

# Stimulan®

piracetam

Capsules / Film Coated Tablets / Syrup

## 1. Name of the medicinal product

**Stimulan®** Capsules / Film-coated Tablets / Syrup

## 2. Qualitative and quantitative composition

**Stimulan® film-coated tablet:**

Active ingredient Piracetam 800 mg

**Inactive ingredients:** Povidone K30, Croscopolone, Talc, Magnesium stearate, Aerosol 200, Calcium Phosphate anhydrous.

**Film coat:** Hypromellose, Titanium Dioxide, Talc, Polyethylene glycol 4000, Glycerine, Sun set yellow.

**Stimulan® Syrup:**

Active ingredient Piracetam 400 mg

**Inactive ingredients:** Aerosol, Lactose, Magnesium Stearate

**Stimulan® Syrup Each 100 ml:**

Active Ingredient Piracetam 20 gm

**Inactive ingredients:** Methyl paraben, Propyl Paraben, Sorbitol, Glycerin, Sodium acetate, Sodium saccharinate, Propylene glycol, cherry flavour, Distilled water.

## 3. Pharmaceutical form

Capsules, Film-Coated Tablets & Syrup for oral administration.

## 4. Clinical particulars

### 4.1 Therapeutic indications

Adults:

**Stimulan®** is indicated for patients suffering from myoclonus of cortical origin, irrespective of aetiology, and should be used in combination with other anti-myoclonic therapies.

### 4.2 Posology and method of administration

The daily dosage should begin at 72 g increasing by 48 g every three to four days up to a maximum of 24 g, in two or three sub-doses. Treatment with other anti-myoclonic medicinal products should be maintained at the same dosage. Depending on the clinical benefit obtained, the dosage of other such medicinal products should be reduced, if possible.

Once started, treatment with piracetam should be continued for as long as the original cerebral disease persists. In patients with an acute episode, spontaneous evolution may occur over time and an attempt should be made every 6 months to decrease or discontinue the medicinal treatment. This should be done by reducing the dose of piracetam by 12 g every two days every three or four days in the case of a Lance and Adams syndrome, in order to prevent the possibility of sudden relapse or withdrawal seizures.

### Elderly

Adjustment of the dose is recommended in elderly patients with compromised renal function (see Dosage adjustment in patients with renal impairment below). For long term treatment in the elderly, regular evaluation of the creatinine clearance is required to allow dosage adaptation if needed.

### Patients with renal impairment

The daily dose must be individualized according to renal function. Refer to the following table and adjust the dose as indicated. To use this dosing table, an estimate of the patient's creatinine clearance (Cl<sub>cr</sub>) in ml/min is needed. The Cl<sub>cr</sub> in ml/min may be estimated from serum creatinine (mg/dl) determination using the following formula:

$$Cl_{cr} = \frac{[140 - \text{age (years)}] \times \text{Weight (kg)}}{72 \times \text{Serum creatinine (mg/dl)}} \quad [X 0.85 \text{ for women}]$$

Group	Creatinine Clearance (ml/min)	Posology and frequency
Normal	> 80	usual daily dose, 2 to 4 sub-doses
Mild	30-79	2 to 3 usual daily doses, 2 or 3 sub-doses
Moderate	30-49	1 to 3 usual daily doses, 2 sub-doses
Severe	< 30	1 to 3 usual daily doses, 1 single intake
First-stage renal disease	< 30	contraindicated

### Patients with hepatic impairment

No dose adjustment is needed in patients with solely hepatic impairment. In patients with hepatic impairment and renal impairment, adjustment of dose is recommended (see Dosage adjustment in patients with renal impairment above).

### Method of administration

Piracetam should be administered orally, and may be taken with or without food. It is recommended to take the daily dose in two to four sub-doses.

### 4.3 Contraindications

Piracetam is contra-indicated in patients with severe renal impairment (renal creatinine clearance of less than 20 ml per minute). It is also contraindicated in patients with cerebral haemorrhage, suffering from Huntington's Chorea and in those with hypersensitivity to piracetam, other pyridoxine derivatives or any of the excipients.

### 4.4 Special warnings and precautions for use

#### Effects on platelet aggregation

Due to the effect of piracetam on platelet aggregation (see section 5.1), caution is recommended in patients with severe haemorrhage, patients at risk of bleeding such as gastrointestinal ulcer, patients with underlying disorders of haemostasis, patients with history of haemorrhagic CVA, patients undergoing major surgery including dental surgery, and patients using anticoagulants or platelet antiaggregant drugs including low dose aspirin.

#### Renal insufficiency

Piracetam is eliminated via the kidneys and care should thus be taken in cases of renal insufficiency (see section 4.2).

#### Elderly

For long-term treatment in the elderly, regular evaluation of the creatinine clearance is required to allow dosage adaptation if needed (see section 4.2).

#### Discontinuation

Always discontinuation of treatment should be avoided as this may induce myoclonic or generalised seizures in some myoclonic patients.

#### Warnings related to the excipients

This product contains about 2 mmol (or about 46 mg) sodium per 24 g piracetam. To be taken into consideration by patients on a controlled sodium diet.

#### Special warnings regarding excipients

**Stimulan® Capsule contains Lactose.** patients with rare hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose maldigestion should not take this medicine.

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

##### Pharmacokinetics interactions

The drug interaction potential resulting in changes of piracetam pharmacokinetics is expected to be low because approximately 90% of the dose of piracetam is excreted in the urine as unchanged drug.

In vitro, piracetam does not inhibit the human liver cytochrome P450 isoforms CYP 1A2, 2B6, 2C8, 2C9, 2C19, 2D6, 2E1 and 4A9/11 at concentrations of 142, 429 and 1422 µg/ml. At 1422 µg/ml, minor inhibitory effects on CYP 2A6 (21%) and 3A4/5 (11%) were observed. However, the Ki values for inhibition of these two CYP isoforms are likely to be well in excess of 1422 µg/ml. Therefore, metabolic interaction of piracetam with other drugs is unlikely.

##### Thyroid hormones

Confusion, irritability and sleep disorder have been reported during concomitant treatment with thyroid extract (T3 + T4).

##### Acenocoumarol

In a published single-blind study on patients with severe recurrent venous thrombosis, piracetam 9.6 g/d did not modify the doses of acenocoumarol necessary to reach INR 2.5 to 3.5, but compared with the effects of acenocoumarol alone, the addition of piracetam 9.6 g/d significantly decreased platelet aggregation, B-thromboglobulin release, levels of fibrinogen and von Willebrand's factors (VIII : C, VIII : vW : Ag, VIII : vW : RCo) and whole blood and plasma viscosity.

##### Antiepileptic drugs

A 20 g daily dose of piracetam over 4 weeks did not modify the peak and trough serum levels of antiepileptic drugs (carbamazepine, phenytoin, phenobarbital, valproate) in epileptic patients who were receiving stable doses.

##### Alcohol

Concomitant administration of alcohol had no effect on piracetam serum levels and alcohol levels were not modified by a 1.6 g oral dose of piracetam.

#### 4.6 Pregnancy and lactation

There are no adequate data from the use of piracetam in pregnant women. Animal studies do not indicate direct or indirect harmful effects with respect to pregnancy, embryonal / foetal development, parturition or post-natal development (see section 5.3).

Piracetam crosses the placental barrier. Drug levels in the newborn are approximately 70% to 90% of maternal levels. Piracetam should not be used during pregnancy unless clearly necessary, when benefit exceeds the risks and the clinical condition of the pregnant mother requires treatment with piracetam.

#### Lactation

Piracetam is excreted in human breast milk. Therefore, piracetam should not be used during breastfeeding or breastfeeding should be discontinued, while receiving treatment with piracetam. A decision must be made whether to discontinue breast-feeding or to discontinue piracetam therapy taking into account the benefit of breast-feeding for the child and the benefit of therapy for the woman.

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

In clinical studies, at dosages between 1.6 - 15 grams per day, hyperkinesia, somnolence, nervousness and depression were reported more frequently in patients on placebo than on piracetam. There is no experience on driving ability in dosages between 15 and 20 grams daily. Caution should therefore be exercised by patients intending to drive or use machinery whilst taking piracetam.

#### 4.8 Undesirable effects

##### a. Clinical studies

Double-blind placebo-controlled clinical or pharmacological trials, of which quantified safety data are available (extracted from the UCB

Documentation Data Bank on June 1997, included more than 3000 subjects receiving piracetam, regardless of indication, dosage form, daily dosage or population characteristics.

When adverse events are grouped together according to WHO System Organ Classes, the following classes were found to be related to a statistically significantly higher occurrence under treatment with piracetam: psychiatric disorders, central and peripheral nervous system disorders, metabolic and nutritional disorders, body as a whole - general disorders.

Following adverse experiences were reported for piracetam with a statistically significantly higher incidence than placebo. Incidences are given for piracetam (n = 307) versus placebo (n = 2850) treated patients.

WHO System Organ Class	Common (> 1 % & ≤ 10 %)	Uncommon (> 0.1 % & ≤ 1 %)
Central and peripheral nervous system disorders	Hyperkinesia (1.72 versus 0.42 %)	
Metabolic and nutritional disorders	Weight increase (1.02 versus 0.59 %)	
Psychiatric disorders	Nervousness (1.15 versus 0.25 %)	Somnolence (0.96 versus 0.25 %) Depression (0.85 versus 0.21 %) Asthenia (0.25 versus 0.00 %)
Body as a whole - general disorders		

##### b. Tabulated list of adverse reactions

Undesirable effects reported in clinical studies and from post-marketing experience are listed in the following table per System Organ Class and per frequency. The frequency is defined as follows: very common (≥1/10); common (≥1/100, <1/10); uncommon (≥1/1,000, <1/100); rare (≥1/10,000, <1/1,000); very rare (<1/10,000).

Data from post-marketing experience are insufficient to support an estimate of their incidence in the population to be treated.

##### Blood and lymphatic disorders

Not known: haemorrhagic disorder.

##### Immune system disorders

Not known: anaphylactoid reaction, hypersensitivity.

##### Psychiatric disorders

Common: nervousness.

Uncommon: depression.

Not known: agitation, anxiety, confusion, hallucination.

##### Nervous system disorders

Common: hyperkinesia.

Uncommon: somnolence.

Not known: ataxia, balance impaired, epilepsy aggravated, headache, insomnia.

##### Ear and labyrinth disorders

Not known: vertigo.

##### Gastrointestinal disorders

Not known: abdominal pain, abdominal pain upper, diarrhoea, nausea, vomiting.

##### Skin and subcutaneous tissue disorders

Not known: angioedematous oedema, dermatitis, pruritus, urticaria.

##### General disorders and administration site conditions

Uncommon: asthenia.

##### Investigations

Common: weight increased.

#### 4.9 Special warnings

- Sorbitol: May cause softening of the stool

#### 4.10 Overdose

No additional adverse events specifically related to overdose have been reported with piracetam.

The highest reported overdose with piracetam was oral intake of 75 g. Bloody diarrhoea with abdominal pain, was most probably related to the extreme high dose of sodium contained in the used formulation.

#### Management of overdose

In acute, significant overdose, the stomach may be emptied by gastric lavage or by induction of emesis. There is no specific antidote for overdose with piracetam. Treatment for an overdose will be symptomatic treatment and may include hemodialysis. The extraction efficiency of the dialyser is 50 to 60% for piracetam.

#### 5. Pharmacological properties

##### 5.1 Pharmacodynamic properties

Piracetam's mode of action in cortical myoclonus is as yet unknown.

Piracetam exerts its haemorrhological effects on the platelets, red blood cells, and vessel walls by increasing erythrocyte deformability and by decreasing platelet aggregation, erythrocyte adhesion to vessel walls and capillary vasospasm.

##### - Effects on the red blood cells:

In patients with sickle cell anemia, piracetam improves the deformability of the erythrocyte membrane, decreases blood viscosity, and prevents redoxus formation.

##### - Effects on platelets:

In open studies in healthy volunteers and in patients with Raynaud's phenomenon, increasing doses of piracetam up to 12 g was associated with a dose-dependent reduction in platelet functions compared with pre-treatment values (tests of aggregation induced by ADP, collagen, epinephrine and 61G release), without significant change in platelet count. In these studies, piracetam prolonged bleeding time.

##### - Effects on blood vessels:

In animal studies, piracetam inhibited vasospasm and counteracted the effects of various spasmogenic agents. It lacked any vasodilatory action and did not induce a "steal" phenomenon, nor low or no reflow, nor hypotensive effects.

In healthy volunteers, piracetam reduced the adhesion of RBCs to vascular endothelium and possessed also a direct stimulant effect on prostacycline release in healthy endothelium.

##### - Effects on coagulation factors:

In healthy volunteers, compared with pre-treatment values, piracetam up to 9.6 g reduced plasma levels of fibrinogen and von Willebrand's factors (VIII : C, VIII R : Ag, VIII R : vW) by 30 to 40 %, and increased bleeding time.

In patients with both primary and secondary Raynaud phenomenon, compared with pre-treatment values, piracetam 8 g/d during 6 months reduced plasma levels of fibrinogen and von Willebrand's factors (VIII : C, VIII R : Ag, VIII R : vW (RCF)) by 30 to 40 %, reduced plasma viscosity, and increased bleeding time.

#### 5.2 Pharmacokinetic properties

Piracetam is rapidly and almost completely absorbed. Peak plasma levels are reached within 15 hours after administration. The extent of oral bioavailability, assessed from the Area Under Curve (AUC), is close to 100% for capsules, tablets and solution. Peak levels and AUC are proportional to the dose given. The volume of distribution of piracetam is 0.7 l/kg, and the plasma half-life is 5.0 hours, in young adult men. Piracetam crosses the blood-brain and the placental barrier and diffuses across membranes used in renal dialysis. Up to now, no metabolic of piracetam has been found.

Piracetam is excreted almost completely in urine and the fraction of the dose excreted in urine is independent of the dose given. Excretion half-life values are consistent with those calculated from plasma / blood data. Clearance of the compound is dependent on the renal creatinine clearance and would be expected to diminish with renal insufficiency.

#### 5.3 Preclinical safety data

Single doses of piracetam yielded LD 50 values at 26 g/kg in mice but LD 50 values were not reached in rats. In dogs, clinical signs after acute oral dosing were mild and lethality was not observed at the maximum tested dose of 10 g/kg.

Repeated oral treatment for up to 1 year in dogs (10 g/kg) and 6 months in rats (2 g/kg) was very well tolerated: no target organ toxicity or signs of (irreversible) toxicity were clearly demonstrated. Safe dose levels represent a multiple of the maximum intended human daily dose of 0.4 g/kg. In terms of exposure (C<sub>max</sub>), safe levels obtained in the rat and the dog represent respectively 8 fold and 50 fold of the maximum human therapeutic level. AUC levels obtained in the same animals were a multiple of the human AUC level at the maximum intended daily dose.

The only change which might eventually be attributed to chronic treatment in male, but not in female, rats was an increase of the incidence over control animals of progressive glomerulonephrosis at the dose of 2.4 g/kg/day given for 132 weeks.

Although piracetam crosses the placenta into the foetal circulation, no teratogenic effects were observed at dose levels up to 4.8 g/kg/day (mic, rats) and 2.7 g/kg/day (rabbits). Furthermore, the compound affects neither fertility nor the peri- or postnatal development of the pregnancy at doses up to 2.7 g/kg/day.

Piracetam was found to be devoid of any mutagenic or clastogenic activity and does not represent any genotoxic or carcinogenic risk to man.

#### 6. Pharmaceutical particulars

##### 6.1 Incompatibilities

None known.

##### 6.2 Shelf life

3 years.

##### 6.3 Storage

- Stimulan 800 mg tablets & Stimulan syrup: Stored at temperature not exceeding 30°C & in a dry place.

- Stimulan 400 mg capsules: Stored at temperature not exceeding 25°C & in a dry place.

##### 6.4 How Supplied

Capsules: Strips of 10 capsules in packs of 3 strips.

Tablets: Strips of 10 tablets in packs of 3 strips.

Syrup: Bottles of 120 ml.

Keep all medicaments out of reach of children



Product of:

**AMOUN PHARMACEUTICAL Co.**

El-Obour City, Al Qalyubia, Egypt.

S.A.E.

