegIntron or PegIntron/REBETOL develop autoimmune diseases (a condition where the body's immune cells attack other cells or organs in the body), including rheumatoid arthritis, systemic lupus erythematosus, and psoriasis. In some patients who already have an autoimmune disease, the disease worsens on PegIntron and PegIntron/REBETOL combination therapy.
- **Growth problems in children.** Weight loss and slowed growth are common in children during treatment with PegIntron/REBETOL. Catch-up weight gain and some catch-up in growth happen after treatment stops, but some children may not reach the height that they were expected to have before treatment.
- **Nerve problems.** People who take PegIntron or other alpha interferon products with telbivudine (Tyzeka®) can have nerve problems such as continuing numbness, tingling, or burning sensation in the arms or legs (peripheral neuropathy). Call your health care provider if you have any of these symptoms.

**Common but less serious side effects include:**

- **Flu-like symptoms.** Most patients who take PegIntron or PegIntron/REBETOL therapy have “flu-like” symptoms (headache, muscle aches, tiredness, and fever). Some of these symptoms (fever, headache) usually lessen after the first few weeks of therapy. You can reduce some of these symptoms by injecting your PegIntron dose at bedtime. Over-the-counter pain and fever reducers, such as acetaminophen or ibuprofen, can be used to prevent or reduce the fever and headache.
- **Extreme fatigue (tiredness).** Many patients become extremely tired while on PegIntron or PegIntron/REBETOL combination therapy.
- **Appetite problems.** Nausea, loss of appetite, and weight loss occur commonly.
- **Thyroid problems.** Some patients develop changes in the function of their thyroid. Symptoms of thyroid changes include the inability to concentrate, feeling cold or hot all the time, a change in your weight, and changes to your skin.
- **Blood sugar problems.** Some patients develop problems with the way their body controls their blood sugar, and may develop high blood sugar or diabetes.
- **Skin reactions.** Redness, swelling, and itching are common at the site of

injection. If after several days these symptoms do not disappear contact your health care provider. You may get a rash during therapy. If this occurs, your health care provider may recommend medicine to treat the rash.

- **Hair thinning.** Hair thinning is common during PegIntron and PegIntron/REBETOL treatment. Hair loss stops and hair growth returns after therapy is stopped.

These are not all of the side effects of PegIntron or PegIntron/REBETOL combination therapy. Your health care provider or pharmacist can give you a more complete list.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

#### General advice about prescription medicines:

Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. If you have any concerns about PegIntron, ask your health care provider. Your health care provider or pharmacist can give you information about PegIntron that was written for health care professionals. Do not use PegIntron for a condition for which it was not prescribed. Do not share this medication with other people.

#### If you are taking PegIntron/REBETOL combination therapy, also read the Medication Guide for REBETOL (ribavirin USP) Capsules and Oral Solution.

*This Medication Guide has been approved by the U.S. Food and Drug Administration.*

*Revised: August 2009*

#### How do I prepare and inject the PegIntron dose?

Before you inject PegIntron, the powder must be mixed with **0.7 mL** of the supplied DILUENT for PegIntron, Sterile Water for Injection (diluent). This product can also be administered by a parent or caretaker as instructed by your health care provider. You should carefully follow the directions given to you by your health care provider.

The vial of mixed PegIntron should be used immediately. DO NOT prepare more than one vial at a time. If you don't use the vial of the prepared solution right away, it must be stored in a refrigerator and used within 24 hours.

#### Storing PegIntron

PegIntron Powder should be stored at room temperature (25°C, 77°F); avoid exposure to heat. After mixing, the PegIntron solution should be used immediately but may be stored in the refrigerator up to 24 hours. The solution contains no preservatives. DO NOT FREEZE.

#### Preparing the PegIntron solution:

1. Find a clean, well-lit, non-slip flat working surface and assemble all of the supplies you will need for an injection. All of the supplies you will need for an injection are in the PegIntron Powder for Injection package. The package contains:

- a vial of PegIntron powder
- a 1.25-mL vial of DILUENT
- 2 disposable syringes, and
- alcohol swabs

2. Check the date printed on the PegIntron carton to make sure that the expiration date has not passed. Remove one vial and look at the contents. The PegIntron in the vial should appear as a white to off-white tablet-like solid that is whole/in pieces or as a loose powder.

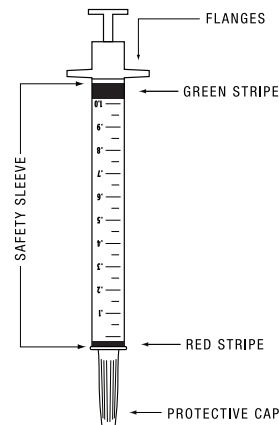
If you have already mixed the PegIntron solution and it has been stored properly in the refrigerator, take it out of the refrigerator and allow the solution to come to room temperature.

3. Wash your hands thoroughly with soap and water, rinse and towel dry. It is important to keep your work area, your hands, and injection site clean to minimize the risk of infection.

The disposable syringes have needles that are already attached and cannot be removed. Each syringe has a clear plastic safety sleeve that is pulled over the needle for disposal after use. The safety sleeve should remain tight against the flange while using the syringe and moved over the needle only when ready for disposal. **Figure A.**

The syringes and needles are for single use only.

Figure A



4. Remove the protective wrapper from ONE of the syringes provided and use for the following steps 5-7. Make sure that the syringe safety sleeve is sitting against the flange (see **Figure A**).

5. Remove the protective plastic cap from the tops of both the supplied DILUENT and the PegIntron vials. Clean the rubber stopper on the top of both vials with an alcohol swab.

6. Carefully remove the protective cap straight off of the needle to avoid damaging the needle point. Fill the syringe with air by pulling the plunger to 0.7 mL (**Figure B**). Hold the DILUENT vial upright. Do not touch the cleaned top of the vial with your hands (**Figure C**). Insert the needle through the center of the rubber stopper of the DILUENT vial, and inject the air from the syringe into the vial (**Figure D**). Turn the vial upside down and make sure the tip of the needle is in the liquid. **Withdraw only 0.7 mL of DILUENT** by pulling the plunger back to the 0.7 mL mark on the side of the syringe (**Figure E**). Remove the needle from the vial (**Figure F**). **Discard the remaining DILUENT.**

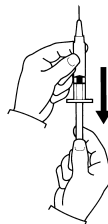


Figure B

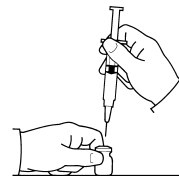


Figure C

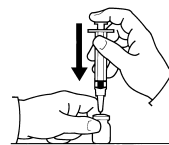


Figure D

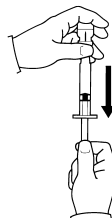


Figure E

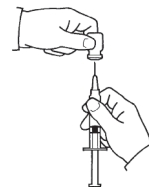


Figure F

7. Insert the needle through the center of the rubber stopper of the PegIntron vial, and place the needle tip against the glass wall of the vial (**Figure G**). SLOWLY inject the 0.7 mL DILUENT so that the stream of DILUENT runs down the side of the vial. To prevent bubbles from forming, DO NOT AIM THE STREAM of diluent directly on the tablet-like SOLID or POWDER in the bottom of the vial. Remove the needle from the vial.

Firmly grasp the safety sleeve and pull it over the exposed needle until you hear a click. The green stripe on the safety sleeve will completely cover the red stripe on the needle. (See **Figure O** in the section: "Injecting the PegIntron Dose.") Discard the syringe and needle in the puncture-proof container.

8. GENTLY swirl the vial in a gentle circular motion (**Figure H**), until the PegIntron

is completely dissolved. **DO NOT SHAKE** the vial. If any powder remains undissolved in the vial, gently turn the vial upside down until all of the powder is dissolved. It is not unusual for the solution to appear cloudy or bubbly for a few minutes. If air bubbles do form, wait until the solution has settled and all bubbles have risen to the top before withdrawing your dose from the vial.



Figure G



Figure H

9. After the solution has settled and is completely dissolved it should be clear, colorless and without particles, but there may be a ring of foam or bubbles on the surface; this is normal. Do not use it if you see particles or the color is not correct.

10. After the PegIntron powder is dissolved but before you withdraw your dose, clean the rubber stopper again with an alcohol swab.

11. Unwrap the second syringe provided. You will use it to give yourself the injection. Carefully remove the protective cap from the needle and fill the syringe with air by pulling the plunger to the number on the side of the syringe (mL) that corresponds to your prescribed dose (**Figure J**). Hold the PegIntron vial upright. **DO NOT** touch the cleaned top of the vial with your hands (**Figure K**). Insert the needle into the vial containing the PegIntron solution and inject the air into the center of the vial (**Figure L**).

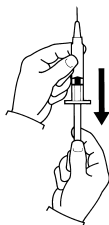


Figure J

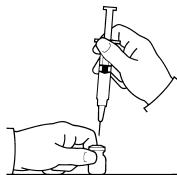


Figure K

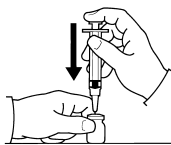


Figure L

12. Turn the PegIntron vial upside down. Be sure the tip of the needle is in the PegIntron solution. While holding the vial and syringe with one hand slowly pull the plunger back to withdraw the exact amount of PegIntron into the syringe your health care provider told you to use (**Figure M**).

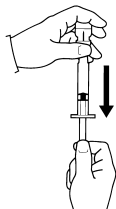


Figure M

13. Remove the needle from the vial (**Figure N**) and check for air bubbles in the syringe. If you see any bubbles, hold the syringe with the needle pointing up and gently tap the syringe until the bubbles rise. Then push the plunger in slowly until the bubbles disappear.

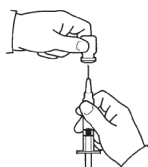


Figure N

## Injecting the PegIntron Dose

### Selecting the Site for Injection

The best sites for giving yourself an injection are those areas with a layer of fat between the skin and muscle, like your thigh, the outer surface of your upper arm, and abdomen. Do not inject yourself in the area near your navel or waistline. If you are very thin, you should only use the thigh or outer surface of the arm for injection.

You should use a different site each time you inject PegIntron to avoid soreness at any one site. Do not inject PegIntron solution into an area where the skin is irritated, red, bruised, infected or has scars, stretch marks or lumps.

14. Clean the skin where the injection is to be given with an alcohol swab, and wait for the area to dry. Remove the protective cap from the needle. Make sure the safety sleeve of the syringe is pushed firmly against the syringe flange so that the needle is fully exposed (see **Figure A**).

15. With one hand, pinch a 2-inch fold of loose skin. With your other hand, pick up the syringe and hold it like a pencil. Position the bevel of the needle facing up and insert the needle approximately  $\frac{1}{4}$  inch into the pinched skin at approximately a 45- to 90-degree angle with a quick dart-like thrust. After the needle is in, remove the hand that you used to pinch your skin and use it to hold the syringe barrel. Pull the plunger of the syringe back very slightly. If blood comes into the syringe, the needle has entered a blood vessel. **Do not inject.** Withdraw the needle and discard the syringe as outlined in step 17. Repeat the above steps with a new vial to prepare a new syringe and inject the medicine at a new site. If no blood is present in the syringe, inject the medicine by gently pressing the plunger all the way down the syringe barrel.

16. Hold an alcohol swab near the needle and pull the needle straight out of the skin. Press the alcohol swab over the injection site for several seconds. Do not massage the injection site. If there is bleeding, cover it with a bandage.

17. After injecting your dose, firmly grasp the safety sleeve and pull it over the exposed needle until you hear a click, and the green stripe on the safety sleeve covers the red stripe on the needle (**Figure O**). Discard the syringe and needle in the Sharp's container supplied to you.

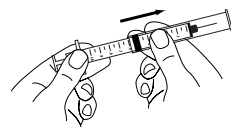


Figure O

18. After 2 hours, check the injection site for redness, swelling, or tenderness. If you have a skin reaction and it doesn't clear up in a few days, contact your health care provider or nurse.

### How do I dispose of the used syringes and needles?

Discard used safety lock syringes and needles in a Sharp's container or other puncture-proof container like a coffee can. **DO NOT USE** glass or clear plastic containers. Your health care provider or nurse will tell you how to dispose of a full container. Always keep the container out of reach of children.

Manufactured by Schering Corporation, a subsidiary of Schering-Plough Corporation, Kenilworth, NJ 07033 USA.

 Schering-Plough



# PegIntron® REDIPEN® Single-dose Delivery System (Peginterferon alfa-2b)

MEDICATION GUIDE

PegIntron® REDIPEN® (Peginterferon alfa-2b) Single-dose Delivery System

## Including appendix with instructions for using PegIntron® REDIPEN® Single-dose Delivery System

Read this Medication Guide carefully before you start taking PegIntron® (Peg In-tron) or PegIntron/REBETOL® (REB-eh-tole) combination therapy. Read the Medication Guide each time you refill your prescription because there may be new information. The information in this Medication Guide does not take the place of talking with your health care provider (doctor, nurse, nurse practitioner, or physician's assistant).

**If you are taking PegIntron/REBETOL combination therapy, also read the Medication Guide for REBETOL (ribavirin USP) Capsules and Oral Solution.**

### What is the most important information I should know about PegIntron and PegIntron/REBETOL combination therapy?

PegIntron (peginterferon) is a treatment for some people who are infected with hepatitis C virus. However, PegIntron and PegIntron/REBETOL combination therapy can have serious side effects that may cause death in rare cases. Before you decide to start treatment, you should talk to your health care provider about the possible benefits and side effects of PegIntron or PegIntron/REBETOL combination therapy. If you begin treatment you will need to see your health care provider regularly for medical examinations and lab tests to make sure your treatment is working and to check for side effects.

**REBETOL may cause birth defects and/or death of an unborn child. If you are pregnant, you or your male partner must not take PegIntron/REBETOL combination therapy. You must not become pregnant while either you or your partner are being treated with the combination PegIntron/REBETOL therapy, or for 6 months after stopping therapy. Men and women should use birth control while taking the combination therapy and for 6 months afterwards. If you or your partner are being treated and you become pregnant, either during treatment or within 6 months of stopping treatment, call your health care provider right away. There is a Ribavirin Pregnancy Registry that collects information about pregnancy outcomes of female patients and female partners of male patients exposed to ribavirin. You or your health care provider are encouraged to contact the Registry at 1-800-593-2214.**

**If you are taking PegIntron or PegIntron/REBETOL therapy you should call your health care provider immediately if you develop any of these symptoms: New or worsening mental health problems such as thoughts about killing or hurting yourself or others, trouble breathing, chest pain, severe stomach or lower back pain, bloody diarrhea or bloody bowel movements, high fever, bruising, bleeding, or decreased vision.**

The most serious possible side effects of PegIntron and PegIntron/REBETOL therapy include:

**Problems with Pregnancy. Combination PegIntron/REBETOL therapy can cause death, serious birth defects, or other harm to your unborn child. If you are a woman of childbearing age, you must not become pregnant during treatment and for 6 months after you have stopped therapy. You must have a negative pregnancy test immediately before beginning treatment, during treatment, and for 6 months after you have stopped therapy. Both male and female patients must use effective forms of birth control during treatment and for the 6 months after treatment is completed. Male patients should use a condom.** If you are a female, you must use birth control even if you believe that you are not fertile or that your fertility is low. You should talk to your health care provider about birth control for you and your partner.

**Mental health problems and suicide.** PegIntron and PegIntron/REBETOL

therapies may cause patients to develop mood or behavioral problems. These can include irritability (getting easily upset) and depression (feeling low, feeling bad about yourself, or feeling hopeless). Some patients may have aggressive behavior. Former drug addicts may fall back into drug addiction or overdose. Some patients think about hurting or killing themselves or other people and some have killed (suicide) or hurt themselves or others. You must tell your health care provider if you are being treated for a mental illness or had treatment in the past for any mental illness, including depression and suicidal behavior. You should tell your health care provider if you have ever been addicted to drugs or alcohol.

**Heart problems.** Some patients taking PegIntron or PegIntron/REBETOL therapy may develop problems with their heart, including low blood pressure, fast heart rate, and very rarely, heart attacks. Tell your health care provider if you have had any heart problems in the past.

**Blood problems.** PegIntron and PegIntron/REBETOL therapies commonly lower two types of blood cells (white blood cells and platelets). In some patients, these blood counts may fall to dangerously low levels. If your blood counts become very low, this could lead to infections or bleeding.

REBETOL therapy causes a decrease in the number of red blood cells you have (anemia). This can be dangerous, especially for patients who already have heart or circulatory (cardiovascular) problems. Talk with your health care provider before taking combination PegIntron/REBETOL therapy if you have or have ever had any cardiovascular problems.

**Body organ problems.** Certain symptoms like severe stomach pain may mean that your internal organs are being damaged. PegIntron may cause lung problems including: trouble breathing, pneumonia, inflammation of lung tissue, and new or worse high blood pressure of the lungs (pulmonary hypertension), which can be severe and may in some cases lead to death. Cases of weakness, loss of coordination, and numbness due to stroke have been reported in patients taking PegIntron, including patients with few or no reported risk factors for stroke.

**Eye problems.** Changes in vision such as a decrease or loss of vision (blindness) may happen in some patients. You should have an eye exam before you take PegIntron. If you have eye problems or have had them in the past, you may need eye exams while you are taking PegIntron. Tell your health care provider or eye doctor right away if you have changes in your vision while taking PegIntron.

*For other possible side effects, see "What are the possible side effects of PegIntron and PegIntron/REBETOL combination therapy?" in this Medication Guide.*

### What is PegIntron and PegIntron/REBETOL combination therapy?

The PegIntron product is a drug used to treat adults who have a lasting (chronic) infection with hepatitis C virus and who show signs that the virus is damaging the liver. PegIntron/REBETOL combination therapy consists of two medications also used to treat hepatitis C infection in adults and children 3 years of age and older. Patients with hepatitis C have the virus in their blood and in their liver. PegIntron reduces the amount of virus in the body and helps the body's immune system fight the virus. REBETOL (ribavirin) is a drug that helps to fight the viral infection, but does not work when used by itself to treat chronic hepatitis C.

It is not known if PegIntron or PegIntron/REBETOL therapies can cure hepatitis C (permanently eliminate the virus), or if it can prevent liver failure or liver cancer that is caused by hepatitis C infection.

It is also not known if PegIntron or PegIntron/REBETOL combination therapy will prevent one infected person from infecting another person with hepatitis C.

**Who should not take PegIntron or PegIntron/REBETOL therapy?**

Do not take PegIntron or PegIntron/REBETOL therapy if you:

- are pregnant, planning to get pregnant during treatment or during the 6 months after treatment, or breastfeeding.
- are a male patient with a female sexual partner who is pregnant, or plans to become pregnant at any time while you are being treated with REBETOL, or during the 6 months after your treatment has ended.
- have hepatitis caused by your immune system attacking your liver (autoimmune hepatitis) or unstable liver disease.
- had an allergic reaction to another alpha interferon or are allergic to any of the ingredients in PegIntron or REBETOL Capsules or Oral Solution. If you have any doubts, ask your health care provider.
- Do not take PegIntron/REBETOL combination therapy if you have abnormal red blood cells such as is seen in sickle-cell anemia or thalassemia major.

**If you have any of the following conditions or serious medical problems, discuss them with your health care provider before taking PegIntron or PegIntron/REBETOL therapy:**

- depression or anxiety
- sleep problems
- high blood pressure
- previous heart attack, or other heart problems
- liver problems (other than hepatitis C infection)
- any kind of autoimmune disease (where the body's immune system attacks the body's own cells), such as psoriasis, systemic lupus erythematosus, rheumatoid arthritis
- thyroid problems
- diabetes
- colitis (inflammation of the bowels)
- cancer
- hepatitis B infection
- HIV infection
- kidney problems
- bleeding problems
- alcoholism
- drug abuse or addiction
- body organ transplant and are taking medicine that keeps your body from rejecting your transplant (suppresses your immune system)

**Tell your health care provider about all the medicines you take**, including prescription and nonprescription medicines, vitamins, and herbal supplements. PegIntron and certain other medicines may affect each other and cause side effects.

**Especially tell your doctor if you take the anti-hepatitis B medicine telbivudine (Tyzeka®).** See "What are the possible side effects of PegIntron?"

**Know the medicines you take. Keep a list of them and show it to your health care provider and pharmacist when you get a new medicine.**

**How should I take PegIntron or PegIntron/REBETOL?**

Your health care provider will decide whether you will take PegIntron therapy alone or the combination of PegIntron/REBETOL, as well as the correct dose (for adults the dose of PegIntron is based on weight). For children 3 years of age and older, your health care provider will recommend the dose of PegIntron based on body surface area. PegIntron and PegIntron/REBETOL are given for up to 1 year. Take your prescribed dose of PegIntron **ONCE A WEEK**, on the same day of each week and at approximately the same time. Take the medicine for the full course of prescribed therapy and do not take

more than the prescribed dose. REBETOL should be taken with food. When you take REBETOL with food, more of the medicine (70% more on average) is taken up by your body. You should take REBETOL the same way every day (twice a day with food) to keep the medicine in your body at a steady level. This will help your health care provider to decide how your treatment is working and how to change the dose of REBETOL you take if you have side effects from REBETOL. **Be sure to read the Medication Guide for REBETOL (ribavirin USP) for complete instructions on how to take the REBETOL capsules and oral solution.**

You should be completely comfortable with how to prepare PegIntron, how to set the dose you take, and how to inject yourself before you use PegIntron for the first time. PegIntron comes in two different forms, a powder in a single-use vial and a REDIPEN® single-use delivery system. See the attached appendix for detailed instructions for preparing and giving a dose of PegIntron.

If you miss a dose of the PegIntron product, take the missed dose as soon as possible during the same day or the next day, then continue on your regular dosing schedule. If several days go by after you miss a dose, check with your health care provider about what to do. Do not double the next dose or take more than one dose a week without talking to your health care provider. Call your health care provider right away if you take more than your prescribed PegIntron dose. Your health care provider may wish to examine you more closely, and take blood for testing.

If you miss a dose of REBETOL, take the missed dose as soon as possible during the same day. If an entire day has gone by, check with your health care provider about what to do. Do not double the next dose.

You must get regular blood tests to help your health care provider check how the treatment is working and to check for side effects.

Tell your health care provider if you are taking or planning to take other prescription or nonprescription medicines, including vitamin and mineral supplements and herbal medicines.

**What should I avoid while taking PegIntron or PegIntron/REBETOL therapies?**

- If you are pregnant do not start taking PegIntron/REBETOL combination therapy.
- Avoid becoming pregnant while taking PegIntron or PegIntron/REBETOL. PegIntron and PegIntron/REBETOL may harm your unborn child (death or serious birth defects) or cause you to lose your baby (miscarry). **If you or your partner become pregnant during treatment or during the 6 months after treatment with PegIntron/REBETOL combination therapy, immediately report the pregnancy to your health care provider. You or your health care provider should call 1-800-593-2214.** By calling this number, information about you and/or your partner will be added to a pregnancy registry that will be used to help you and your health care provider make decisions about your treatment for hepatitis in the future. You, your partner, and/or your health care provider will be asked to provide follow-up information on the outcome of the pregnancy.
- Do not breastfeed your baby while taking PegIntron.

**What are the possible side effects of PegIntron and PegIntron/REBETOL combination therapy?**

**PegIntron may cause serious side effects including:**

- See "What is the most important information I should know about PegIntron and PegIntron/REBETOL combination therapy?"
- **Other body organ problems.** A few patients have inflammation of the kidney.
- **New or worsening autoimmune disease.** Some patients taking PegIntron or PegIntron/REBETOL develop autoimmune diseases

(a condition where the body's immune cells attack other cells or organs in the body), including rheumatoid arthritis, systemic lupus erythematosus, and psoriasis. In some patients who already have an autoimmune disease, the disease worsens on PegIntron and PegIntron/REBETOL combination therapy.

- **Growth problems in children.** Weight loss and slowed growth are common in children during treatment with PegIntron/REBETOL. Catch-up weight gain and some catch-up in growth happen after treatment stops, but some children may not reach the height that they were expected to have before treatment.
- **Nerve problems.** People who take PegIntron or other alpha interferon products with telbivudine (Tyzeka®) can have nerve problems such as continuing numbness, tingling, or burning sensation in the arms or legs (peripheral neuropathy). Call your health care provider if you have any of these symptoms.

#### Common but less serious side effects include:

- **Flu-like symptoms.** Most patients who take PegIntron or PegIntron/REBETOL therapy have “flu-like” symptoms (headache, muscle aches, tiredness, and fever). Some of these symptoms (fever, headache) usually lessen after the first few weeks of therapy. You can reduce some of these symptoms by injecting your PegIntron dose at bedtime. Over-the-counter pain and fever reducers, such as acetaminophen or ibuprofen, can be used to prevent or reduce the fever and headache.
- **Extreme fatigue (tiredness).** Many patients become extremely tired while on PegIntron or PegIntron/REBETOL combination therapy.
- **Appetite problems.** Nausea, loss of appetite, and weight loss occur commonly.
- **Thyroid problems.** Some patients develop changes in the function of their thyroid. Symptoms of thyroid changes include the inability to concentrate, feeling cold or hot all the time, a change in your weight, and changes to your skin.
- **Blood sugar problems.** Some patients develop problems with the way their body controls their blood sugar, and may develop high blood sugar or diabetes.
- **Skin reactions.** Redness, swelling, and itching are common at the site of injection. If after several days these symptoms do not disappear contact

your health care provider. You may get a rash during therapy. If this occurs, your health care provider may recommend medicine to treat the rash.

- **Hair thinning.** Hair thinning is common during PegIntron and PegIntron/REBETOL treatment. Hair loss stops and hair growth returns after therapy is stopped.

These are not all of the side effects of PegIntron or PegIntron/REBETOL combination therapy. Your health care provider or pharmacist can give you a more complete list.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

#### General advice about prescription medicines:

Medicines are sometimes prescribed for purposes other than those listed in a Medication Guide. If you have any concerns about PegIntron, ask your health care provider. Your health care provider or pharmacist can give you information about PegIntron that was written for health care professionals. Do not use PegIntron for a condition for which it was not prescribed. Do not share this medication with other people.

#### If you are taking PegIntron/REBETOL combination therapy, also read the Medication Guide for REBETOL (ribavirin USP) Capsules and Oral Solution.

*This Medication Guide has been approved by the U.S. Food and Drug Administration.*

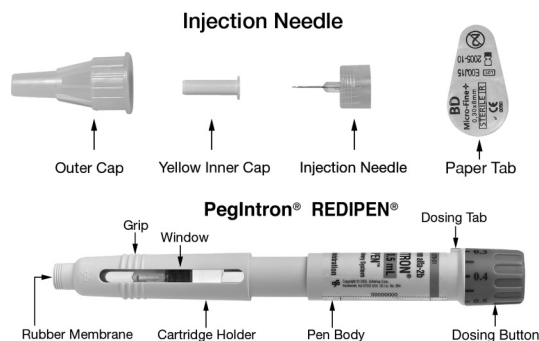
*Revised: August 2009*

#### How do I prepare and inject the PegIntron REDIPEN dose?

The PegIntron REDIPEN system is for a single use, by one person only, **ONCE A WEEK**. The REDIPEN must not be shared. Use only the injection needle provided in the packaging for the PegIntron REDIPEN system. If you have problems with the REDIPEN system or the PegIntron solution, you should contact your health care provider or pharmacist.

The following instructions explain how to prepare and inject yourself with the PegIntron REDIPEN system. This product can also be administered by a parent or caretaker as instructed by your health care provider. Please read the instructions carefully and follow them step by step. Your health care provider will instruct you on how to self-inject with the PegIntron REDIPEN. Do not attempt to inject yourself unless you are sure you understand the procedure and requirements for self-injection.

## How to Use the PegIntron® REDIPEN® Single-dose Delivery System.



### Storing PegIntron

PegIntron REDIPEN should be stored in the refrigerator at 2°-8°C (36°-46°F); avoid exposure to heat. After mixing, the PegIntron solution should be used immediately but may be stored in the refrigerator up to 24 hours at 2°-8°C (36°-46°F). The solution contains no preservatives. **DO NOT FREEZE.**

### Preparation

1. Find a clean, well-lit, non-slip flat working surface and assemble all of the supplies you will need for an injection. All of the supplies you will need are in the PegIntron REDIPEN package. The package contains:
  - a PegIntron REDIPEN single-dose delivery system
  - one disposable needle
  - two alcohol swabs, and
  - dosing tray (the dosing tray is the bottom half of the REDIPEN package).
2. Take the PegIntron REDIPEN out of the refrigerator and allow the medicine to come to room temperature. Before removing the REDIPEN from the carton, check the expiration date printed on the PegIntron REDIPEN carton to make sure that the expiration date has not passed. Do not use if the expiration date has passed.
3. After taking the PegIntron REDIPEN out of the carton, look in the window of the REDIPEN and make sure the PegIntron in the cartridge holder window is a white to off-white tablet that is whole, or in pieces, or powdered.
4. Wash your hands thoroughly with soap and water, rinse, and towel dry.

It is important to keep your work area, your hands, and the injection site clean to minimize the risk of infection.

### 1. Mix the Drug

#### Key points:

**Before you mix the PegIntron, make sure it is at room temperature. It is important that you keep the PegIntron REDIPEN UPRIGHT (dosing button down) as shown in Figure 1.**

- Hold the PegIntron REDIPEN **UPRIGHT** (Figure 1a) in the dosing tray on a hard, flat, non-slip surface with the dosing button **down**. You may want to hold the REDIPEN using the grip.
- To mix the powder and the liquid, keep the REDIPEN upright in the dosing tray and press the top half of the REDIPEN downward toward the hard, flat, non-slip surface **until you hear the click** (Figure 1b). Once you've heard the click, you will notice in the window that both dark stoppers are now touching. The dosing button should be flush with the pen body.



Figure 1a

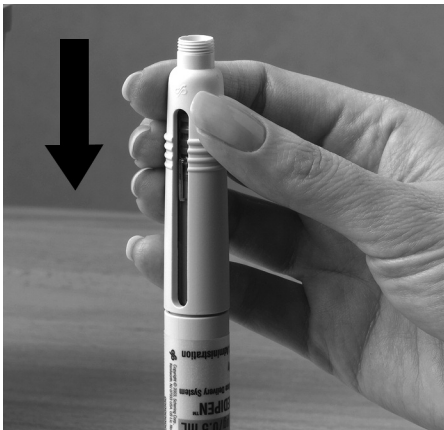


Figure 1b

- Wait several seconds for the powder to completely dissolve.
- Gently turn the PegIntron REDIPEN upside down twice** (Figure 2). **To avoid excessive foaming, DO NOT SHAKE.**

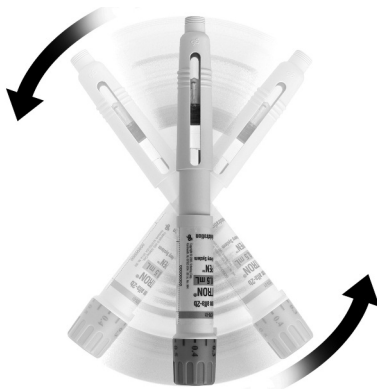


Figure 2

- Keep the PegIntron REDIPEN **UPRIGHT**, with the dosing button down. Then, look through the REDIPEN window to see that the mixed PegIntron solution is completely dissolved. The solution should be clear and colorless **before use**. Before attaching the needle, it is normal to see some small bubbles in the REDIPEN window, near the top of the solution. Do not use the solution if it is discolored, or not clear, or if particulates are present.
- Place the PegIntron REDIPEN back into the dosing tray provided in the packaging** (Figure 3). The dosing button will be on the bottom.



Figure 3

### 2. Attach the Needle

- Wipe the rubber membrane of the PegIntron REDIPEN with one alcohol swab.
- Remove the protective paper tab from the injection needle, but do NOT remove either the outer cap or the yellow inner cap from the injection needle. Keeping the PegIntron REDIPEN UPRIGHT in the dosing tray, **FIRMLY** push the injection needle straight into the REDIPEN rubber membrane, and screw it firmly in place, in a clockwise direction (Figure 4). Remember to leave the needle caps in place when you attach the needle to the REDIPEN. Pushing the needle through the rubber membrane “primes” the needle and allows the extra liquid and air in the pen to be removed.



Figure 4

**NOTE:** Some fluid will trickle out. This is **normal**. The dark stoppers move up and you will no longer see the fluid in the window once the needle is successfully primed.

### 3. Dialing the Dose

- a. Remove the PegIntron REDIPEN from the dosing tray (Figure 5a). Holding the PegIntron REDIPEN firmly, pull the dosing button out as far as it will go. You will see a dark band. **Do not push the dosing button in until you are ready to self-inject the PegIntron dose.**



Figure 5a

- b. Turn the dosing button until your prescribed dose is lined up with the dosing tab (Figure 5b). The dosing button will turn freely. If you have trouble dialing your dose, check to make sure the dosing button has been pulled out **as far** as it will go (Figure 5c).



Figure 5b



Figure 5c

- c. Carefully lay the PegIntron REDIPEN down on a hard, flat, non-slip surface. Do NOT remove either of the needle caps and do NOT push the dosing button in until you are ready to self-inject the PegIntron dose.

### 4. Injecting the PegIntron Dose

#### Choosing an Injection Site

The best sites for giving yourself an injection are those areas with a layer of fat between the skin and muscle, like your thigh, the outer surface of your upper arm, and abdomen. Do not inject yourself in the area near your navel or waistline. If you are very thin, you should only use the thigh or outer surface of the arm for injection.

You should use a different site each time you inject PegIntron to avoid soreness at any one site. Do not inject PegIntron into an area where the skin is irritated, red, bruised, infected, or has scars, stretch marks, or lumps.

- a. Clean the skin where the injection is to be given with the second alcohol swab provided, and wait for the area to dry.
- b. Remove the **outer** cap from the needle (Figure 6a). There may be some liquid around the yellow inner needle cap (Figure 6b). This is normal.



Figure 6a



Figure 6b

- c. Once the injection site is dry, remove the **yellow** inner needle cap (Figure 6c). You are now ready to inject.



Figure 6c

- d. **Hold the PegIntron REDIPEN with your fingers wrapped around the pen body barrel and your thumb on the dosing button (Figure 7).**
  - With your other hand, pinch the skin in the area you have cleaned for injection.
  - Insert the needle into the pinched skin at an angle of 45° to 90°.
  - Press the dosing button down slowly and firmly until you can't push it any further.
  - Keep your thumb pressed down on the dosing button for an additional 5 seconds to ensure that you get the complete dose.
  - Remove the needle from your skin.



Figure 7

- e. Gently press the injection site with a small bandage or sterile gauze if necessary for a few seconds but do not massage the injection site. If there is bleeding, cover with an adhesive bandage. **DO NOT RECAP THE NEEDLE and DO NOT REUSE the REDIPEN.**

**How do I dispose of the REDIPEN?**

Discard the REDIPEN and needle and any solution remaining in the REDIPEN in a Sharp's container or other puncture-resistant container like a metal coffee can. DO NOT use glass or clear plastic containers. Ask your health care provider how to dispose of a full container. Always keep the container out of reach of children.

**After 2 hours, check the injection site for redness, swelling, or tenderness. If you have a skin reaction and it doesn't clear up in a few days, contact your health care provider.**

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