Summary of Product Characteristics

1 NAME OF THE MEDICINAL PRODUCT

Irinotecan Hydrochloride 20 mg/ml Concentrate for Solution for Infusion

2 QUALITATIVE AND QUANTITATIVE COMPOSITION

One ml of concentrate contains 20 mg Irinotecan hydrochloride trihydrate equivalent to 17.33 mg irinotecan.

Each 2 ml or 5 ml or 15ml or 25 ml vial of Irinotecan concentrate for solution for infusion contains 40 mg or 100 mg or 300mg or 500 mg of Irinotecan hydrochloride trihydrate respectively.

Excipient:
Sorbitol E420
Sodium
For a full list of excipients, see section 6.1.

3 PHARMACEUTICAL FORM

Concentrate for solution for infusion.

A pale yellow clear solution.

4 CLINICAL PARTICULARS

4.1 Therapeutic Indications

Irinotecan concentrate for solution for infusion is indicated for the treatment of patients with advanced colorectal cancer:
• - In combination with 5-fluorouracil and folinic acid in patients without prior chemotherapy for advanced disease,

• - As a single agent in patients who have failed an established 5-fluorouracil containing treatment regimen.

Irinotecan in combination with cetuximab is indicated for the treatment of patients with epidermal growth factor receptor (EGFR)-expressing metastatic colorectal cancer after failure of irinotecan-including cytotoxic therapy.
Irinotecan in combination with 5-fluorouracil, folinic acid and bevacizumab is indicated for first-line treatment of patients with metastatic carcinoma of the colon or rectum.

4.2 Posology and method of administration

For adults only. After dilution Irinotecan concentrate for solution for infusion should be infused into a peripheral or central vein.
Recommended dosage:
In monotherapy (for previously treated patient):
The recommended dosage of Irinotecan Hydrochloride Trihydrate is 350 mg/m^2 administered as an intravenous infusion over a 30 to 90 minute period every three weeks (see below "Method of Administration" and section 4.4 and 6.6).

In combination therapy (for previously untreated patient):
Safety and efficacy of Irinotecan in combination with 5-fluorouracil (5FU) and folinic acid (FA) have been assessed with the following schedule (see section 5.1): Irinotecan plus 5FU/FA in every 2 weeks schedule.
The recommended dose of Irinotecan Hydrochloride Trihydrate is 180 mg/m^2 administered once every 2 weeks as an intravenous infusion over a 30 - 90 minute period, followed by infusion with folinic acid and 5-fluorouracil.
For the posology and method of administration of concomitant cetuximab, refer to the product information for this medicinal product.
Normally, the same dose of Irinotecan is used as administered in the last cycles of the prior Irinotecan-containing regimen.
Irinotecan must not be administered earlier than 1 hour after the end of the cetuximab infusion.
For the posology and method of administration of bevacizumab, refer to the bevacizumab summary product of characteristics.

Dosage adjustments:
Irinotecan should be administered after appropriate recovery of all adverse events to grade 0 or 1 NCI-CTC grading (National Cancer Institute Common Toxicity Criteria) and when treatment-related diarrhoea is fully resolved.
At the start of a subsequent infusion of therapy, the dose of Irinotecan concentrate for solution for infusion, and 5FU when applicable, should be decreased according to the worst grade of adverse events observed in the prior infusion. Treatment should be delayed by 1 to 2 weeks to allow recovery from treatment-related adverse events.
With the following adverse events a dose reduction of 15 to 20 % should be applied for Irinotecan Hydrochloride Trihydrate and/or 5FU when applicable:

- haematological toxicity [neutropenia grade 4, febrile neutropenia (neutropenia grade 3-4 and fever grade 2-4), thrombocytopenia and leukopenia (grade 4)],
- non haematological toxicity (grade 3-4).

Recommendations for dose modifications of cetuximab when administered in combination with Irinotecan must be followed according to the product information for this medicinal product.
Refer to the bevacizumab summary product of characteristics for dose modifications of bevacizumab when administered in combination with Irinotecan/5FU/FA.

Treatment Duration:
Treatment with Irinotecan should be continued until there is an objective progression of the disease or an unacceptable toxicity.

Special populations:
Patients with Impaired Hepatic Function:
In monotherapy: Blood bilirubin levels [up to 3 times the upper limit of the normal range (ULN)] in patients with performance status ≤ 2, should determine the starting dose of Irinotecan concentrate for solution for infusion. In these patients with hyperbilirubinemia and prothrombin time greater than 50%, the clearance of Irinotecan is decreased (see section 5.2) and therefore the risk of hematotoxicity is increased. Thus, weekly monitoring of complete blood counts should be conducted in this patient population.

- In patients with bilirubin up to 1.5 times the ULN, the recommended dosage of Irinotecan Hydrochloride Trihydrate is 350 mg/m^2,
- In patients with bilirubin ranging from 1.5 to 3 times the ULN, the recommended dosage of Irinotecan Hydrochloride Trihydrate is 200 mg/m^2,
- Patients with bilirubin beyond 3 times the ULN should not be treated with Irinotecan (see section 4.3 and section 4.4).

No data are available in patients with hepatic impairment treated by Irinotecan in combination.
Patients with Impaired Renal Function:
Irinotecan is not recommended for use in patients with impaired renal function, as studies in this population have not been conducted. (See section 4.4 and section 5.2).

Elderly:
No specific pharmacokinetic studies have been performed in elderly. However, the dose should be chosen carefully in this population due to their greater frequency of decreased biological functions. This population should require more intense surveillance (see section 4.4).

Paediatric population
Irinotecan should not be used in children.

Method of administration
Irinotecan concentrate for solution for infusion is cytotoxic, for information regarding dilution, and special precautions for disposal and other handling see section 6.6.
Irinotecan concentrate for solution for infusion should not be delivered as an intravenous bolus or an intravenous infusion shorter than 30 minutes or longer than 90 minutes.

Treatment Duration
Treatment with irinotecan should be continued until there is an objective progression of the disease or an unacceptable toxicity.

4.3 Contraindications

- Chronic inflammatory bowel disease and/or bowel obstruction (see section 4.4).
- History of severe hypersensitivity reactions to Irinotecan Hydrochloride Trihydrate or to one of the excipients.
- Lactation (see section 4.4 and section 4.6)
- Bilirubin > 3 times the ULN (see section 4.4).
- Severe bone marrow failure.
- WHO performance status > 2.
- Concomitant use with St John's Wort (see section 4.5)

For additional contraindications of cetuximab or bevacizumab or capecitabine, refer to the product information for these medicinal products.

4.4 Special warnings and precautions for use

The use of Irinotecan concentrate for solution for infusion should be confined to units specialised in the administration of cytotoxic chemotherapy and it should only be administered under the supervision of a physician qualified in the use of anticancer chemotherapy.
Given the nature and incidence of adverse events, Irinotecan concentrate for solution for infusion will only be prescribed in the following cases after the expected benefits have been weighted against the possible therapeutic risks:
• - in patients presenting a risk factor, particularly those with a WHO performance status = 2.
• - in the few rare instances where patients are deemed unlikely to observe recommendations regarding management of adverse events (need for immediate and prolonged antidiarrhoeal treatment combined with high fluid intake at onset of delayed diarrhoea). Strict hospital supervision is recommended for such patients.

When Irinotecan concentrate for solution for infusion is used in monotherapy, it is usually prescribed with the every-3-week-dosage schedule. However, the weekly-dosage schedule (see section 5.1) may be considered in patients who may need a closer follow-up or who are at particular risk of severe neutropenia.

Delayed diarrhoea

Patients should be made aware of the risk of delayed diarrhoea occurring more than 24 hours after the administration of Irinotecan and at any time before the next cycle. In monotherapy, the median time of onset of the first liquid stool was on day 5 after the infusion of Irinotecan Hydrochloride Trihydrate. Patients should quickly inform their physician of its occurrence and start appropriate therapy immediately.

Patients with an increased risk of diarrhoea are those who had a previous abdominal/pelvic radiotherapy, those with baseline hyperleucocytosis, those with performance status ≥ 2 and women. If not properly treated, diarrhoea can be life threatening, especially if the patient is concomitantly neutropenic.

As soon as the first liquid stool occurs, the patient should start drinking large volumes of beverages containing electrolytes and an appropriate antidiarrhoeal therapy must be initiated immediately. This antidiarrhoeal treatment will be prescribed by the department where Irinotecan Hydrochloride Trihydrate has been administered. After discharge from the hospital, the patients should obtain the prescribed drugs so that they can treat the diarrhoea as soon as it occurs. In addition, they must inform their physician or the department administering Irinotecan Hydrochloride Trihydrate when/if diarrhoea is occurring.

The currently recommended antidiarrhoeal treatment consists of high doses of loperamide (4 mg for the first intake and then 2 mg every 2 hours). This therapy should continue for 12 hours after the last liquid stool and should not be modified. In no instance should loperamide be administered for more than 48 consecutive hours at these doses, because of the risk of paralytic ileus, nor for less than 12 hours.

In addition to the anti-diarrhoeal treatment, a prophylactic broad-spectrum antibiotic should be given, when diarrhoea is associated with severe neutropenia (neutrophil count < 500 cells/mm^3).

In addition to the antibiotic treatment, hospitalisation is recommended for management of the diarrhoea, in the following cases:

- Diarrhoea associated with fever,
- Severe diarrhoea (requiring intravenous hydration),
- Diarrhoea persisting beyond 48 hours following the initiation of high-dose loperamide therapy.

Loperamide should not be given prophylactically, even in patients who experienced delayed diarrhoea at previous cycles.

In patients who experienced severe diarrhoea, a reduction in dose is recommended for subsequent cycles (see section 4.2).

Haematology

Weekly monitoring of complete blood cell count is recommended during treatment with Irinotecan. Patients should be aware of the risk of neutropenia and the significance of fever. Febrile neutropenia (temperature > 38°C and neutrophil count ≤ 1,000 cells/mm^3) should be urgently treated in the hospital with broad-spectrum intravenous antibiotics.

In patients who experienced severe haematological events, a dose reduction is recommended for subsequent administration (see section 4.2).

There is an increased risk of infections and haematological toxicity in patients with severe diarrhoea. In patients with severe diarrhoea, complete blood cell counts should be performed.

Liver impairment
Liver function tests should be performed at baseline and before each cycle.
Weekly monitoring of complete blood counts should be conducted in patients with bilirubin ranging from 1.5 to 3 times ULN, due to decrease of the clearance of Irinotecan (see section 5.2) and thus increasing the risk of hematotoxicity in this population. Irinotecan should not be administered to patients with a bilirubin > 3 times ULN (see section 4.3).
Nausea and vomiting
A prophylactic treatment with antiemetics is recommended before each treatment with Irinotecan. Nausea and vomiting have been frequently reported. Patients with vomiting associated with delayed diarrhoea should be hospitalised as soon as possible for treatment.
Acute cholinergic syndrome
If acute cholinergic syndrome appears (defined as early diarrhoea and various other signs and symptoms such as sweating abdominal cramping, lacrimation, myosis and salivation), atropine sulphate (0,25 mg subcutaneously) should be administered unless clinically contraindicated (see section 4.8). Caution should be exercised in patients with asthma. In patients who experienced an acute and severe cholinergic syndrome, the use of prophylactic atropine sulphate is recommended with subsequent doses of Irinotecan.
Respiratory disorders
Interstitial pulmonary disease presenting as pulmonary infiltrates is uncommon during Irinotecan therapy. Interstitial pulmonary disease can be fatal. Risk factors possibly associated with the development of interstitial pulmonary disease include the use of pneumotoxic drugs, radiation therapy and colony stimulating factors.
Patients with risk factors should be closely monitored for respiratory symptoms before and during Irinotecan therapy.
Extravasation
While irinotecan is not a known vesicant, care should be taken to avoid extravasation and the infusion site should be monitored for signs of inflammation. Should extravasation occur, flushing the site and application of ice is recommended.

Elderly
Due to the greater frequency of decreased biological functions, in particular hepatic function, in elderly patients, dose selection with Irinotecan concentrate for solution for infusion should be cautious in this population (see section 4.2).
Chronic inflammatory bowel disease and/orPatients with bowel obstruction
Patients must not be treated with Irinotecan concentrate for solution for infusion until resolution of the bowel obstruction (see section 4.3).
Patients with Impaired Renal Function
Studies in this population have not been conducted. (see 4.2 and section 5.2)

Cardiac Disorders
Myocardial ischaemic events have been observed following irinotecan therapy predominately in patients with underlying cardiac disease, other known risk factors for cardiac disease, or previous cytotoxic chemotherapy (see section 4.8)
Consequently, patients with known risk factors should be closely monitored, and action should be taken to try to minimize all modifiable risk factors (e.g. smoking, hypertension, and hyperlipidaemia)
Immunosuppressant Effects/Increased Susceptibility to Infections
Administration of live or live-attenuated vaccines in patients immunocompromised by chemotherapeutic agents including irinotecan, may result in serious or fatal infections. Vaccination with a live vaccine should be avoided in patients receiving irinotecan. Killed or inactivated vaccines may be administered; however, the response to such vaccines may be diminished.
Others
Since Irinotecan concentrate for solution for infusion contains sorbitol, it is unsuitable in hereditary fructose intolerance.
Infrequent cases of renal insufficiency, hypotension or circulatory failure have been observed in patients who experienced episodes of dehydration associated with diarrhoea and/or vomiting, or sepsis.
Contraceptive measures must be taken during and for at least three months after cessation of therapy. (see section 4.6).
Concomitant administration of Irinotecan with a strong inhibitor (e.g. ketoconazole) or inducer (e.g. rifampicin, carbamazepine, phenobarbital, phenytoin, St John's Wort) of CYP3A4 may alter the metabolism of Irinotecan and should be avoided (see section 4.5).

4.5 Interaction with other medicinal products and other forms of interactions

Interaction between Irinotecan and neuromuscular blocking agents cannot be ruled out. Since Irinotecan has anticholinesterase activity, drugs with anticholinesterase activity may prolong the neuromuscular blocking effects of suxamethonium and the neuromuscular blockade of non-depolarising drugs may be antagonised.
Several studies have shown that concomitant administration of CYP3A-inducing anticonvulsant drugs (e.g., carbamazepine, phenobarbital or phenytoin) leads to reduced exposure to Irinotecan, SN-38 and SN-38 glucuronide and reduced pharmacodynamic effects. The effects of such anticonvulsant drugs were reflected by a decrease in AUC of SN-38 and SN-38G

by 50% or more. In addition to induction of cytochrome P450 3A enzymes, enhanced glucuronidation and enhanced biliary excretion may play a role in reducing exposure to Irinotecan and its metabolites.
A study has shown that the co-administration of ketoconazole resulted in a decrease in the AUC of APC of 87% and in an increase in the AUC of SN-38 of 109% in comparison to Irinotecan given alone.
Caution should be exercised in patients concurrently taking drugs known to inhibit (e.g., ketoconazole) or induce (e.g., rifampicin, carbamazepine, phenobarbital or phenytoin) drug metabolism by cytochrome P450 3A4. Concurrent administration of Irinotecan with an inhibitor/inducer of this metabolic pathway may alter the metabolism of Irinotecan and should be avoided (see section 4.4).
In a small pharmacokinetic study (n=5), in which Irinotecan 350 mg/m^2 was co-administered with St. John's Wort (Hypericum perforatum) 900 mg, a 42% decrease in the active metabolite of Irinotecan, SN-38, plasma concentrations was observed. St. John's Wort decreases SN-38 plasma levels. As a result, St. John's Wort should not be administered with Irinotecan (see section 4.3).
Co-administration of 5-fluorouracil/folinic acid in the combination regimen does not change the pharmacokinetics of Irinotecan.
Atazanavir sulphate. Coadministration of atazanavir sulfate, a CYP3A4 and UGT1A1 inhibitor, has the potential to increase systemic exposure to SN-38, the active metabolite of irinotecan. Physicians should take this into consideration when co-administering these drugs.

Interactions common to all cytotoxics :
The use of anticoagulants is common due to increased risk of thrombotic events in tumoral diseases. If vitamin K antagonist anticoagulants are indicated, an increased frequency in the monitoring of INR (International Normalised Ratio) is required due to their narrow therapeutic index , the high intra-individual variability of blood thrombogenicity and the possibility of interaction between oral anticoagulants and anticancer chemotherapy.

Concomitant use contraindicated
- Yellow fever vaccine: risk of fatal generalised reaction to vaccines

Concomitant use not recommended
- Live attenuated vaccines (except yellow fever): risk of systemic, possible fatal disease (eg-infections). This risk is increased in subjects who are already immunosuppressed by their underlying disease.

Use an inactivated vaccine where this exists (poliomyelitis)
- Phenytoin: Risk of exacerbation of convulsions resulting from the decrease of phenytoin digestive absorption by cytotoxic drug or risk of toxicity enhancement due to increased hepatic metabolism by phenytoin.

Concomitant use to take into consideration
- Ciclosporine, Tacrolimus: Excessive immunosuppression with risk of lymphoproliferation.

There is no evidence that the safety profile of Irinotecan is influenced by cetuximab or vice versa.
In one study, irinotecan concentrations were similar in patients receiving bolus Irinotecan/5FU/FA (125 mg/m^2 of irinotecan, 500 mg/m^2 of 5-FU, and 20 mg/m^2 of leucovorin, given in repeated 6-week cycles, comprising weekly treatment for 4 weeks, followed by a 2-week rest) alone and in combination with bevacizumab. Plasma Concentrations of SN-38, the active metabolite of Irinotecan, were analyzed in a subset of patients (approximately 30 per treatment arm). Concentrations of SN-38 were on average 33% higher in patients receiving bolus Irinotecan /5FU/FA in combination with bevacizumab compared with bolus Irinotecan/5FU/FA alone. Due to high inter-patient variability and limited sampling, it is uncertain if the increase in SN-38 levels observed was due to bevacizumab. There was a small increase in grades 3/4 diarrhoea and leukopenia adverse events in the arm receiving bevacizumab. More dose reductions of Irinotecan were reported for patients receiving Irinotecan/5FU/FA in combination with bevacizumab.
Patients who develop severe diarrhoea, leukopenia, or neutropenia with the bevacizumab and Irinotecan combination should have Irinotecan dose modifications as specified in section 4.2 Posology and method of administration.

4.6 Fertility, pregnancy and lactation

Pregnancy:
There is no information on the use of Irinotecan in pregnant women. Irinotecan has been shown to be embryotoxic, fetotoxic and teratogenic in animals. Therefore, based on results from animal studies and the mechanism of action of irinotecan, Irinotecan concentrate for solution for infusion should not be used during pregnancy unless clearly necessary.

Women of child-bearing potential/Contraception:
Women of childbearing potential and men have to use effective contraception during and up to 1 month and 3 months after treatment respectively.

Fertility
There are no human data on the effect of irinotecan on fertility. In animals adverse effects of irinotecan on the fertility of offspring has been documented (see section 5.3).

Lactation
In lactating rats, ^{14}C-Irinotecan was detected in milk. It is not known whether Irinotecan is excreted in human milk. Consequently, because of the potential for adverse reactions in nursing infants, breast-feeding must be discontinued for the duration of Irinotecan therapy (see section 4.3).

4.7 Effects on ability to drive and use machines

Patients should be warned about the potential for dizziness or visual disturbances which may occur within 24 hours following the administration of Irinotecan, and advised not to drive or operate machinery if these symptoms occur.

4.8 Undesirable effects

Undesirable effects detailed in this section refer to Irinotecan. There is no evidence that the safety profile of Irinotecan is influenced by cetuximab or vice versa. In combination with cetuximab, additional reported undesirable effects were those expected with cetuximab (such as acneform rash 88%). For information on adverse reactions on irinotecan in combination with cetuximab, also refer to their respective summaries of product characteristics. For information on adverse reactions in combination with bevacizumab, refer to the bevacizumab summary of product characteristics.
Adverse drug reactions reported in patients treated with capecitabine in combination with irinotecan in addition to those seen with capecitabine monotherapy or seen at a higher frequency grouping compared to capecitabine monotherapy include:

Very common, all grade adverse drug reactions: thrombosis/embolism; Common, all grade adverse drug reactions: hypersensitivity reaction, cardiac ischemia/infarction; *Common, grade 3 and grade 4 adverse drug reactions*: febrile neutropenia.

For complete information on adverse reactions of capecitabine, refer to the capecitabine summary product of characteristics. Grade 3 and Grade 4 adverse drug reactions reported in patients treated with capecitabine in combination with irinotecan and bevacizumab in addition to those seen with capecitabine monotherapy or seen at a higher frequency grouping compared to capecitabine monotherapy include:

Common, grade 3 and grade 4 adverse drug reactions: neutropenia, thrombosis/embolism, hypertension, and cardiac ischemia/infarction. For complete information on adverse reactions of capecitabine and bevacizumab, refer to the respective capecitabine and bevacizumab summary of productcharacteristics.
The following adverse reactions considered to be possibly or probably related to the administration of Irinotecan Hydrochloride Trihydrate have been reported from 765 patients at the recommended dose of 350 mg/m^2 in monotherapy, and from 145 patients treated by Irinotecan Hydrochloride Trihydrate in combination therapy with 5FU/FA in every 2 weeks schedule at the recommended dose of 180 mg/m^2.

Gastrointestinal disorders
Delayed diarrhoea
Diarrhoea (occurring more than 24 hours after administration) is a dose-limiting toxicity of Irinotecan concentrate for solution for infusion.
<u>In monotherapy:</u>
Severe diarrhoea was observed in 20% of patients who follow recommendations for the management of diarrhoea. Of the evaluable cycles, 14% have a severe diarrhoea. The median time of onset of the first liquid stool was on day 5 after the infusion of Irinotecan Hydrochloride Trihydrate.
<u>In combination therapy:</u>
Severe diarrhoea was observed in 13.1% of patients who follow recommendations for the management of diarrhoea. Of the evaluable cycles, 3.9% have a severe diarrhoea.

Uncommon cases of pseudo-membranous colitis have been reported, one of which has been documented bacteriologically (Clostridium difficile).

Nausea and vomiting

In monotherapy :

Nausea and vomiting were severe in approximately 10% of patients treated with antiemetics.

In combination therapy:

A lower incidence of severe nausea and vomiting was observed (2.1% and 2.8% of patients respectively).

Dehydration

Episodes of dehydration commonly associated with diarrhoea and/or vomiting have been reported.

Infrequent cases of renal insufficiency, hypotension or cardio-circulatory failure have been observed in patients who experienced episodes of dehydration associated with diarrhoea and/or vomiting.

Other gastrointestinal disorders

Constipation relative to Irinotecan and/or loperamide has been observed, shared between:

- in monotherapy : in less than 10 % of patients
- in combination therapy : 3.4 % of patients.

Infrequent cases of intestinal obstruction, ileus, or gastrointestinal haemorrhage and rare cases of colitis, including typhlitis, ischemic and ulcerative colitis were reported. Rare cases of intestinal perforation were reported. Other mild effects include anorexia, abdominal pain and mucositis.

Rare cases of symptomatic or asymptomatic pancreatitis have been associated with irinotecan therapy.

Blood and lymphatic system disorders

Neutropenia is a dose-limiting toxic effect. Neutropenia was reversible and not cumulative; the median day to nadir was 8 days whatever the use in monotherapy or in combination therapy.

In monotherapy :
Neutropenia was observed in 78.7 % of patients and was severe (neutrophil count < 500 cells/mm^3) in 22.6 % of patients. Of the evaluable cycles, 18 % had a neutrophil count below 1,000 cells/mm^3 including 7.6 % with a neutrophil count < 500 cells/mm^3. Total recovery was usually reached by day 22.
Fever with severe neutropenia was reported in 6.2 % of patients and in 1.7 % of cycles. Infectious episodes occurred in about 10.3 % of patients (2.5 % of cycles) and were associated with severe neutropenia in about 5.3 % of patients (1.1 % of cycles), and resulted in death in 2 cases.
Anaemia was reported in about 58.7% of patients (8% with haemoglobin <80 g/l and 0.9% with haemoglobin <65 g/l).
Thrombocytopenia (< 100,000 cells/mm^3) was observed in 7.4 % of patients and 1.8 % of cycles with 0.9 % with platelets count ≤ 50,000 cells/mm^3 and 0.2 % of cycles.
Nearly all the patients showed a recovery by day 22.
In combination therapy:
Neutropenia was observed in 82.5 % of patients and was severe (neutrophil count < 500 cells/mm^3) in 9.8 % of patients. Of the evaluable cycles, 67.3 % had a neutrophil count below 1,000 cells/mm^3 including 2.7 % with a neutrophil count < 500 cells/mm^3. Total recovery was usually reached within 7-8 days.
Fever with severe neutropenia was reported in 3.4 % of patients and in 0.9 % of cycles.
Infectious episodes occurred in about 2 % of patients (0.5 % of cycles) and were associated with severe neutropenia in about 2.1 % of patients (0.5 % of cycles), and resulted in death in 1 case.
Anaemia was reported in 97.2 % of patients (2.1 % with haemoglobin < 80 g/L).
Thrombocytopenia (< 100,000 cells/mm^3) was observed in 32.6 % of patients and 21.8 % of cycles. No severe thrombocytopenia (< 50,000 cells/mm^3) has been observed. One case of peripheral thrombocytopenia with antiplatelet antibodies has been reported.

Infections and Infestations
Infrequent cases of renal insufficiency, hypotension or cardio-circulatory failure have been observed in patients who experienced sepsis.

General disorders and administration site conditions
Acute cholinergic syndrome
Severe transient acute cholinergic syndrome was observed in 9 % of patients treated in monotherapy and in 1.4 % of patients treated in combination therapy. The main symptoms were defined as early diarrhoea and various other symptoms such as abdominal pain, conjunctivitis, rhinitis, hypotension, vasodilatation, sweating, chills, malaise, dizziness, visual disturbances, myosis, lachrimation and increased salivation occurring during or within the first 24 hours after the infusion of Irinotecan Hydrochloride Trihydrate. These symptoms disappear after atropine administration (see section 4.4).
Asthenia was severe in less than 10 % of patients treated in monotherapy and in 6.2 % of patients treated in combination therapy. The causal relationship to Irinotecan has not been clearly established.
Fever in the absence of infection and without concomitant severe neutropenia, occurred in 12 % of patients treated in monotherapy and in 6.2 % of patients treated in combination therapy.
Mild infusion site reactions have been reported although uncommonly.
Cardiac disorder
Rare cases of hypertension during or following the infusion have been reported.
Respiratory, thoracic and mediastinal disorders
Interstitial pulmonary disease presenting as pulmonary infiltrates is uncommon during irinotecan therapy. Early effects such as dyspnoea have been reported (see section 4.4).
Skin and subcutaneous tissue disorders
Alopecia was very common and reversible. Mild cutaneous reactions have been reported although uncommonly.

Immune system disorders
Uncommon mild allergy reactions and rare anaphylactic/anaphylactoid reactions have been reported.
Musculoskeletal and connective tissue disorders
Early effects such as muscular contraction or cramps and paresthesia have been reported.
Laboratory tests
In monotherapy, transient and mild to moderate increases in serum levels of either transaminases, alkaline phosphatase or bilirubin were observed in 9.2%, 8.1% and 1.8% of the patients, respectively, in the absence of progressive liver metastasis.
Transient and mild to moderate increases of serum levels of creatinine have been observed in 7.3% of the patients.

In combination therapy transient serum levels (grades 1 and 2) of either ALT (alanine aminotransferase), AST (aspartate aminotransferase), alkaline phosphatase or bilirubin were observed in 15%, 11%, 11% and 10% of the patients, respectively, in the absence of progressive liver metastasis. Transient grade 3 was observed in 0%, 0%, 0% and 1% of the patients, respectively. No grade 4 was observed.
Increases of amylase and/or lipase have been rarely reported.
Rare cases of hypokalemia and hyponatremia mostly related with diarrhea and vomiting have been reported.
Nervous system disorders
There have been very rare postmarketing reports of transient speech disorders associated with infusion of Irinotecan.

4.9 Overdose

There have been reports of overdosage at doses up to approximately twice the recommended therapeutic dose, which may be fatal. The most significant adverse reactions reported were severe neutropenia and severe diarrhoea. There is no known antidote for Irinotecan. Maximum supportive care should be instituted to prevent dehydration due to diarrhoea and to treat any infectious complications.

5 PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Other antineoplastic agents, ATC Code: L01XX19
Experimental data
Irinotecan is a semi-synthetic derivative of camptothecin. It is an antineoplastic agent, which acts as a specific inhibitor of DNA topoisomerase I. It is metabolised by carboxylesterase in most tissues to SN-38, which was found to be more active than Irinotecan in purified topoisomerase I and more cytotoxic than Irinotecan against several murine and human tumour cell lines. The inhibition of DNA topoisomerase I by Irinotecan or SN-38 induces single-strand DNA lesions which blocks the DNA replication fork and are responsible for the cytotoxicity. This cytotoxic activity was found time-dependent and was specific to the S phase.
In vitro, Irinotecan and SN-38 were not found to be significantly recognised by the P -glycoprotein MDR, and displays cytotoxic activities against doxorubicin and vinblastine resistant cell lines.
Furthermore, Irinotecan has a broad antitumour activity in vivo against murine tumour models (P03 pancreatic ductal adenocarcinoma, MA16/C mammary adenocarcinoma, C38 and C51 colon adenocarcinomas) and against human xenografts (Co-4 colon adenocarcinoma, Mx-1 mammary adenocarcinoma, ST-15 and SC-16 gastric adenocarcinomas). Irinotecan is also active against tumours expressing the P-glycoprotein MDR (vincristine- and doxorubicin-resistant P388 leukaemia's).
Beside the antitumour activity of Irinotecan, the most relevant pharmacological effect is the inhibition of acetylcholinesterase.

Clinical data
In combination therapy with Folinic Acid and 5-Fluorouracil
A phase III study was performed in 385 previously untreated metastatic colorectal cancer patients treated with either every 2 weeks schedule (see section 4.2) or weekly schedule regimens. In the every 2 weeks schedule, on day 1, the administration of Irinotecan Hydrochloride Trihydrate at 180 mg/m² once every 2 weeks is followed by infusion with folinic acid (200 mg/m² over a 2-hour intravenous infusion) and 5-fluorouracil (400 mg/m² as an intravenous bolus, followed by 600 mg/m² over a 22-hour intravenous infusion). On day 2, folinic acid and 5-fluorouracil are administered at the same doses and schedules. In the weekly schedule, the administration of Irinotecan at 80 mg/m² is followed by infusion with folinic acid (500 mg/m² over a 2-hour intravenous infusion) and then by 5-fluorouracil (2300 mg/m² over a 24-hour intravenous infusion) over 6 weeks.
In the combination therapy trial with the 2 regimens described above, the efficacy of Irinotecan was evaluated in 198 treated patients:

	Combined regimens (n=198)		Weekly schedule (n=50)		Every 2 weeks schedule (n=148)	
	Irinotecan Hydrochloride Trihyd	5FU/FA	Irinotecan Hydrochloride Trihyd	5FU/FA	Irinotecan Hydrochloride Trihyd	5FU/FA

	rate +5FU/ FA		rate +5FU/ FA		rate +5FU/ FA	
Response rate (%)	40.8 *	23.1 *	51.2 *	28.6 *	37.5 *	21.6 *
p value	p<0.001		p=0.045		p=0.005	
Median time to progression (months)	6.7	4.4	7.2	6.5	6.5	3.7
p value	p<0.001		NS		p=0.001	
Median duration of response (months)	9.3	8.8	8.9	6.7	9.3	9.5
p value	NS		p=0.043		NS	
Median duration of response and stabilisation (months)	8.6	6.2	8.3	6.7	8.5	5.6
p value	p<0.001		NS		p=0.003	
Median time to treatment failure (months)	5.3	3.8	5.4	5.0	5.1	3.0
p value	p=0.0014		NS		p<0.001	
Median survival (months)	16.8	14.0	19.2	14.1	15.6	13.0
p value	p=0.028		NS		p=0.041	

5FU : 5-fluorouracil
FA : folinic acid
NS : Non Significant
*: As per protocol population analysis

In the weekly schedule, the incidence of severe diarrhoea was 44.4% in patients treated by Irinotecan in combination with 5FU/FA and 25.6% in patients treated by 5FU/FA alone. The incidence of severe neutropenia (neutrophil count < 500 cells/mm^3) was 5.8% in patients treated by Irinotecan in combination with 5FU/FA and in 2.4% in patients treated by 5FU/FA alone.
Additionally, median time to definitive performance status deterioration was significantly longer in Irinotecan combination group than in 5FU/FA alone group (p=0.046).
Quality of life was assessed in this phase III study using the EORTC QLQ-C30 questionnaire. Time to definitive deterioration constantly occurred later in the Irinotecan groups. The evolution of the Global Health Status/Quality of life was slightly better in Irinotecan combination group although not significant; showing that efficacy of Irinotecan in combination could be reached without affecting the quality of life.
In combination with bevazicumab:
A phase III randomised, double-blind, active-controlled clinical trial evaluated bevacizumab in combination with Irinotecan/5FU/FA as first-line treatment for metastatic carcinoma of the colon or rectum (Study AVF2107g). The addition of bevacizumab to the combination of Irinotecan/5FU/FA resulted in a statistically significant increase in overall survival. The clinical benefit, as measured by overall survival, was seen in all pre-specified patient subgroups, including those defined by age,

sex, performance status, location of primary tumour, number of organs involved, and duration of metastatic disease. Refer also to the bevacizumab summary of product characteristics. The efficacy results of Study AVF2107g are summarized in the table below.

	AVF2107g	
	Arm 1 Irinotecan/**5 FU/ FA Placebo**	**Arm 2** Irinotecan/**5 FU /FA Avastin** [a]
Number of Patients	411	402
Overall survival		
Median time (months)	15.6	20.3
95% Confidence Interval	14.29 – 16.99	18.46 – 24.18
Hazard ratio[b]		0.660
p-value		0.000004
Progression-free survival		
Median time (months)	6.2	10.6
Hazard ratio		0.54
p-value		<0.00001
Overall response rate		
Rate (%)	34.8	44.8
95% CI	30.2 – 39.6	39.9 – 49.8
p-value		0.0036
Duration of response		
Median time (months)	7.1	10.4

25–75 percentile (months)	4.7 – 11.8	6.7 – 15.0

[a]5 mg/kg every 2 weeks. [b]Relative to control arm.

In combination therapy with cetuximab

EMR 62 202-013: This randomised study in patients with metastatic colorectal cancer who had not received prior treatment for metastatic disease compared the combination of cetuximab and irinotecan plus infusional 5-fluorouracil/folinic acid (5-FU/FA) (599 patients) to the same chemotherapy alone (599 patients). The proportion of patients with KRAS wild-type tumours from the patient population evaluable for KRAS status comprised 64%.

The efficacy data generated in this study are summarised in the table below:

	Overall population		**KRAS wild-type population**	
Variable/statistic	**Cetuximab plus FOLFIRI (N=599)**	**FOLFIRI (N=599)**	**Cetuximab plus FOLFIRI (N=172)**	**FOLFIRI (N=176)**
ORR				
% (95%CI)	46.9 (42.9, 51.0)	38.7 (34.8, 42.8)	59.3 (51.6, 66.7)	43.2 (35.8, 50.9)
p-value	0.0038		0.0025	
PFS				
Hazard Ratio (95% CI)	0.85 (0.726, 0.998)		0.68 (0.501, 0.934)	
p-value	0.0479		0.0167	

CI = confidence interval, FOLFIRI = irinotecan plus infusional 5-FU/FA, ORR = objective response rate (patients with complete response or partial response), PFS = progression-free survival time

In combination therapy with capecitabine

Data from a randomised, controlled phase III study (CAIRO) support the use of capecitabine at a starting dose of 1000 mg/m2 for 2 weeks every 3 weeks in combination with irinotecan for the first-line treatment of patients with metastatic colorectal cancer. 820 Patients were randomized to receive either sequential treatment (n=410) or combination treatment (n=410). Sequential treatment consisted of first-line treatment with capecitabine (1250 mg/m2 twice daily for 14 days),second-line irinotecan (350 mg/m2 on day 1), and third-line combination of capecitabine (1000 mg/m2 twice daily for 14 days) with oxaliplatin (130 mg/m2 on day 1). Combination treatment consisted of first-line treatment of capecitabine (1000 mg/m2 twice daily for 14 days) combined with irinotecan (250 mg /m2 on day 1) (XELIRI) and second-line capecitabine (1000 mg/m2 twice daily for 14 days) plus oxaliplatin (130 mg/m2 on day 1). All treatment cycles were administered at intervals of 3 weeks. In first-line treatment the median progression-free survival in the intent-to-treat population was 5.8 months (95%CI, 5.1 -6.2 months) for capecitabine monotherapy and 7.8 months (95%CI, 7.0-8.3 months) for XELIRI (p=0.0002).

Data from an interim analysis of a multicentre, randomised, controlled phase II study (AIO KRK 0604) support the use of capecitabine at a starting dose of 800 mg/m2 for 2 weeks every 3 weeks in combination with irinotecan and bevacizumab for the first-line treatment of patients with metastatic colorectal cancer. 115 patients were randomised to treatment with capecitabine combined with irinotecan (XELIRI) and bevacizumab: capecitabine (800 mg/m2 twice daily for two weeks followed by a 7-day rest period), irinotecan (200 mg/m2 as a 30 minute infusion on day 1 every 3 weeks), and bevacizumab (7.5 mg/kg as a 30 to 90 minute infusion on day 1 every 3 weeks); a total of 118 patients were randomised to treatment with capecitabine combined with oxaliplatin plus bevacizumab: capecitabine (1000 mg/m2 twice daily for two weeks followed by a 7-day rest period), oxaliplatin (130 mg/m2 as a 2 hour infusion on day 1 every 3 weeks), and bevacizumab (7.5 mg/kg as a 30 to 90 minute infusion on day 1 every 3 weeks). Progression-free survival at 6 months in the intent-to-treat population was 80% (XELIRI plus bevacizumab) versus 74 % (XELOX plus bevacizumab). Overall response rate (complete response plus partial response) was 45 % (XELOX plus bevacizumab) versus 47 % (XELIRI plus bevacizumab).

In monotherapy for the second-line treatment of metastatic colorectal carcinoma:

Clinical phase II/III studies were performed in more than 980 patients in the every 3 week dosage schedule with metastatic colorectal cancer who failed a previous 5-FU regimen. The efficacy of Irinotecan was evaluated in 765 patients with documented progression on 5-FU at study entry.

	Phases III					
	Irinotecan versus supportive care			Irinotecan versus 5FU		
	Irinotecan Hydrochloride Trihydrate n=183	Supportive care n=90	p values	Irinotecan Hydrochloride Trihydrate n=127	5FU n=129	p values
Progression Free Survival at 6 months (%)	NA	NA		33.5 *	26.7	p=0.03
Survival at 12 months (%)	36.2 *	13.8	p=0.0001	44.8 *	32.4	p=0.0351
Median survival (Months)	9.2*	6.5	p=0.0001	10.8*	8.5	p=0.0351

NA: Non Applicable

*: Statistically significant difference

In phase II studies, performed on 455 patients in the every 3-week dosage schedule, the progression free survival at 6 months was 30 % and the median survival was 9 months. The median time to progression was 18 weeks.

Additionally, non-comparative phase II studies were performed in 304 patients treated with a weekly schedule regimen, at a dose of 125 mg/m^2 administered as an intravenous infusion over 90 minutes for 4 consecutive weeks followed by 2 weeks rest. In these studies, the median time to progression was 17 weeks and median survival was 10 months. A similar safety profile has been observed in the weekly-dosage schedule in 193 patients at the starting dose of 125 mg/m^2, compared to the every 3-week-dosage schedule. The median time of onset of the first liquid stool was on day 11.

In combination with cetuximab after failure of irinotecan-including cytotoxic therapy:

The efficacy of the combination of cetuximab with Irinotecan was investigated in two clinical studies. A total of 356 patients with EGFR-expressing metastatic colorectal cancer who had recently failed Irinotecan-including cytotoxic therapy and who had a minimum Karnofsky performance status of 60, but the majority of whom had a Karnofsky performance status of ≥80 received the combination treatment.

EMR 62 202-007: This randomised study compared the combination of cetuximab and Irinotecan (218 patients) with cetuximab monotherapy (111 patients).

IMCL CP02-9923: This single arm open-label study investigated the combination therapy in 138 patients.

The efficacy data from these studies are summarized below:

Study	N	ORR		DCR		PFS (months)		OS (months)	
		n (%)	95%CI	n (%)	95%CI	Median	95%CI	Median	95%CI
Cetuximab + Irinotecan									
EMR 62 202-007	218	50 (22.9)	17.5, 29.1	121 (55.5)	48.6, 62.2	4.1	2.8, 4.3	8.6	7.6, 9.6
IMCL CP02-9923	138	21 (15.2)	9.7, 22.3	84 (60.9)	52.2, 69.1	2.9	2.6, 4.1	8.4	7.2, 10.3
Cetuximab									

EMR 62 202-007	111	12 (10.8)	5.7, 18.1	36 (32.4)	23.9, 42.0	1.5	1.4, 2.0	6.9	5.6, 9.1

CI = confidence interval, DCR = disease control rate (patients with complete response, partial response, or stable disease for at least 6 weeks), ORR = objective response rate (patients with complete response or partial response), OS = overall survival time, PFS = progression-free survival

The efficacy of the combination of cetuximab with Irinotecan was superior to that of cetuximab monotherapy, in terms of objective response rate (ORR), disease control rate (DCR) and progression-free survival (PFS). In the randomised trial, no effects on overall survival were demonstrated (hazard ratio 0.91, p = 0.48).

Pharmacokinetic/Pharmacodynamic data

The intensity of the major toxicities encountered with Irinotecan (e.g., leukoneutropenia and diarrhoea) is related to the exposure (AUC) to parent drug and metabolite SN-38. Significant correlations were observed between haematological toxicity (decrease in white blood cells and neutrophils at nadir) or diarrhoea intensity and both Irinotecan and metabolite SN-38 AUC values in monotherapy.

Patients with Reduced UGT1A1 Activity

Uridine diphosphate-glucuronosyl transferase 1A1 (UGT1A1) is involved in the metabolic deactivation of SN-38, the active metabolite of irinotecan to inactive SN-38 glucuronide (SN-38G). The UGT1A1 gene is highly polymorphic, resulting in variable metabolic capacities among individuals. One specific variation of the UGT1A1 gene includes a polymorphism in the promoter region known as the UGT1A1*28 variant. This variant and other congenital deficiencies in UGT1A1 expression (such as Crigler-Najjar and Gilbert's syndrome) are associated with reduced activity of this enzyme. Data from a meta analysis indicate that individuals with Crigler-Najjar syndrome (types 1 and 2) or those who are homozygous for the UGT1A1*28 allele (Gilbert's syndrome) are at increased risk of haematological toxicity (grades 3 and 4) following administration of irinotecan at moderate or high doses (>150 mg/m2). A relationship between UGT1A1 genotype and the occurrence of irinotecan induced diarrhea was not established.

Patients known to be homozygous for UGT1A1*28 should be administered the normally indicated irinotecan starting dose. However, these patients should be monitored for haematologic toxicities. A reduced irinotecan starting dose should be considered for patients who have experienced prior haematologic toxicity with previous treatment. The exact reduction in starting dose in this patient population has not been established and any subsequent dose modifications should be based on a patient's tolerance of the treatment (see sections 4.2 and 4.4).

There is at present insufficient data to conclude on clinical utility of UGT1A1 genotyping.

5.2 Pharmacokinetic properties

In a phase I study in 60 patients with a dosage regimen of a 30-minute intravenous infusion of 100 to 750 mg/m^2 every three weeks, Irinotecan showed a biphasic or triphasic elimination profile. The mean plasma clearance was 15 L/h/m^2 and the volume of distribution at steady state (Vss): 157 L/m^2. The mean plasma half-life of the first phase of the triphasic model was 12 minutes, of the second phase 2.5 hours, and the terminal phase half-life was 14.2 hours. SN-38 showed a biphasic elimination profile with a mean terminal elimination half-life of 13.8 hours. At the end of the infusion, at the recommended dose of 350 mg/m^2, the mean peak plasma concentrations of Irinotecan and SN-38 were 7.7 µg/ml and 56 ng/ml, respectively, and the mean area under the curve (AUC) values were 34 µg.h/ml and 451 ng.h/ml, respectively. A large interindividual variability in pharmacokinetic parameters is generally observed for SN-38.

A population pharmacokinetic analysis of Irinotecan has been performed in 148 patients with metastatic colorectal cancer, treated with various schedules and at different doses in phase II trials.

Pharmacokinetic parameters estimated with a three compartment model were similar to those observed in phase I studies. All studies have shown that Irinotecan (CPT-11) and SN-38 exposure increase proportionally with CPT-11 administered dose; their pharmacokinetics are independent of the number of previous cycles and of the administration schedule.

In vitro, plasma protein binding for Irinotecan and SN-38 was approximately 65 % and 95 % respectively.

Mass balance and metabolism studies with 14 C-labelled drug have shown that more than 50% of an intravenously administered dose of Irinotecan is excreted as unchanged drug, with 33% in the faeces mainly via the bile and 22% in urine.

Two metabolic pathways account each for at least 12% of the dose:

- Hydrolysis by carboxylesterase into active metabolite SN-38, SN-38 is mainly eliminated by glucuronidation, and further by biliary and renal excretion (less than 0.5% of the Irinotecan dose) The SN-38 glucuronite is subsequently probably hydrolysed in the intestine.
- Cytochrome P450 3A enzymes-dependent oxidations resulting in opening of the outer piperidine ring with formation of APC (aminopentanoic acid derivate) and NPC (primary amine derivate) (see section 4.5).

Unchanged Irinotecan is the major entity in plasma, followed by APC, SN-38 glucuronide and SN-38. Only SN-38 has significant cytotoxic activity.
Irinotecan clearance is decreased by about 40% in patients with bilirubinemia between 1.5 and 3 times the ULN. In these patients a 200 mg/m^2 Irinotecan dose leads to plasma drug exposure comparable to that observed at 350 mg/m^2 in cancer patients with normal liver parameters.

5.3 Preclinical safety data

Irinotecan and SN-38 have been shown to be mutagenic in vitro in the chromosomal aberration test on CHO-cells as well as in the in vivo micronucleus test in mice.
However, they have been shown to be devoid of any mutagenic potential in the Ames test.
In rats treated once a week during 13 weeks at the maximum dose of 150 mg/m^2 (which is less than half the human recommended dose), no treatment related tumours were reported 91 weeks after the end of treatment.
Single- and repeated-dose toxicity studies with Irinotecan have been carried out in mice, rats and dogs. The main toxic effects were seen in the haematopoietic and lymphatic systems. In dogs, delayed diarrhoea associated with atrophy and focal necrosis of the intestinal mucosa was reported. Alopecia was also observed in The severity of these effects was dose-related and reversible.
Reproduction
Irinotecan was teratogenic in rats and rabbits at doses below the human therapeutic dose. In rats, pups born to treated animals with external abnormalities showed a decrease in fertility. This was not seen in morphologically normal pups. In pregnant rats there was a decrease in placental weight and in the offspring a decrease in fetal viability and increase in behavioural abnormalities.

6 PHARMACEUTICAL PARTICULARS

6.1 List of excipients

Sorbitol E420
Lactic acid
Sodium hydroxide (for pH-adjustment)
Hydrochloric acid (for pH-adjustment)
Water for injections

6.2 Incompatibilities

This medicinal product must not be mixed with other medicinal products, except those mentioned in section 6.6 (see also section 4.2).

6.3 Shelf life

Vial before opening
2 years.

After opening
The content of the vial should be used immediately after the first breakage of vial.

After dilution
Chemical and physical in-use stability of the drug product after dilution in the recommended solutions for infusion (see section 6.6) has been demonstrated for 24 hours at 15-25°C and for 48 hours at 2-8°C. From a microbiological point of view, unless the methods of opening and dilution preclude the risk of microbial contamination, the product should be used immediately after dilution.
If not used immediately, in-use storage times and conditions are the responsibility of the user.

6.4 Special precautions for storage

Store below 25°C. Store in the original package in order to protect from light.
Do not freeze.
For storage conditions of the diluted medicinal product, see section 6.3.

6.5 Nature and contents of container

For 2 ml,
Concentrate for solution for infusion is filled in 2 ml Type - I amber glass vial closed with chlorobutyl rubber stopper and aluminum flip off seal.

For 5 ml,
Concentrate for solution for infusion is filled in 5 ml Type - I amber glass vial closed with chlorobutyl rubber stopper and aluminum flip off seal.

For 15ml,
Concentrate for solution for infusion is filled in 20ml Type- I amber glass vial closed with grey butyl rubber stopper and aluminium flip off seal.

For 25 ml,
Concentrate for solution for infusion is filled in 30 ml Type - I amber glass vial closed with grey butyl rubber stopper and aluminum flip off seal.

Pack sizes:
1 x 2 ml vial
1 x 5 ml vial

1 x 15ml vial
1 x 25 ml vial
Not all pack size may be marketed

6.6 Special precautions for disposal and other handling

Handling
As with all antineoplastic agents, caution should be exercised when handling Irinotecan concentrate for solution for infusion. Dilution should be carried out under aseptic conditions by trained personnel in a designated area. Precautions should be taken to avoid contact with the skin and mucous membranes.

Instructions for dilution
Irinotecan concentrate for solution for infusion is intended for intravenous infusion only after diluting prior to administration in the recommended diluents, either 0.9 % Sodium chloride solution for infusion or 5% glucose solution for infusion. Aseptically withdraw the required amount of Irinotecan concentrate for solution for infusion from the vial with a calibrated syringe and inject into a 250 ml infusion bag or bottle. The infusion should be thoroughly mixed by manual rotation.

If any precipitate is observed in the vials or after reconstitution, the product should be discarded according to standard procedures for cytotoxic agents.

Protection instructions for preparation of Irinotecan concentrate for solution for infusion
1. Protective chamber should be used and protective gloves as well as protective gown should be worn. If there is no protective chamber available mouth cover and goggles should be used.

2. Opened containers, like injection vials and infusion bottles and used cannulae, syringes, catheters, tubes, and residuals of cytostatic should be considered as hazardous waste and undergo disposal according to local guidelines for the handling of HAZARDOUS WASTE.

3. Follow the instructions below in case of spillage:
- protective clothing should be worn
- broken glass should be collected and placed in the container for HAZARDOUS WASTE
- contaminated surfaces should be flushed properly with copious amounts of cold water
- the flushed surfaces should then be wiped thoroughly and the materials used for wiping should be disposed as HAZARDOUS WASTE

4. In the event of Irinotecan concentrate for solution for infusion contact with the skin, the area should be rinsed with plenty of running water and then washed with soap and water. In case of contact with mucous membranes, wash the contacted area thoroughly with water. If you have any discomfort, contact a doctor.

5. In case of contact of Irinotecan concentrate for solution for infusion with eyes, wash them thoroughly with plenty of water. Contact an ophthalmologist immediately.

Disposal
All items used for preparation, administration or otherwise coming into contact with irinotecan should undergo disposal according to local guidelines for the handling of cytotoxic compounds.

7 MARKETING AUTHORISATION HOLDER

Fresenius Kabi Deutschland GmbH
Else-Kroener Strasse 1
Bad Homburg v.d.H 61352
Germany

8 MARKETING AUTHORISATION NUMBER

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