

# AUSTRALIAN PRODUCT INFORMATION

## MIACALCIC® (calcitonin salmon)

### 1 NAME OF THE MEDICINE

Calcitonin salmon

### 2 QUALITATIVE AND QUANTITATIVE COMPOSITION

Each 1 mL solution for injection contains 50 or 100 I.U. calcitonin salmon (present as polyacetate polyhydrate).

For the full list of excipients, see [Section 6.1 List of excipients](#).

### 3 PHARMACEUTICAL FORM

Clear, colourless solution, practically free of visible foreign particles.

### 4 CLINICAL PARTICULARS

#### 4.1 THERAPEUTIC INDICATIONS

Active Paget's Disease in patients who do not respond to alternative treatments or for whom such treatments are not suitable.

Hypercalcaemia.

#### 4.2 DOSE AND METHOD OF ADMINISTRATION

Note: 1 I.U. = 1 MRC unit. One unit corresponds to 0.2 µg of the pure peptide.

Miacalcic may be administered subcutaneously (s.c.), intramuscularly (i.m.) or intravenously (i.v.); local and systemic tolerance is generally good with all 3 routes of administration at recommended dosages.

Due to the association between occurrence of malignancies and long-term calcitonin use (see [Section 4.4 Special warnings and precautions for use](#)), the treatment duration in all indications should be limited to the shortest period of time possible and using the lowest effective dose.

#### Dosage

##### *Hypercalcaemia*

Treatment should be limited to the shortest duration possible. The recommended dose is 5-10 I.U. per kg daily, administered by slow i.v. infusion in 500 mL normal saline over at least six hours, or by slow i.v. injection in 2 to 4 divided doses spread over the day.

Alternatively, the same daily dose may be given by one or more s.c. or i.m. injections. If the volume of Miacalcic for injection exceeds 2 mL, i.m. injection is preferable and multiple sites of injection should be used.

Rehydration should be considered. Emergency treatment is followed by specific treatment of the underlying disease, if required.

## ***Paget's Disease***

80 - 100 I.U. daily by s.c. or i.m. injection. In some cases, the injections may be given only every second day. In particular after improvement of the objective and subjective symptoms, an injection of 50 I.U. per day may be sufficient.

The duration of treatment depends on the therapeutic indication and the patient's response. The need for ongoing therapy should be assessed by a health practitioner on a regular basis. Following cessation of chronic treatment return of biochemical values to pre-treatment levels may take weeks or years.

### **Method of Administration**

#### ***For intramuscular or subcutaneous use:***

The solution requires no further dilution.

Patients who are instructed in the self-administration of s.c. injections must receive precise directions from the physician or the nurse.

#### ***For intravenous infusion:***

Intravenous infusion is the most effective method of administration and should always be used in emergency or severe cases of hypercalcaemia. Dilute the required amount of calcitonin salmon in 500 mL of 0.9% sodium chloride and infuse over at least 6 hours.

### **Elderly**

Use adult dosage with care. It should be noted that most patients with Paget's disease are elderly.

### **Hepatic impairment**

No information available.

### **Renal impairment**

A smaller dose may be required in renal impairment, as calcitonin salmon is metabolised and excreted predominantly by the kidneys.

## **4.3 CONTRAINDICATIONS**

Pregnancy and Lactation (see section [4.6 Fertility, pregnancy, and lactation](#)).

Hypersensitivity to calcitonin salmon or to any of the excipients in the formulation.

## **4.4 SPECIAL WARNINGS AND PRECAUTIONS FOR USE**

### **Hypersensitivity Reactions**

Being a polypeptide, calcitonin salmon may give rise in rare cases to localised or generalised hypersensitivity reactions. Allergic-type reactions, including single cases of anaphylactic

shock, have been reported. If such symptoms are observed and can definitely be ascribed to the effect of the drug, treatment should be discontinued.

### **Malignancies**

Meta-analyses of randomised controlled trials conducted in patients with osteoarthritis and osteoporosis have shown that long term calcitonin salmon use is associated with a small but statistically significant increase in the incidence of malignancies compared to placebo (see section [4.8 Adverse effects \(Undesirable effects\)](#)). These meta-analyses demonstrated an increase in the absolute rate of occurrence of malignancies for patients treated with calcitonin compared to placebo which varied between 0.7% and 2.36%. Numerical imbalances between calcitonin and placebo were observed after 6 to 12 months of therapy. The increased malignancy risk with the meta-analysis was heavily influenced by a single large 5-year trial, which had an observed risk difference of 3.4%. Imbalances in risk were still observed when analyses excluded basal cell carcinoma. There were several limitations with the meta-analysis data and it is not clear how these limitations affect the results. A mechanism for this observation has not been identified. Patients in these trials were treated with oral or intra-nasal formulations however it cannot be excluded that an increased risk also applies when calcitonin is administered s.c., i.m. or i.v.. The benefits for the individual patient should be carefully evaluated against possible risks (see section [4.8 Adverse effects \(Undesirable effects\)](#)).

### **Sensitivity Testing**

It is advisable to perform a scratch or intradermal skin test to determine sensitivity before administration, as calcitonin is a protein. A 1 in 100 dilution should be used.

### **Escape Phenomena**

Escape phenomena seen sometimes in long term therapy are usually due to a saturation of the binding sites rather than to the development of antibodies. After an interruption of treatment, the therapeutic response to Miacalcic is restored (see section [4.8 Adverse effects \(Undesirable effects\)](#)).

### **Use in the elderly**

See section [4.2. Dose and method of administration](#).

### **Paediatric use**

Long term safety and efficacy have not been established in children, and therefore calcitonin is not recommended for paediatric use except in exceptional circumstances. Calcitonin salmon has been used in familial hyperphosphatasemia. Unless the physician considers that prolonged treatment is indicated on compelling medical grounds, prolonged treatment should be avoided as calcitonin may interfere with bone growth. In the absence of specific dosage experience in children, the doses relating to body weight should be used cautiously. Dosage should be adjusted to desired effect.

### **Effects on laboratory tests**

Calcitonin decreases the rate of bone turnover in conditions with an increased rate of bone resorption and formation, such as active Paget's disease, malignant osteolysis and some forms of osteoporosis characterised by a high bone turnover. This can be measured biochemically

as a decrease in urine hydroxyproline excretion and a decrease in serum alkaline phosphatase levels.

#### **4.5 INTERACTIONS WITH OTHER MEDICINES AND OTHER FORMS OF INTERACTIONS**

Concomitant use of calcitonin salmon and lithium may lead to a reduction in plasma concentrations. The dose of lithium may need to be adjusted.

#### **4.6 FERTILITY, PREGNANCY AND LACTATION**

##### **Effects on fertility**

No data available.

##### **Use in pregnancy – Pregnancy Category B2**

There is no information on the drug's use in pregnancy and therefore the drug should not be used in pregnant women or those likely to become pregnant unless the expected benefits outweigh any potential risk.

##### **Use in lactation**

Animal studies suggest that calcitonin might suppress lactation in nursing mothers. Treatment during lactation is not recommended.

#### **4.7 EFFECTS ON ABILITY TO DRIVE AND USE MACHINES**

Miacalcic may cause fatigue, dizziness and visual disturbances (see section [4.8 Adverse effects \(Undesirable effects\)](#)), which may impair the reactions of the patient. Patients should be warned that these effects may occur, in which case they should not drive or use machines.

#### **4.8 ADVERSE EFFECTS (UNDESIRABLE EFFECTS)**

For Miacalcic ampoules no recent frequency estimations based on clinical trials are available. Estimations based on the number of post-marketing reports received lead to frequencies lower than those reported in controlled clinical trials with Miacalcic nasal spray. For events attributed to the systemic administration of calcitonin salmon therefore the same (higher) frequency categories as used for the nasal spray was also used for Miacalcic ampoules.

Adverse reactions (Table 1) are listed by MedDRA system organ class. Within each system organ class, the adverse drug reactions are ranked by frequency, with the most frequent reactions first. Within each frequency grouping, adverse drug reactions are presented in order of decreasing seriousness. In addition, the corresponding frequency category for each adverse drug reaction is based on the following convention (CIOMS III): 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 ( $< 1/10,000$ )

**Table 1 Adverse events reported for Miacalcic during clinical trials**

<b>Immune system disorders:</b>	
Rare:	Hypersensitivity <sup>+</sup> .
Very rare:	Anaphylactic and anaphylactoid reactions <sup>^</sup> , anaphylactic shock.
<b>Nervous system disorders:</b>	
Common:	Dizziness, headache, dysgeusia.
Uncommon:	Paraesthesia.
<b>Eye disorders :</b>	
Uncommon:	Visual impairment.
<b>Vascular disorders:</b>	
Common:	Flushing*.
Uncommon:	Hypertension.
<b>Gastrointestinal disorders:</b>	
Common:	Nausea, diarrhoea, abdominal pain.
Uncommon:	Vomiting.
<b>Skin and subcutaneous tissue disorders:</b>	
Rare:	Pruritus, rash generalised (including maculopapular eruption urticaria)
<b>Musculoskeletal and connective tissue disorders:</b>	
Common:	Arthralgia.
Uncommon:	Musculoskeletal pain, muscle spasms.
<b>Renal and urinary disorders:</b>	
Rare:	Polyuria.
<b>General disorders and administration site conditions:</b>	
Common:	Fatigue.
Uncommon:	Injection site reaction (including pain on injection), influenza-like illness (including chills and fever), oedema (facial, peripheral and generalised).

<sup>^</sup> Reactions resulting in tachycardia, hypotension and collapse.

\* Facial flushing accompanied by a sensation of heat.

<sup>+</sup> Allergic reactions manifested in some cases by rash, hypertension or peripheral oedema.

The gastrointestinal disorder may include nausea, abdominal pain, diarrhoea and vomiting and is usually a transient, dose-related phenomenon, and occurs more frequently after i.v. than i.m. or s.c. administration. This problem may be overcome either by concomitant anti-emetic therapy or by subdividing the daily dose. A temporary dose reduction may be necessary in a few cases.

### **Immunological:**

Calcitonin salmon binding antibodies may develop in some patients after several months (generally of low titre, and more likely to occur with higher doses). However, the development of antibodies does not necessarily cause clinical resistance but may do so in a small number of cases.

### **Malignancies:**

Meta-analyses of randomised controlled trials conducted in patients with osteoarthritis and osteoporosis have shown that long term calcitonin use is associated with a small but statistically significant increase in the incidence of malignancies compared to patients treated with placebo. A mechanism for this observation has not been identified (see section [4.4 Special warnings and precautions for use](#)).

### **Post-marketing Experience**

The following reactions have been identified through post-marketing reporting and literature review. Because this adverse drug reaction has been reported voluntarily from a population of uncertain size, it is not possible to reliably estimate its frequency which is therefore categorised as not known.

*Central and peripheral nervous system:* Tremor

*Metabolism and nutrition disorders:* Hypocalcaemia

*Skin and subcutaneous tissue disorders:* Urticaria

### **Reporting suspected adverse effects**

Reporting suspected adverse reactions after registration 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 at [www.tga.gov.au/reporting-problems](http://www.tga.gov.au/reporting-problems).

## **4.9 OVERDOSE**

For information on the management of overdose, contact the Poisons Information Centre on 13 11 26 (Australia).

Nausea, vomiting, flushing and dizziness are known to be dose dependent when Miacalcic is administered parenterally. Nausea and vomiting have occurred following administration of Miacalcic as a parenteral overdose, but severe adverse reactions due to overdosage have so far not been reported.

## **5 PHARMACOLOGICAL PROPERTIES**

### **5.1 PHARMACODYNAMIC PROPERTIES**

Pharmacotherapeutic group, ATC code: Regulator of calcium homeostasis, H05BA01.

The secretion and biosynthesis of calcitonin in both animals and man are regulated by the concentration of calcium in plasma. When the calcium concentration is high the amount of the hormone increases.

The pharmacological activity of salmon calcitonin is the same as that of mammalian calcitonin. In man, data on relative potency are sparse, but calcitonin salmon is thought to be at least 10 - 40 times as potent by weight as porcine or human calcitonin in producing hypocalcaemia depending on methodology. Presumably due to its greater affinity for receptor binding sites in bone and kidney, and slower rate of metabolism, calcitonin salmon has a longer duration of action.

Calcitonin inhibits osteoclastic bone resorption, altering both the number and/or resorptive activity of osteoclasts. There is suggestive evidence in animals and man that calcitonin may promote bone and collagen formation via an increase in osteoblastic activity. However, the exact role of calcitonin on osteoblastic activity has not been fully established.

Calcitonin decreases the rate of bone turnover in conditions with an increased rate of bone resorption and formation, such as active Paget's disease, malignant osteolysis and some forms of osteoporosis characterised by a high bone turnover. This can be measured biochemically as a decrease in urine hydroxyproline excretion and a decrease in serum alkaline phosphatase levels.

Calcitonin treatment of Paget's disease may relieve bone pain, lower skin temperature over involved bone, decrease excessive cardiac output, stabilise hearing and allow radiographic and histological regression of bone lesions. Clinical experience demonstrates that calcitonin salmon possesses analgesic activity. Investigations have shown binding sites specific to calcitonin salmon in some areas of the central nervous system.

Calcitonin increases the excretion of phosphate, calcium and sodium by decreasing their tubular reabsorption.

Calcitonin is effective in diminishing hypercalcaemia in patients with hyperparathyroidism, vitamin D intoxication and osteolytic bone metastases.

The gastrointestinal effects attributed to calcitonin include the inhibition of gastric acid secretion, stimulation of the intestinal secretion of water and electrolytes, inhibition of pancreatic enzyme secretion and modifications of glucose insulin relationships. Calcitonin probably has no major effects on the intestinal absorption of calcium and does not affect gastrointestinal motility.

### **Mechanism of action**

It has been postulated that cyclic AMP is involved in the secretion of calcitonin, which binds specifically to the membrane receptors of the target tissue and stimulates cyclic AMP accumulation.

### **Clinical trials**

No data available.

## **5.2 PHARMACOKINETIC PROPERTIES**

### **Absorption**

Due to its polypeptide nature, calcitonin salmon is not administered by the oral route as intestinal proteases inactivate the drug. It is administered by s.c., i.m., or i.v. routes. The onset of action is immediate after i.v. administration and occurs in about 15 minutes following i.m. or s.c. administration, with peak plasma levels being attained within one hour.

After s.c. administration, peak plasma levels are reached in about 23 minutes. The bioavailability of calcitonin salmon is about 70% following both i.m. and s.c. administration.

### **Distribution**

Protein binding: 30 - 40%.

Volume of distribution: 0.15 - 0.30 litres/kg.

### **Metabolism**

Studies suggest that calcitonin salmon is rapidly metabolised to unidentified and inactive metabolites primarily in the kidneys, but also in the blood and peripheral tissues. The metabolic clearance rate of calcitonin salmon appears to be lower than either porcine or synthetic human calcitonin.

### **Excretion**

Up to 95% of calcitonin salmon and its metabolites are excreted by the kidney, of which less than 2% is unchanged drug.

The absorption half-life is reported to be 8-22 minutes. The elimination half-life is about 60 minutes following i.m. administration and 60-90 minutes following s.c. or i.v. administration. The apparent biological half-life is several hours.

## **5.3 PRECLINICAL SAFETY DATA**

### **Genotoxicity**

No data available.

### **Carcinogenicity**

No data available.

## **6 PHARMACEUTICAL PARTICULARS**

### **6.1 LIST OF EXCIPIENTS**

glacial acetic acid  
sodium acetate  
sodium chloride  
water for injections

### **6.2 INCOMPATIBILITIES**

Incompatibilities were either not assessed or not identified as part of the registration of this medicine.

### **6.3 SHELF LIFE**

In Australia, information on the shelf life can be found on the public summary of the Australian Register of Therapeutic Goods (ARTG). The expiry date can be found on the packaging.

#### 6.4 SPECIAL PRECAUTIONS FOR STORAGE

Store at 2-8°C. Refrigerate. Do not freeze.

#### 6.5 NATURE AND CONTENTS OF CONTAINER

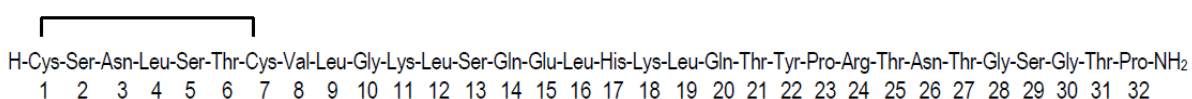
1 mL clear Type 1 glass ampoule with a one-point-cut (OPC) for ease of opening. Packs of 5 ampoules per carton.

#### 6.6 SPECIAL PRECAUTIONS FOR DISPOSAL

In Australia, any unused medicine or waste material should be disposed of in accordance with local requirements.

#### 6.7 PHYSICOCHEMICAL PROPERTIES

##### Chemical structure



##### CAS number

47931-85-1

#### 7 MEDICINE SCHEDULE (POISONS STANDARD)

Schedule 4 – Prescription Only Medicine

#### 8 SPONSOR

Chiesi Australia Pty Ltd  
Level 7, Suite 1, 500 Bourke Street,  
Melbourne, VIC 3000  
Email: [medinfo.au@chiesi.com](mailto:medinfo.au@chiesi.com)

#### 9 DATE OF FIRST APPROVAL

21 August 1991 (grandfathered)

#### 10 DATE OF REVISION

11 March 2026

##### SUMMARY TABLE OF CHANGES

Section Changed	Summary of new information
1, 2, 4 and 5	Revision to active ingredient to reflect the Australian Approved Name only
6.7	Structure corrected

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