

# SUMMARY OF PRODUCT CHARACTERISTICS

## 1 NAME OF THE MEDICINAL PRODUCT

Tapentadol Neuraxpharm 250 mg prolonged-release capsules, hard

## 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Each prolonged-release capsule contains 250 mg tapentadol (as phosphate).

For the full list of excipients, see section 6.1.

## 3 PHARMACEUTICAL FORM

Prolonged-release capsule, hard

Hard gelatin capsule (size 000) with swedish orange cap and swedish orange body filled with white to off-white spherical pellets. Approximately 26.1 mm in length.

## 4 CLINICAL PARTICULARS

### 4.1 Therapeutic indications

This medicine is indicated for the management of severe chronic pain in adults, which can be adequately managed only with opioid analgesics.

### 4.2 Posology and method of administration

#### Posology

Prior to starting treatment with opioids, a discussion should be held with patients to put in place a strategy for ending treatment with tapentadol in order to minimise the risk of addiction and drug withdrawal syndrome (see section 4.4).

The dosing regimen should be individualised according to the severity of pain being treated, the previous treatment experience and the ability to monitor the patient.

This medicine should be taken twice daily, approximately every 12 hours.

#### *Initiation of therapy*

#### *Initiation of therapy in patients currently not taking opioid analgesics*

Patients should start treatment with 50 mg Tapentadol Neuraxpharm twice daily.

#### *Initiation of therapy in patients currently taking opioid analgesics*

When switching from opioids to this medicine and choosing the initial dose, the nature of the previous medicinal product, administration and the mean daily dose should be taken into account. This may require higher initial doses of Tapentadol

Neuraxpharm for patients currently taking opioids compared to those not having taken opioids before initiating therapy with this medicine.

#### *Titration and maintenance*

After initiation of therapy the dose should be titrated individually to a level that provides adequate analgesia and minimises undesirable effects under the close supervision of the prescribing physician.

Experience from clinical trials has shown that a titration regimen in increments of 50 mg prolonged-release tapentadol twice daily every 3 days was appropriate to achieve adequate pain control in most of the patients.

Total daily doses of more than 500 mg prolonged-release tapentadol have not yet been studied and are therefore not recommended.

#### *Renal Impairment*

In patients with mild or moderate renal impairment a dosage adjustment is not required (see section 5.2).

Prolonged-release tapentadol has not been studied in controlled efficacy trials in patients with severe renal impairment, therefore the use in this population is not recommended (see sections 4.4 and 5.2).

#### *Hepatic Impairment*

In patients with mild hepatic impairment a dosage adjustment is not required (see section 5.2).

This medicine should be used with caution in patients with moderate hepatic impairment. Treatment in these patients should be initiated at the lowest available dose strength, i.e. Tapentadol Neuraxpharm 50 mg, and not be administered more frequently than once every 24 hours. Further treatment should reflect maintenance of analgesia with acceptable tolerability (see sections 4.4 and 5.2).

Prolonged-release tapentadol has not been studied in patients with severe hepatic impairment and therefore, use in this population is not recommended (see sections 4.4 and 5.2).

#### *Elderly patients (persons aged 65 years and over)*

In general, a dose adaptation in elderly patients is not required. However, as elderly patients are more likely to have decreased renal and hepatic function, care should be taken in dose selection as recommended (see sections 4.2 and 5.2).

#### *Paediatric Patients*

The safety and efficacy of tapentadol in children and adolescents below 18 years of age has not yet been established. Therefore this medicine is not recommended for use in this population.

#### Method of administration

This medicine is for oral. It can be taken with or without food.

The capsules may be swallowed whole with the aid of liquids, or alternatively, the capsule may be opened and the capsule contents sprinkled onto a small amount (tablespoon) of cold soft food (e.g. apple sauce) and taken immediately, and not stored for future use. Drinking some fluids, e.g. water, should follow the intake of the sprinkles with apple sauce.

The capsules and the capsule contents must not be crushed or chewed to ensure that the prolonged-release mechanism is maintained.

#### Treatment goals and discontinuation

Before initiating treatment with Tapentadol, 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 [product name], 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).

#### Duration of treatment

Tapentadol should not be used longer than necessary.

### **4.3 Contraindications**

This medicine is contraindicated

- in patients with hypersensitivity to tapentadol or to any of the excipients listed in section 6.1.
- in situations where active substances with mu-opioid receptor agonist activity are contraindicated, i.e. patients with significant respiratory depression (in unmonitored settings or the absence of resuscitative equipment), and patients with acute or severe bronchial asthma or hypercapnia
- in any patient who has or is suspected of having paralytic ileus
- in patients with acute intoxication with alcohol, hypnotics, centrally acting analgesics, or psychotropic active substances (see section 4.5)

### **4.4 Special warnings and precautions for use**

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 Tapentadol. A higher dose and longer duration of opioid treatment can increase the risk of developing OUD. Abuse or intentional misuse of opioids 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 Tapentadol 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.

A comprehensive patient history should be taken to document concomitant medications, including over-the-counter medicines and medicines obtained on-line, and past and present medical and psychiatric conditions.

Patients may find that treatment is less effective with chronic use and express a need to increase the dose to obtain the same level of pain control as initially experienced. Patients may also supplement their treatment with additional pain relievers. These could be signs that the patient is developing tolerance. The risks of developing tolerance should be explained to the patient.

Overuse or misuse may result in overdose and/or death. It is important that patients only use medicines that are prescribed for them at the dose they have been prescribed and do not give this medicine to anyone else.

Patients should be closely monitored for signs of misuse, abuse, or addiction. The clinical need for analgesic treatment should be reviewed regularly.

#### *Drug withdrawal syndrome*

Prior to starting treatment with any opioids, a discussion should be held with patients to put in place a withdrawal strategy for ending treatment with tapentadol.

Drug withdrawal syndrome may occur upon abrupt cessation of therapy or dose reduction. When a patient no longer requires therapy, it is advisable to taper the dose gradually to minimise symptoms of withdrawal. Tapering from a high dose may take weeks to months.

The opioid drug withdrawal syndrome is characterised by some or all of the following: restlessness, lacrimation, rhinorrhoea, yawning, perspiration, chills, myalgia, mydriasis and palpitations. Other symptoms may also develop including irritability, agitation, anxiety, hyperkinesia, tremor, weakness, insomnia, anorexia, abdominal cramps, nausea, vomiting, diarrhoea, increased blood pressure, increased respiratory rate or heart rate.

If women take this drug during pregnancy, there is a risk that their newborn infants will experience neonatal withdrawal syndrome.

#### *Hyperalgesia*

Hyperalgesia may be diagnosed if the patient on long-term opioid therapy presents with increased pain. This might be qualitatively and anatomically distinct from pain related to disease progression or to breakthrough pain resulting from development of opioid tolerance. Pain associated with hyperalgesia tends to be more diffuse than the pre-existing pain and less defined in quality. Symptoms of hyperalgesia may resolve with a reduction of opioid dose.

#### *Risk from concomitant use of sedating medicinal products such as benzodiazepines or related substances*

Concomitant use of tapentadol and sedating medicinal products such as benzodiazepines or related substances may result in sedation, respiratory depression, coma and death. Because of these risks, concomitant prescribing with these sedating medicinal products should be reserved for patients for whom alternative treatment options are not possible.

If a decision is made to prescribe tapentadol concomitantly with sedating medicinal products, the reduction of dose of one or both agents should be considered and the duration of the concomitant 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).

#### *Respiratory Depression*

At high doses or in mu-opioid receptor agonist sensitive patients, tapentadol may produce dose-related respiratory depression. Therefore, tapentadol should be administered with caution to patients with impaired respiratory functions. Alternative non-mu-opioid receptor agonist analgesics should be considered and tapentadol should be employed only under careful medical supervision at the lowest effective dose in such patients. If respiratory depression occurs, it should be treated as any mu-opioid receptor agonist-induced respiratory depression (see section 4.9).

#### *Head Injury and Increased Intracranial Pressure*

Tapentadol should not be used in patients who may be particularly susceptible to the intracranial effects of carbon dioxide retention such as those with evidence of increased intracranial pressure, impaired consciousness, or coma. Analgesics with mu-opioid receptor agonist activity may obscure the clinical course of patients with head injury. Tapentadol should be used with caution in patients with head injury and brain tumors.

#### *Seizures*

Prolonged-release tapentadol has not been systematically evaluated in patients with a seizure disorder, and such patients were excluded from clinical trials. However, like other analgesics with mu-opioid agonist activity tapentadol is not recommended in patients with a history of a seizure disorder or any condition that would put the patient at risk of seizures. In addition, tapentadol may increase the seizure risk in patients taking other medicinal products that lower the seizure threshold (see section 4.5).

#### *Renal Impairment*

Prolonged-release tapentadol has not been studied in controlled efficacy trials in patients with severe renal impairment, therefore the use in this population is not recommended (see section 4.2 and 5.2).

#### *Hepatic Impairment*

Subjects with mild and moderate hepatic impairment showed a 2-fold and 4.5-fold increase in systemic exposure, respectively, compared with subjects with normal hepatic function. Tapentadol should be used with caution in patients with moderate hepatic impairment (see section 4.2 and 5.2), especially upon initiation of treatment. Prolonged-release tapentadol has not been studied in patients with severe hepatic impairment and therefore, use in this population is not recommended (see sections 4.2 and 5.2).

#### *Use in Pancreatic/Biliary Tract Disease*

Active substances with mu-opioid receptor agonist activity may cause spasm of the sphincter of Oddi. Tapentadol should be used with caution in patients with biliary tract disease, including acute pancreatitis.

#### *Sleep-related breathing disorders*

Opioids can cause sleep-related breathing disorders including central sleep apnoea (CSA) and sleep-related hypoxemia. Opioid use increases the risk of CSA in a dose-

dependent fashion. In patients who present with CSA, consider decreasing the total opioid dosage.

#### *Mixed opioid agonists/antagonists*

Care should be taken when combining tapentadol with mixed mu-opioid agonist/antagonists (like pentazocine, nalbuphine) or partial mu-opioid agonists (like buprenorphine). In patients maintained on buprenorphine for the treatment of opioid dependence, alternative treatment options (like e.g. temporary buprenorphine discontinuation) should be considered, if administration of full mu-agonists (like tapentadol) becomes necessary in acute pain situations. On combined use with buprenorphine, higher dose requirements for full mu-receptor agonists have been reported and close monitoring of adverse events such as respiratory depression is required in such circumstances.

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

### *Centrally-acting medicinal products/central nervous system (CNS)*

#### *depressants, including alcohol and CNS depressant narcotic drugs*

Medicinal products like benzodiazepines, barbiturates and opioids (analgesics, antitussives or substitution treatments) may enhance the risk of respiratory depression if taken in combination with tapentadol. CNS depressants (e.g. benzodiazepines, antipsychotics, H1-antihistamines, opioids, alcohol) can enhance the sedative effect of tapentadol and impair vigilance. Therefore, when a combined therapy of tapentadol with a respiratory or CNS depressant is contemplated, the reduction of dose of one or both agents should be considered. The concomitant use of opioids and gabapentinoids (gabapentin and pregabalin) increases the risk of opioid overdose, respiratory depression and death.

#### *Mixed opioid agonists/antagonists*

Care should be taken when combining tapentadol with mixed mu-opioid agonist/antagonists (like pentazocine, nalbuphine) or partial mu-opioid agonists (like buprenorphine) (see also section 4.4).

Tapentadol can induce convulsions and increase the potential for selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants, antipsychotics and other medicinal products that lower the seizure threshold to cause convulsions.

There have been reports of serotonin syndrome in a temporal connection with the therapeutic use of tapentadol in combination with serotonergic medicinal products such as selective serotonin re-uptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs) and tricyclic antidepressants.

Serotonin syndrome is likely when one of the following is observed:

- Spontaneous clonus
- Inducible or ocular clonus with agitation or diaphoresis
- Tremor and hyperreflexia
- Hypertonia and body temperature > 38°C and inducible ocular clonus.

Withdrawal of the serotonergic medicinal products usually brings about a rapid improvement. Treatment depends on the nature and severity of the symptoms.

The major elimination pathway for tapentadol is conjugation with glucuronic acid mediated via uridine diphosphate transferase (UGT) mainly UGT1A6, UGT1A9 and UGT2B7 isoforms. Thus, concomitant administration with strong inhibitors of these isoenzymes (e.g. ketoconazole, fluconazole, meclofenamic acid) may lead to increased systemic exposure of tapentadol (see section 5.2).

For patients on tapentadol treatment, caution should be exercised if concomitant drug administration of strong enzyme inducing drugs (e.g. rifampicin, phenobarbital, St John's Wort (*hypericum perforatum*)) starts or stops, since this may lead to decreased efficacy or risk for adverse effects, respectively.

Treatment with tapentadol should be avoided in patients who are receiving monoamine oxidase (MAO) inhibitors or who have taken them within the last 14 days due to potential additive effects on synaptic noradrenaline concentrations which may result in adverse cardiovascular events, such as hypertensive crisis.

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

## **4.6 Fertility, pregnancy and lactation**

### *Pregnancy*

There is very limited amount of data from the use in pregnant women. Studies in animals have not shown teratogenic effects. However, delayed development and embryotoxicity were observed at doses resulting in exaggerated pharmacology (mu-opioid-related CNS effects related to dosing above the therapeutic range). Effects on the postnatal development were already observed at the maternal NOAEL (see section 5.3).

Tapentadol should be used during pregnancy only if the potential benefit justifies the potential risk to the foetus.

Regular use during pregnancy may cause drug dependence in the foetus, leading to withdrawal symptoms in the neonate.

If opioid use is required for a prolonged period in a pregnant woman, advise the patient of the risk of neonatal opioid withdrawal syndrome and ensure that appropriate treatment will be available.

### *Labour and Delivery*

Administration during labour may depress respiration in the neonate and an antidote for the child should be readily available.

### *Breast feeding*

Administration to nursing women is not recommended as tapentadol may be secreted in breast milk and may cause respiratory depression in the infant.

### *Fertility*

No human data on the effect of tapentadol 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

This medicine can impair cognitive function and can affect a patient's ability to drive safely. When prescribing this medicine, patients should be told:

- The medicine is likely to affect your ability to drive
- Do not drive until you know how the medicine affects you
- It is an offence to drive if you are unfit to drive
- However, you would not be committing an offence (called 'statutory defence') if:
  - The medicine has been prescribed to treat a medical or dental problem and
  - You have taken it according to the instructions given by the prescriber and in the information provided with the medicine and
  - It was not affecting your ability to drive safely

Tapentadol may have major influence on the ability to drive and use machines, because it may adversely affect central nervous system functions (see section 4.8). This has to be expected especially at the beginning of treatment, when any change of dosage occurs as well as in connection with use of alcohol or tranquilisers (see section 4.4). Patients should be cautioned as to whether driving or use of machines is permitted.

## 4.8 Undesirable effects

The adverse drug reactions that were experienced by patients in the placebo-controlled trials performed with tapentadol were predominantly of mild and moderate severity. The most frequent adverse drug reactions were in the gastrointestinal and central nervous system (nausea, dizziness, constipation, headache and somnolence).

The table below lists adverse drug reactions that were identified from clinical trials performed with tapentadol and from post-marketing environment. They are listed by class and frequency.

Frequencies are defined as very common ( $\geq 1/10$ ); common ( $\geq 1/100$  to  $< 1/10$ ); uncommon ( $\geq 1/1,000$  to  $< 1/100$ ); rare ( $\geq 1/10,000$  to  $< 1/1,000$ ); very rare ( $< 1/10,000$ ), not known (cannot be estimated from the available data).

ADVERSE DRUG REACTIONS					
System Organ Class	Frequency				
	Very common	Common	Uncommon	Rare	Unknown
Immune system disorders			Drug hypersensitivity*		
Metabolism and nutrition disorders		Decreased appetite	Weight decreased		
Psychiatric disorders		Anxiety, Depressed mood, Sleep disorder, Nervousness, Restlessness	Disorientation, Confusional state, Agitation, Perception disturbances, Abnormal dreams, Euphoric mood	Thinking abnormal	Drug dependence, (see section 4.4) Delirium**
Nervous system disorders	Dizziness, Somnolence,	Disturbance in attention,	Depressed level of consciousness,	Convulsion, Presyncope,	

	Headache	Tremor, Muscle contractions involuntary	Memory impairment, Mental impairment, Syncope, Sedation, Balance disorder, Dysarthria, Hypoaesthesia, Paraesthesia	Coordination abnormal	
<b>Eye disorders</b>			Visual disturbance		
<b>Cardiac disorders</b>			Heart rate increased, Heart rate decreased, Palpitations		
<b>Vascular disorders</b>		Flushing	Blood pressure decreased		
<b>Respiratory, thoracic and mediastinal disorders</b>		Dyspnoea		Respiratory depression	
<b>Gastrointestinal disorders</b>	Nausea, Constipation	Vomiting, Diarrhoea, Dyspepsia	Abdominal discomfort	Impaired gastric emptying	
<b>Skin and subcutaneous tissue disorders</b>		Pruritus, Hyperhidrosis, Rash	Urticaria		
<b>Renal and urinary disorders</b>			Urinary hesitation, Pollakiuria		
<b>Reproductive system and breast disorders</b>			Sexual dysfunction		
<b>General disorders and administration site conditions</b>		Asthenia, Fatigue, Feeling of body temperature change, Mucosal dryness, Oedema	Feeling abnormal, Irritability	Feeling drunk, Feeling of relaxation	Drug withdrawal syndrome
* Post-marketing rare events of angioedema, anaphylaxis and anaphylactic shock have been reported.					
** Post marketing cases of delirium were observed in patients with additional risk factors such as cancer and advanced age.					

Clinical trials performed with tapentadol with patient exposure up to 1 year have shown little evidence of withdrawal symptoms upon abrupt discontinuations and these were generally classified as mild, when they occurred. Nevertheless, physicians should be vigilant for symptoms of withdrawal (see section 4.2) and treat patients accordingly should they occur.

The risk of suicidal ideation and suicides committed is known to be higher in patients suffering from chronic pain. In addition, substances with a pronounced influence on

the monoaminergic system have been associated with an increased risk of suicidality in patients suffering from depression, especially at the beginning of treatment. For tapentadol data from clinical trials and post-marketing reports do not provide evidence for an increased risk.

#### 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 the Yellow Card Scheme at: [www.mhra.gov.uk/yellowcard](http://www.mhra.gov.uk/yellowcard) or search for MHRA Yellow Card in the Google Play or Apple App Store.

## **4.9 Overdose**

Patients should be informed of the signs and symptoms of overdose and to ensure that family and friends are also aware of these signs and to seek immediate medical help if they occur.

### *Symptoms*

Human experience with overdose of tapentadol is very limited. Preclinical data suggest that symptoms similar to those of other centrally acting analgesics with mu-opioid receptor agonist activity are to be expected upon intoxication with tapentadol. In principle, these symptoms include, referring to the clinical setting, in particular miosis, vomiting, cardiovascular collapse, consciousness disorders up to coma, convulsions and respiratory depression up to respiratory arrest that may be fatal.

### *Management*

Management of overdose should be focused on treating symptoms of mu-opioid agonism. Primary attention should be given to re-establishment of a patent airway and institution of assisted or controlled ventilation when overdose of tapentadol is suspected.

Pure opioid receptor antagonists such as naloxone are specific antidotes to respiratory depression resulting from opioid overdose. Respiratory depression following an overdose may outlast the duration of action of the opioid receptor antagonist. Administration of an opioid receptor antagonist is not a substitute for continuous monitoring of airway, breathing, and circulation following an opioid overdose. If the response to opioid receptor antagonists is suboptimal or only brief in nature, an additional dose of antagonist (e.g. naloxone) should be administered as directed by the manufacturer of the product.

Gastrointestinal decontamination may be considered in order to eliminate unabsorbed active substance. Gastrointestinal decontamination with activated charcoal or by gastric lavage may be considered within 2 hours after intake. Before attempting gastrointestinal decontamination, care should be taken to secure the airway.

## **5 PHARMACOLOGICAL PROPERTIES**

## 5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Analgesics; opioids; other opioids

ATC code: N02AX06

Tapentadol is a strong analgesic with  $\mu$ -opioid agonistic and additional noradrenaline reuptake inhibition properties. Tapentadol exerts its analgesic effects directly without a pharmacologically active metabolite.

Tapentadol demonstrated efficacy in preclinical models of nociceptive, neuropathic and visceral pain; efficacy has been verified in clinical trials with tapentadol in non-malignant nociceptive and neuropathic chronic pain conditions as well as chronic tumour-related pain. The trials in pain due to osteoarthritis and chronic low back pain showed similar analgesic efficacy of tapentadol to a strong opioid used as a comparator.

Effects on the cardiovascular system: In a thorough human QT trial, no effect of multiple therapeutic and suprathreshold doses of tapentadol on the QT interval was shown. Similarly, tapentadol had no relevant effect on other ECG parameters (heart rate, PR interval, QRS duration, T-wave or U-wave morphology).

### *Paediatric population*

The European Medicines Agency has deferred the obligation to submit the results of studies with tapentadol in all subsets of the paediatric population in severe chronic pain (see section 4.2 for information on paediatric use).

### *Post-marketing data*

Two post-marketing studies were performed to address the practical use of tapentadol.

The efficacy of tapentadol prolonged-release tablets has been verified in a multicenter, randomized, double blind parallel-group trial with patients suffering from low back pain with a neuropathic component (KF5503/58). Reductions in average pain intensity were similar in the tapentadol treatment group and the comparator treatment group i.e. receiving a combination of tapentadol prolonged-release tablets and pregabalin immediate release tablets.

In an open-label, multicenter, randomized trial with patients having severe chronic low back pain with a neuropathic component (KF5503/60), tapentadol prolonged-release tablets were associated with significant reductions in average pain intensity.

## 5.2 Pharmacokinetic properties

The reference medicinal product is tapentadol prolonged-release tablets.

Bioequivalence studies have shown tapentadol prolonged-release capsules are bioequivalent to tapentadol prolonged-release tablets.

### *Absorption*

Mean absolute bioavailability after single-dose administration (fasting) of tapentadol prolonged-release tablets is approximately 32% due to extensive first-pass metabolism. Maximum serum concentrations of tapentadol are observed at between 3 and 6 hours after administration of prolonged-release tablets.

Dose proportional increases for AUC have been observed after administration of the prolonged-release tablets over the therapeutic dose range.

A multiple dose trial with twice daily dosing using 86 mg and 172 mg tapentadol administered as prolonged-release tablets showed an accumulation ratio of about 1.5

for the parent active substance which is primarily determined by the dosing interval and apparent half-life of tapentadol. Steady state serum concentrations of tapentadol are reached on the second day of the treatment regimen.

#### *Food Effect*

The AUC and  $C_{max}$  increased by 8% and 18%, respectively, when prolonged-release tablets were administered after a high-fat, high-calorie breakfast. This was judged to be without clinical relevance as it falls into the normal inter-subject variability of tapentadol PK parameters. This medicine may be given with or without food.

#### *Distribution*

Tapentadol is widely distributed throughout the body. Following intravenous administration, the volume of distribution ( $V_z$ ) for tapentadol is 540 +/- 98 l. The serum protein binding is low and amounts to approximately 20%.

#### *Metabolism*

In humans, the metabolism of tapentadol is extensive. About 97% of the parent compound is metabolised. The major pathway of tapentadol metabolism is conjugation with glucuronic acid to produce glucuronides. After oral administration approximately 70% of the dose is excreted in urine as conjugated forms (55% glucuronide and 15% sulfate of tapentadol). Uridine diphosphate glucuronyl transferase (UGT) is the primary enzyme involved in the glucuronidation (mainly UGT1A6, UGT1A9 and UGT2B7 isoforms). A total of 3% of active substance is excreted in urine as unchanged active substance. Tapentadol is additionally metabolised to N-desmethyl tapentadol (13%) by CYP2C9 and CYP2C19 and to hydroxy tapentadol (2%) by CYP2D6, which are further metabolised by conjugation. Therefore, active substance metabolism mediated by cytochrome P450 system is of less importance than glucuronidation.

None of the metabolites contributes to the analgesic activity.

#### *Elimination*

Tapentadol and its metabolites are excreted almost exclusively (99%) via the kidneys. The total clearance after intravenous administration is 1530 +/- 177 ml/min. Terminal half-life is on average 5-6 hours after oral administration.

#### *Special populations*

##### *Elderly patients*

The mean exposure (AUC) to tapentadol was similar in a trial with elderly subjects (65-78 years of age) compared to young adults (19-43 years of age), with a 16% lower mean  $C_{max}$  observed in the elderly subject group compared to young adult subjects.

##### *Renal Impairment*

AUC and  $C_{max}$  of tapentadol were comparable in subjects with varying degrees of renal function (from normal to severely impaired). In contrast, increasing exposure (AUC) to tapentadol-O-glucuronide was observed with increasing degree of renal impairment. In subjects with mild, moderate, and severe renal impairment, the AUC of tapentadol-O-glucuronide are 1.5-, 2.5-, and 5.5-fold higher compared with normal renal function, respectively.

##### *Hepatic Impairment*

Administration of tapentadol resulted in higher exposures and serum levels to tapentadol in subjects with impaired hepatic function compared to subjects with normal hepatic function. The ratio of tapentadol pharmacokinetic parameters for the

mild and moderate hepatic impairment groups in comparison to the normal hepatic function group were 1.7 and 4.2, respectively, for AUC; 1.4 and 2.5, respectively, for  $C_{max}$ ; and 1.2 and 1.4, respectively, for  $t_{1/2}$ . The rate of formation of tapentadol-O-glucuronide was lower in subjects with increased liver impairment.

#### *Pharmacokinetic Interactions*

Tapentadol is mainly metabolised by glucuronidation, and only a small amount is metabolised by oxidative pathways.

As glucuronidation is a high capacity/low affinity system, which is not easily saturated even in disease, and as therapeutic concentrations of active substances are generally well below the concentrations needed for potential inhibition of glucuronidation, any clinically relevant interactions caused by glucuronidation are unlikely to occur. In a set of drug-drug interaction trials using paracetamol, naproxen, acetylsalicylic acid and probenecid, a possible influence of these active substances on the glucuronidation of tapentadol was investigated. The trials with probe active substances naproxen (500 mg twice daily for 2 days) and probenecid (500 mg twice daily for 2 days) showed increases in AUC of tapentadol by 17% and 57%, respectively. Overall, no clinically relevant effects on the serum concentrations of tapentadol were observed in these trials.

Furthermore, interaction trials of tapentadol with metoclopramide and omeprazole were conducted to investigate a possible influence of these active substances on the absorption of tapentadol. These trials also showed no clinically relevant effects on tapentadol serum concentrations.

*In vitro* studies did not reveal any potential of tapentadol to either inhibit or induce cytochrome P450 enzymes. Thus, clinically relevant interactions mediated by the cytochrome P450 system are unlikely to occur.

Plasma protein binding of tapentadol is low (approximately 20%). Therefore, the likelihood of pharmacokinetic drug-drug interactions by displacement from the protein binding site is low.

### **5.3 Preclinical safety data**

Tapentadol was not genotoxic in bacteria in the Ames test. Equivocal findings were observed in an *in vitro* chromosomal aberration test, but when the test was repeated the results were clearly negative. Tapentadol was not genotoxic *in vivo*, using the two endpoints of chromosomal aberration and unscheduled DNA synthesis, when tested up to the maximum tolerated dose. Long-term animal studies did not identify a potential carcinogenic risk relevant to humans.

Tapentadol had no influence on male or female fertility in rats but there was reduced *in utero* survival at the high dose. It is not known whether this was mediated via the male or the female. Tapentadol showed no teratogenic effects in rats and rabbits following intravenous and subcutaneous exposure. However, delayed development and embryotoxicity were observed after administration of doses resulting in exaggerated pharmacology (mu-opioid related CNS effects related to dosing above the therapeutic range). After intravenous dosing in rats reduced *in utero* survival was seen.

In rats, tapentadol caused increased mortality of the F1 pups that were directly exposed via milk between days 1 and 4 postpartum already at dosages that did not provoke maternal toxicities. There were no effects on neurobehavioral parameters.

Excretion into breast milk was investigated in rat pups suckled by dams dosed with tapentadol. Pups were dose-dependently exposed to tapentadol and tapentadol O-glucuronide. It was concluded that tapentadol is excreted in milk.

## **6 PHARMACEUTICAL PARTICULARS**

### **6.1 List of excipients**

#### *Capsule content*

Cellulose, microcrystalline

Talc

Ethylcellulose

Povidone K30

Dibutyl sebacate

#### *Capsule shell*

Gelatin

Titanium dioxide (E171)

Red iron oxide (E172)

### **6.2 Incompatibilities**

Not applicable

### **6.3 Shelf life**

3 years

### **6.4 Special precautions for storage**

This medicinal product does not require any special storage conditions.

### **6.5 Nature and contents of container**

Peelable child resistant paper/PET/aluminium-PVC/PE/PVDC blisters.

Pack with 56 prolonged-release capsules.

### **6.6 Special precautions for disposal**

Any unused product or waste material should be disposed of in accordance with local requirements.

## **7 MARKETING AUTHORISATION HOLDER**

Neuraxpharm UK Limited

First Floor, Building 1410,

Arlington Business Park,

Theale, Reading,

Berkshire RG7 4SA

United Kingdom

**8      MARKETING AUTHORISATION NUMBER(S)**

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**10     DATE OF REVISION OF THE TEXT**

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