

**23 January 2025**

**SUMMARY OF PRODUCT CHARACTERISTICS**

**for**

**BuTrans, transdermal patches**

**0. D.SP.NO.**

27447

**1. NAME OF THE MEDICINAL PRODUCT**

BuTrans

**2. QUALITATIVE AND QUANTITATIVE COMPOSITION**

BuTrans 5 microgram/hour

Each transdermal patch contains 5 mg of buprenorphine in a 6.25 cm2 area releasing a nominal 5 micrograms of buprenorphine per hour over a period of 7 days.

BuTrans 10 microgram/hour

Each transdermal patch contains 10 mg of buprenorphine in a 12.5 cm2 area releasing a nominal 10 micrograms of buprenorphine per hour over a period of 7 days.

BuTrans 20 microgram/hour

Each transdermal patch contains 20 mg of buprenorphine in a 25 cm2 area releasing a nominal 20 micrograms of buprenorphine per hour over a period of 7 days.

For the full list of excipients, see section 6.1.

**3. PHARMACEUTICAL FORM**

Transdermal patches

Beige, coloured patch with rounded corners.

Square patch marked BuTrans 5 μg/h

Rectangular patch marked BuTrans 10 μg/h

Square patch marked BuTrans 20 μg/h

**4. CLINICAL PARTICULARS**

**4.1 Therapeutic indications**

Treatment of non-malignant pain of moderate intensity when an opioid is necessary for obtaining adequate analgesia.

BuTrans is not suitable for the treatment of acute pain.

BuTrans is indicated in adults.

**4.2 Posology and method of administration**

Posology

BuTrans should be administered every 7th day.

*Patients aged 18 years and over*

The lowest BuTrans dose (BuTrans 5 microgram/hour transdermal patch) should be used as the initial dose. Consideration should be given to the previous opioid history of the patient (see section 4.5) as well as to the current general condition and medical status of the patient.

*Titration*

During initiation of treatment with BuTrans, short-acting supplemental analgesics may be required (see section 4.5) as needed until analgesic efficacy with BuTrans is attained.

During the titration process, the dose may be adjusted every 3-days (72 hours). Thereafter, the 7-day dosing interval should be maintained. Subsequent dosage increases may then be titrated based on the need for supplemental pain relief and the patient’s analgesic response to the patch.

To increase the dose, a larger patch should replace the patch that is currently being worn, or a combination of patches should be applied in different places to achieve the desired dose. It is recommended that no more than two patches are applied at the same time, up to a maximum total dose of 40 microgram/hour BuTrans. A new patch should not be applied to the same skin site for the subsequent 3-4 weeks (see section 5.2).

Patients should be carefully and regularly monitored to assess the optimum dose and duration of treatment.

In the absence of adequate pain control, the possibility of hyperalgesia, tolerance and progression of underlying disease should be considered (see section 4.4). A BuTrans dose reduction or discontinuation of BuTrans treatment or treatment review may be indicated.

*Conversion from opioids*

BuTrans can be used as an alternative to treatment with other opioids. Such patients should be started on the lowest available dose (BuTrans 5 microgram/hour transdermal patch) and continue taking short-acting supplemental analgesics (see section 4.5) during titration, as required.

*Paediatric population*

The safety and efficacy of BuTrans in children below 18 years of age has not been established. No data are available.

*Elderly*

No dosage adjustment of BuTrans is required in elderly patients.

*Renal impairment*

No special dose adjustment of BuTrans is necessary in patients with renal impairment.

*Hepatic impairment*

There is no need for dosage adjustment of BuTrans in patients with mild to moderate hepatic impairment.

Buprenorphine is metabolised in the liver. The intensity and duration of its action may be affected in patients with impaired liver function. Therefore, such patients should be carefully monitored during treatment with BuTrans.

Patients with severe hepatic impairment may accumulate buprenorphine during BuTrans treatment. Consideration of alternate therapy should be considered, and BuTrans should be used with caution, if at all, in such patients.

Method of administration

*Route of administration*

**Transdermal patch to be worn for 7 days. The patch must not be divided or cut into pieces.**

*Patch application*

In order to ensure effective analgesia of buprenorphine and to minimise the potential of skin reactions (see section 4.4), the following directions of use should be followed:

BuTrans should be applied to non-irritated, intact skin of the upper outer arm, upper chest, upper back or the side of the chest, but not to any parts of the skin with large scars. BuTrans should be applied to a relatively hairless or nearly hairless skin site. If none are available, the hair at the site should be cut with scissors, not shaven.

If the application site must be cleaned, it should be done with clean water only. Soaps, alcohol, oils, lotions or abrasive devices must not be used. The skin must be dry before the patch is applied. BuTrans should be applied immediately after removal from the sealed sachet. Following removal of the protective layer, the transdermal patch should be pressed firmly in place with the palm of the hand for approximately 30 seconds, making sure the contact is complete, especially around the edges. If the edges of the patch begin to peel off, the edges may be taped down with suitable skin tape to ensure a 7 day period of wear.

The patch should be worn continuously for 7 days. Bathing, showering, or swimming should not affect the patch. If a patch falls off, a new one should be applied and worn for 7 days.

*Duration of administration*

BuTrans should under no circumstances be administered for longer than absolutely necessary. If long-term pain treatment with BuTrans is necessary in view of the nature and severity of the illness, then careful and regular monitoring should be carried out (if necessary with breaks in treatment) to establish whether and to what extent further treatment is necessary.

*Treatment goals and discontinuation*

Before initiating treatment with BuTrans, a treatment strategy including treatment duration and treatment goals, and a plan for end of the treatment, should be agreed together with the patient, in accordance with pain management guidelines. During treatment, there should be frequent contact between the physician and the patient to evaluate the need for continued treatment, consider discontinuation and to adjust dosages if needed. When a patient no longer requires therapy with BuTrans, it may be advisable to taper the dose gradually to prevent symptoms of withdrawal. In absence of adequate pain control, the possibility of hyperalgesia, tolerance and progression of underlying disease should be considered (see section 4.4).

After removal of the patch, buprenorphine serum concentrations decrease gradually and thus the analgesic effect is maintained for a certain amount of time. This should be considered when therapy with BuTrans is to be followed by other opioids. As a general rule, a subsequent opioid should not be administered within 24 hours after removal of the patch. At present, only limited information is available on the starting dose of other opioids administered after discontinuation of the transdermal patch (see section 4.5).

*Duration of treatment*

BuTrans should not be used longer than necessary.

*Patients with fever or exposed to external heat*

While wearing the patch, patients should be advised to avoid exposing the application site to external heat sources, such as heating pads, electric blankets, hot water bottles, heat lamps, sauna, hot tubs, and heated water beds, etc, as an increase in absorption of buprenorphine may occur. When treating febrile patients, one should be aware that fever may also increase absorption resulting in increased plasma concentrations of buprenorphine and thereby increased risk of opioid reactions.

**4.3 Contraindications**

BuTrans is contraindicated in:

* patients with known hypersensitivity to the active substance buprenorphine or to any of the excipients (see section 6.1),
* opioid dependent patients and for narcotic withdrawal treatment,
* conditions in which the respiratory centre and function are severely impaired or may become so,
* patients who are receiving MAO inhibitors or have taken them within the last two weeks (see section 4.5),
* patients suffering from myasthenia gravis,
* patients suffering from delirium tremens.

**4.4 Special warnings and precautions for use**

BuTrans should be used with particular caution in patients with:

* Respiratory depression
* CNS depressants co-administration (see below and section 4.5)
* Serotonergic agents (see below and section 4.5)
* Psychological dependence [addiction], abuse profile and history of substance and/or alcohol abuse (see below)
* Sleep apnoea
* Acute alcohol intoxication
* Head injury, intracranial lesions or increased intracranial pressure, shock, a reduced level of consciousness of uncertain origin
* Severely impaired hepatic function (see section 4.2)
* Constipation

Respiratory depression

Significant respiratory depression has been associated with buprenorphine, particularly by the intravenous route. A number of overdose deaths have occurred when addicts have intravenously abused buprenorphine, usually with benzodiazepines concomitantly. Additional overdose deaths due to ethanol and benzodiazepines in combination with buprenorphine have been reported. (see Section 4.9). Caution should be exercised when prescribing BuTrans to patients known to have, or suspected of having, problems with drug or alcohol abuse or serious mental illness.

Concomitant use of opioids such as buprenorphine and sedative medicines such as benzodiazepines or related drugs may result in sedation, respiratory depression, coma and death. Because of these risks, concomitant prescribing with these sedative medicines should be reserved for patients for whom alternative treatment options are not possible. If a decision is made to prescribe buprenorphine concomitantly with sedative medicines, the lowest effective dose should be used, and the duration of treatment should be as short as possible.

The patients should be followed closely for signs and symptoms of respiratory depression and sedation. In this respect, it is strongly recommended to inform patients and their caregivers to be aware of these symptoms (see section 4.5).

Serotonin syndrome

Concomitant administration of BuTrans and other serotonergic agents, such as MAO inhibitors, selective serotonin re-uptake inhibitors (SSRIs), serotonin norepinephrine re-uptake inhibitors (SNRIs) or tricyclic antidepressants may result in serotonin syndrome, a potentially life-threatening condition (see section 4.5).

If concomitant treatment with other serotonergic agents is clinically warranted, careful observation of the patient is advised, particularly during treatment initiation and dose increases.

Symptoms of serotonin syndrome may include mental-status changes, autonomic instability, neuromuscular abnormalities, and/or gastrointestinal symptoms.

If serotonin syndrome is suspected, a dose reduction or discontinuation of therapy should be considered depending on the severity of the symptoms.

Buprenorphine is a µ-opioid agonist, acting as a full agonist with respect to analgesia and as a partial agonist with respect to its respiratory depressant properties (see section 5.1).

Long-term treatment effects and tolerance

In all patients, tolerance to the analgesic effects, hyperalgesia, physical dependence, and psychological dependence may develop upon repeated administration of opioids, whereas incomplete tolerance is developed for some side effects like opioid induced constipation. Particularly in patients with chronic non cancer pain, it has been reported that they may not experience a meaningful amelioration in pain intensity from continuous opioid treatment in the long term. It is recommended to re-evaluate the appropriateness of continued use of BuTrans regularly at the time of prescription renewals in patients. When it is decided that there is no benefit for continuation, gradual down titration should be applied to address withdrawal symptoms.

Tolerance and opioid use disorder (abuse and dependence)

Tolerance, physical and psychological dependence, and opioid use disorder (OUD) may develop upon repeated administration of opioids such as BuTrans. Repeated use of BuTrans can lead to OUD. A higher dose and longer duration of opioid treatment can increase the risk of developing OUD. Abuse or intentional misuse of BuTrans may result in overdose and/or death. The risk of developing OUD is increased in patients with a personal or a family history (parents or siblings) of substance use disorders (including alcohol use disorder), in current tobacco users or in patients with a personal history of other mental health disorders (e.g. major depression, anxiety and personality disorders).

Before initiating treatment with BuTrans and during the treatment, treatment goals and a discontinuation plan should be agreed with the patient (see section 4.2). Before and during treatment the patient should also be informed about the risks and signs of OUD. If these signs occur, patients should be advised to contact their physician.

Patients will require monitoring for signs of drug-seeking behaviour (e.g. too early requests for refills). This includes the review of concomitant opioids and psycho-active drugs (like benzodiazepines). For patients with signs and symptoms of OUD, consultation with an addiction specialist should be considered. If opioid discontinuation is to occur see section 4.4 Long-term treatment effects and tolerance.

Withdrawal syndrome

A withdrawal syndrome may occur upon abrupt cessation of therapy. Withdrawal (abstinence syndrome), when it occurs, is generally mild, begins after 2 days and may last up to 2 weeks. Withdrawal symptoms include agitation, anxiety, nervousness, insomnia, hyperkinesia, tremor and gastrointestinal disorders. When a patient no longer requires therapy with buprenorphine, it may be advisable to taper the dose gradually to prevent symptoms of withdrawal. Administration of buprenorphine to persons who are physically dependent on full µ-opioid agonists may precipitate an abstinence syndrome depending on the level of physical dependence, and the timing and dose of buprenorphine.

Sleep-related breathing disorders

Opioids may cause sleep-related breathing disorders including central sleep apnoea (CSA) and sleep-related hypoxemia. Opioid use may increase the risk of CSA in a dose-dependent fashion. In patients who present with CSA, consider decreasing the total opioid dosage.

Skin reactions at application site

To minimise the risk of occurrence of application site skin reactions, it is important to follow the posology instructions (see section 4.2).

Application site reactions with BuTrans are usually presented by a mild or moderate skin inflammation (contact dermatitis), and their typical appearance may include erythema, oedema, pruritus, rash, small blisters (vesicles), and painful/burning sensation at the application site. Most commonly the cause is skin irritation (irritant contact dermatitis), and these reactions resolve spontaneously after BuTrans removal.

Patients and caregivers should be instructed accordingly to monitor the application sites for such reactions. If allergic contact dermatitis is suspected, relevant diagnostic procedures should be performed to determine if sensitisation has occurred and its actual cause (buprenorphine and/or other ingredients of the patch).

Since CYP3A4 inhibitors may increase concentrations of buprenorphine (see section 4.5), patients already treated with CYP3A4 inhibitors should have their dose of BuTrans carefully titrated since a reduced dosage might be sufficient in these patients.

BuTrans is not recommended for analgesia in the immediate post-operative period or in other situations characterised by a narrow therapeutic index or a rapidly varying analgesic requirement.

Buprenorphine may lower the seizure threshold in patients with a history of seizure disorder.

Severe febrile illness may increase the rate of buprenorphine absorption from BuTrans transdermal patches.

In humans limited euphorigenic effects have been observed with buprenorphine. This may result in some abuse of the product.

Endocrine system

Opioids may influence the hypothalamic-pituitary-adrenal or –gonadal axes. Some changes that can be seen include an increase in serum prolactin, and decreases in plasma cortisol and testosterone. Clinical symptoms may be manifest from these hormonal changes.

BuTrans should not be used at higher doses than recommended.

**4.5 Interaction with other medicinal products and other forms of interaction**

Effect of other active substances on the pharmacokinetics of buprenorphine

Buprenorphine is primarily metabolised by glucuronidation and to a lesser extent (about 30 %) by CYP3A4. Concomitant treatment with CYP3A4 inhibitors may lead to elevated plasma concentrations with intensified efficacy of buprenorphine.

Studies with the CYP3A4 inhibitor ketoconazole did not produce clinically relevant increases in mean maximum (Cmax) or total (AUC) buprenorphine exposure following BuTrans with ketoconazole as compared to BuTrans alone.

The interaction between buprenorphine and CYP3A4 enzyme inducers has not been studied. Co‑administration of BuTrans and enzyme inducers (e.g. phenobarbital, carbamazepine, phenytoin and rifampicin) could lead to increased clearance which might result in reduced efficacy.

Reductions in hepatic blood flow induced by some general anaesthetics (e.g. halothane) and other medicinal products may result in a decreased rate of hepatic elimination of buprenorphine.

Pharmacodynamic interactions

BuTrans must not be used concomitantly with MAOIs or in patients who have received MAOIs within the previous two weeks (see section 4.3).

BuTrans should be used cautiously when co-administered with:

Serotonergic medicinal products, such as MAO inhibitors, selective serotonin re-uptake inhibitors (SSRIs), serotonin norepinephrine re-uptake inhibitors (SNRIs) or tricyclic antidepressants as the risk of serotonin syndrome, a potentially life-threatening condition, is increased (see section 4.4).

Other central nervous system depressants: other opioid derivatives (analgesics and antitussives containing e.g. morphine, dextropropoxyphene, codeine, dextromethorphan or noscapine). Certain antidepressants, sedative H1-receptor antagonists, alcohol, anxiolytics, neuroleptics, clonidine and related substances. These combinations increase the CNS depressant activity.

The concomitant use of BuTrans with gabapentinoids (gabapentin and pregabalin) may result in respiratory depression, hypotension, profound sedation, coma or death (see section 4.4).

Concomitant administration of buprenorphine with anticholinergics or medications with anticholinergic activity (e.g. tricyclic antidepressants, antihistamines, antipsychotics, muscle relaxants, anti-Parkinson drugs) may results in increased anticholinergic adverse effects.

Sedative medicines such as benzodiazepines or related drugs as concomitant use increases the risk of sedation, respiratory depression, coma and death because of additive CNS depressant effect. The dose and duration of concomitant use should be limited (see section 4.4). Such agents include sedatives or hypnotics, general anesthetics, other opioid analgesics, phenothiazines, centrally acting anti-emetics, benzodiazepines and alcohol.

At typical analgesic doses buprenorphine is described to function as a pure mu receptor agonist. In BuTrans clinical studies subjects receiving full mu agonist opioids (up to 90 mg oral morphine or oral morphine equivalents per day) were transferred to BuTrans. There were no reports of abstinence syndrome or opioid withdrawal during conversion from entry opioid to BuTrans (see section 4.4).

**4.6 Fertility, pregnancy and lactation**

Pregnancy

There are no or limited amounts of data from the use of BuTrans in pregnant women. Studies in animals have shown reproductive toxicity (see section 5.3). The potential risk for humans is unknown. Buprenorphine crosses the placenta and buprenorphine and the active metabolite norbuprenorphine can be detected in newborn serum, urine and meconium following in utero exposure.

Towards the end of pregnancy high doses of buprenorphine may induce respiratory depression in the neonate even after a short period of administration. Prolonged use of buprenorphine during pregnancy can result in neonatal opioid withdrawal syndrome.

Therefore, BuTrans should not be used during pregnancy and in women of childbearing potential who are not using effective contraception unless the potential benefit justifies the potential risk to the foetus.

Breastfeeding

Buprenorphine is excreted in human milk. Studies in rats have shown that buprenorphine may inhibit lactation. Available pharmacodynamic/toxicological data in animals has shown excretion of buprenorphine in milk (see section 5.3). A risk to the newborn/infants cannot be excluded. BuTrans should be used with caution during breast-feeding.

Fertility

No human data on the effect of buprenorphine on fertility are available. In a fertility and early embryonic development study, no effects on reproductive parameters were observed in male or female rats (see section 5.3).

**4.7 Effects on ability to drive and use machines**

Traffic warning.

BuTrans has a major influence on the ability to drive and use machines. Even when used according to instructions, BuTrans may affect the patient’s reactions to such an extent that road safety and the ability to operate machinery may be impaired. This applies particularly in the beginning of treatment and in conjunction with other centrally acting substances including alcohol, tranquillisers, sedatives and hypnotics. An individual recommendation should be given by the physician. A general restriction is not necessary in cases where a stable dose is used.

Patients who are affected and experience side effects (e.g. dizziness, drowsiness, blurred vision) during treatment initiation or titration to a higher dose should not drive or use machines, for at least 24 hours after the patch has been removed.

**4.8 Undesirable effects**

Serious adverse reactions that may be associated with BuTrans therapy in clinical use are similar to those observed with other opioid analgesics, including respiratory depression (especially when used with other CNS depressants) and hypotension (see section 4.4).

The following undesirable effects have occurred

Very common (≥1/10), common (≥1/100, <1/10), uncommon (≥1/1000, <1/100), rare (≥1/10,000, <1/1000), very rare (<1/10,000), not known (cannot be estimated from the available data).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| System organ class  MedDRA | Very common (≥1/10) | Common (≥1/100, <1/10) | Uncommon (≥1/1000, <1/100) | Rare (≥1/10,000, <1/1000) | Very rare (<1/10,000) | Not known (cannot be estimated from the available data) |
| Immune system disorders |  |  | Hypersensitivi­ty | Anaphylactic reaction |  | Anaphylactoid reaction |
| Metabolic and nutritional disorders |  | Anorexia |  | Dehydration |  |  |
| Psychiatric disorders |  | Confu­sion  Depres­sion  Insomnia  Nervous­ness  Anxiety | Affect lability  Sleep disorder Restlessness Agitation  Euphoric mood  Hallucina­tions  Libido decreased  Nightmares  Aggression | Psychotic disorder | Drug dependen­ce (see section 4.4)  Mood swings | Depersona­lisation |
| Nervous system disorders | Headache  Dizziness  Somnolen­ce | Tremor | Sedation  Dysgeusia  Dysarthria  Hypoaesthesia  Memory impairment  Migraine  Syncope  Coordination abnormal  Disturbance in attention  Paraesthesia | Balance disorder  Speech disorder | Involunta­ry muscle contrac­tions | Seizures  Sleep apnoea syndrome  Hyperalge­sia |
| Eye disorders |  |  | Dry eye  Blurred vision | Visual disturbance  Eyelid oedema  Miosis |  |  |
| Ear and labyrinth disorders |  |  | Tinnitus  Vertigo |  | Ear pain |  |
| Cardiac disorders |  |  | Palpitations  Tachycardia | Angina pectoris |  |  |
| Vascular disorders |  |  | Hypotension  Circulatory collapse  Hypertension  Flushing | Vasodilatation  Orthostatic hypotension |  |  |
| Respiratory, thoracic and mediastinal disorders |  | Dyspnoea | Cough  Wheezing  Hiccups | Respiratory depression  Respiratory failure  Asthma aggravated  Hyperventila­tion  Rhinitis |  |  |
| Gastrointesti­nal disorders | Constipa­tion  Nausea  Vomiting | Abdominal pain  Diarrhoea  Dyspep­sia  Dry mouth | Flatulence | Dysphagia  Ileus |  | Diverticulitis |
| Hepatobiliary disorders |  |  |  |  |  | Biliary colic |
| Skin and subcutaneous tissue disorders | Pruritus  Erythema | Rash  Sweating  Exanthe­ma | Dry skin  Urticaria | Face oedema | Pustules  Vesicles | Dermatitis contact  Application skin discoloration |
| Musculoskeletal and connective tissue disorders |  | Muscular weakness | Myalgia  Muscle spasms |  |  |  |
| Renal and urinary disorders |  |  | Urinary incontinence  Urinary retention  Urinary hesitation |  |  |  |
| Reproductive system and breast disorders |  |  |  | Erectile dysfunction  Sexual dysfunction |  |  |
| General disorders and administra­tion site conditions | Application site reactions1\* | Tired­ness  Asthenic conditi­ons  Periphe­ral oedema | Fatigue  Pyrexia  Rigors  Oedema  Drug withdrawal syndrome  Chest pain | Influenza like illness |  | Drug withdrawal syndrome neonatal  Drug tolerance |
| Investigations |  |  | Alanine aminotrans­ferase increased  Weight decreased |  |  |  |
| Injury, poisoning and procedural complications |  |  | Accidental injury  Fall |  |  |  |

1 Includes common signs and symptoms of contact dermatitis (irritative or allergic): erythema, oedema, pruritus, rash, vesicles, painful/burning sensation at the application site.

\* In some cases delayed local allergic reactions (allergic contact dermatitis) occurred with marked signs of inflammation. Mechanical injuries during patch removal (e.g. laceration) are also possible in patients with fragile skin. Chronic inflammation may lead to long-lasting sequelae, such as post inflammatory hyper- and hypopigmentation, as well as dry and thick scaly skin lesions, which may closely resemble scars. In such cases treatment with BuTrans should be terminated (see sections 4.3 and 4.4).

Drug dependence

Repeated use of BuTrans can lead to drug dependence, even at therapeutic doses. The risk of drug dependence may vary depending on a patient's individual risk factors, dosage, and duration of opioid treatment (see section 4.4).

Buprenorphine has a low risk of physical dependence. After discontinuation of BuTrans, withdrawal symptoms are unlikely. This may be due to the very slow dissociation of buprenorphine from the opioid receptors and to the gradual decrease of buprenorphine plasma concentrations (usually over a period of 30 hours after removal of the last patch). However, after long-term use of BuTrans, withdrawal symptoms similar to those occurring during opioid withdrawal, cannot be entirely excluded. These symptoms include agitation, anxiety, nervousness, insomnia, hyperkinesia, tremor and gastrointestinal disorders.

Reporting of suspected adverse reactions

Reporting suspected adverse reactions after authorisation of the medicinal product is important. It allows continued monitoring of the benefit/risk balance of the medicinal product. Healthcare professionals are asked to report any suspected adverse reactions via:

Lægemiddelstyrelsen

Axel Heides Gade 1

DK-2300 København S

Website: www.meldenbivirkning.dk

**4.9 Overdose**

Symptoms

Symptoms similar to those of other centrally acting analgesics are to be expected. These include respiratory depression, including apnoea, sedation, drowsiness, nausea, vomiting, cardiovascular collapse and marked miosis.

Treatment

Remove any patches from the patient’s skin.

Establish and maintain a patent airway, assist or control respiration as indicated and maintain adequate body temperature and fluid balance. Oxygen, intravenous fluids, vasopressors and other supportive measures should be employed as indicated.

A specific opioid antagonist such as naloxone may reverse the effects of buprenorphine, although naloxone may be less effective in reversing the effects of buprenorphine than other µ-opioid agonists. Treatment with continuous intravenous naloxone should begin with the usual doses but high doses may be required.

**4.10 Legal status**

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**5. PHARMACOLOGICAL PROPERTIES**

**5.1 Pharmacodynamic properties**

Pharmacotherapeutic group: Analgesics, opioids, ATC-code: N02AE01.

Buprenorphine is a μ-opioid agonist, acting as a full agonist with respect to analgesia and as a partial agonist with respect to its respiratory depressant properties. It also has antagonistic activity at the kappa opioid receptor.

Other pharmacologic effects

*In vitro* and animal studies indicate various effects of natural opioids, such as morphine, on components of the immune system; the clinical significance of these findings is unknown. Whether buprenorphine, a semisynthetic opioid, has immunological effects similar to morphine is unknown.

Like other opioid analgesics, buprenorphine has a potential risk of respiratory depression. However, evidence suggests that buprenorphine is a partial agonist with respect to its respiratory depressant activity and a ceiling effect has been reported following intravenous doses of greater than 2 μg/kg. Respiratory depression appears to be a rare occurrence at therapeutic doses of the transdermal preparation [up to 40 μg/h].

Efficacy has been demonstrated in seven pivotal phase III studies of up to 12 weeks duration in patients with non‑malignant pain of various aetiologies. These included patients with moderate and severe OA and back pain. BuTrans demonstrated clinically significant reductions in pain scores (approximately 3 points on the BS-11 scale) and significantly greater pain control compared with placebo.

A long term, open-label extension study (n=384) has also been performed in patients with non‑malignant pain. With chronic dosing, 63% of patients were maintained in pain control for 6 months, 39% of patients for 12 months, 13% of patients for 18 months and 6% for 21 months. Approximately 17% were stabilised on the 5 mg dose, 35% on the 10 mg dose and 48% on the 20 mg dose.

**5.2 Pharmacokinetic properties**

There is evidence of enterohepatic recirculation.

Studies in non‑pregnant and pregnant rats have shown that buprenorphine passes the blood-brain and placental barriers. Concentrations in the brain (which contained only unchanged buprenorphine) after parenteral administration were 2-3 times higher than after oral administration. After intramuscular or oral administration buprenorphine apparently accumulates in the foetal gastrointestinal lumen – presumably due to biliary excretion, as enterohepatic circulation has not fully developed.

Each patch provides a steady delivery of buprenorphine for up to seven days. Steady state is achieved during the first application. After removal of BuTrans, buprenorphine concentrations initially decline at a rate of approximately 50% in 12 hours. Thereafter, mean elimination half-lives have been reported to be between 30 and 45 hours.

Absorption

Following BuTrans application, buprenorphine diffuses from the patch through the skin. In clinical pharmacology studies, the median time for BuTrans 10 microgram/hour to deliver detectable buprenorphine concentrations (25 picograms/ml) was approximately 17 hours. Analysis of residual buprenorphine in patches after 7‑day use shows 15 % of the original load delivered. A study of bioavailability, relative to intravenous administration, confirms that this amount is systemically absorbed. Buprenorphine concentrations remain relatively constant during the 7‑day patch application.

*Application site*

A study in healthy subjects demonstrated that the pharmacokinetic profile of buprenorphine delivered by BuTrans is similar when applied to upper outer arm, upper chest, upper back or the side of the chest (midaxillary line, 5th intercostal space). The absorption varies to some extent depending on the application site and the exposure is at the most approximately 26 % higher when applied to the upper back compared to the side of the chest.

In a study of healthy subjects receiving BuTrans repeatedly to the same site, an almost doubled exposure was seen with a 14 day rest period. For this reason, rotation of application sites is recommended, and a new patch should not be applied to the same skin site for 3-4 weeks.

In a study of healthy subjects, application of a heating pad directly on the transdermal patch caused a transient 26‑55 % increase in blood concentrations of buprenorphine. Concentrations returned to normal within 5 hours after the heat was removed. For this reason, applying direct heat sources such as hot water bottles, heat pads or electric blankets directly to the patch is not recommended. A heating pad applied to a BuTrans site immediately after patch removal did not alter absorption from the skin depot.

Distribution

Buprenorphine is approximately 96 % bound to plasma proteins.

Studies of intravenous buprenorphine have shown a large volume of distribution, implying extensive distribution of buprenorphine. In a study of intravenous buprenorphine in healthy subjects, the volume of distribution at steady state was 430 l, reflecting the large volume of distribution and lipophilicity of the active substance.

Following intravenous administration, buprenorphine and its metabolites are secreted into bile, and within several minutes, distributed into the cerebrospinal fluid. Buprenorphine concentrations in the cerebrospinal fluid appear to be approximately 15 % to 25 % of concurrent plasma concentrations.

Biotransformation and elimination

Buprenorphine metabolism in the skin following BuTrans application is negligible. Following transdermal application, buprenorphine is eliminated via hepatic metabolism, with subsequent biliary excretion and renal excretion of soluble metabolites. Hepatic metabolism, through CYP3A4 and UGT1A1/1A3 enzymes, results in two primary metabolites, norbuprenorphine and buprenorphine 3‑O‑glucuronide, respectively. Norbuprenorphine is glucuronidated before elimination. Buprenorphine is also eliminated in the faeces. In a study in post-operative patients, the total elimination of buprenorphine was shown to be approximately 55 l/h.

Norbuprenorphine is the only known active metabolite of buprenorphine.

Effect of buprenorphine on the pharmacokinetics of other active substances

Based on *in vitro* studies in human microsomes and hepatocytes, buprenorphine does not have the potential to inhibit metabolism catalysed by the CYP450 enzymes CYP1A2, CYP2A6 and CYP3A4 at concentrations obtained with use of BuTrans 20 µg/h transdermal patch. The effect on metabolism catalysed by CYP2C8, CYP2C9 and CYP2C19 has not been studied.

**5.3 Preclinical safety data**

Reproductive and developmental toxicity

No effect on fertility or general reproductive performance was observed in rats treated with buprenorphine. In embryofoetal developmental toxicity studies conducted in rats and rabbits using buprenorphine, no embryofoetal toxicity effects were observed. In a rat pre- and post-natal developmental toxicity study with buprenorphine there was pup mortality, decreased pup body weight and concomitant maternal reduced food consumption and clinical signs.

Genotoxicity

A standard battery of genotoxicity tests indicated that buprenorphine is non-genotoxic.

Carcinogenicity

In long-term studies in rats and mice there was no evidence of any carcinogenic potential relevant for humans.

Systemic toxicity and dermal toxicity

In single- and repeat‑dose toxicity studies in rats, rabbits, guinea pigs, dogs and minipigs, BuTrans caused minimal or no adverse systemic events, whereas skin irritation was observed in all species examined.

Toxicological data available did not indicate a sensitising potential of the additives of the transdermal patches.

**6. PHARMACEUTICAL PARTICULARS**

**6.1 List of excipients**

Adhesive matrix (containing buprenorphine)

[(Z)-octadec-9-en-1-yl] (Oleyl oleate),

Povidone K90,

4-oxopentanic acid, (Levulinic Acid)

Poly[acrylic acid-co-butylacrylate-co-(2-ethylhexyl)acrylate-co-vinylacetate] (5:15:75:5), cross-linked (DuroTak 387-2054)

Adhesive matrix (without buprenorphine)

Poly[acrylic acid-co-butylacrylate-co-(2-ethylhexyl) acrylate-co-vinylacetate] (5:15:75:5), not cross-linked (DuroTak 387-2051).

Separating foil between the adhesive matrices with and without buprenorphine

Poly(Ethyleneterephthalate) – foil.

Backing layer

Poly(Ethyleneterephthalate) – tissue.

Release liner (on the front covering the adhesive matrix containing buprenorphine) (to be removed before applying the patch)

Poly(Ethyleneterephthalate) – foil, siliconised, coated on one side with aluminium.

**6.2 Incompatibilities**

Not applicable.

**6.3 Shelf life**

2 years.

**6.4 Special precautions for storage**

Do not store above 25 °C.

**6.5 Nature and contents of container**

Sealed child resistant sachet, composed of identical top and bottom layers of heat-sealable laminate, comprising (from outside to inside) paper, PET, polyethylene-based copolymer, aluminium and poly (acrylic acid-co-ethylene).

Pack Sizes: 1, 2, 3, 4, 5, 8, 10, 12 transdermal patches.

Not all pack sizes may be marketed.

**6.6 Special precautions for disposal and other handling**

The patch should not be used if the seal is broken.

Disposal after use

When changing the patch, the used patch should be removed, the adhesive layer folded inwards on itself, and the patch disposed of safely and out of sight and reach of children.

**7. MARKETING AUTHORISATION HOLDER**

Mundipharma A/S

Frydenlundsvej 30

2950 Vedbæk

**8. MARKETING AUTHORISATION NUMBER(S)**

5 micrograms/hour: 47511

10 micrograms/hour: 47512

20 micrograms/hour: 47513

**9. DATE OF FIRST AUTHORISATION**

16 May 2012

**10. DATE OF REVISION OF THE TEXT**

23 January 2025