

NEW ZEALAND DATA SHEET

1. PRODUCT NAME

GENOTROPIN[®] 5 mg powder for injection with solvent.
GENOTROPIN[®] 5.3 mg powder for injection with solvent.
GENOTROPIN[®] 12 mg powder for injection with solvent.
GENOTROPIN *GoQuick*[®] 5 mg powder for injection with solvent.
GENOTROPIN *GoQuick*[®] 5.3 mg powder for injection with solvent.
GENOTROPIN *GoQuick*[®] 12 mg powder for injection with solvent.

2. QUALITATIVE AND QUANTITATIVE COMPOSITION

GENOTROPIN / GENOTROPIN *GoQuick* 5 mg powder for injection with solvent. One cartridge contains 5 mg somatotropin*. After reconstitution the concentration of somatotropin is 5 mg/mL.

GENOTROPIN / GENOTROPIN *GoQuick* 5.3 mg powder for injection with solvent. One cartridge contains 5.3 mg somatotropin*. After reconstitution the concentration of somatotropin is 5.3 mg/mL.

GENOTROPIN / GENOTROPIN *GoQuick* 12 mg powder for injection with solvent. One cartridge contains 12 mg somatotropin*. After reconstitution the concentration of somatotropin is 12 mg/mL.

*produced in *Escherichia coli* cells by recombinant DNA technology

For a full list of excipients, see section 6.1.

3. PHARMACEUTICAL FORM

Powder and solvent for solution for injection. In the two-chamber cartridge there is a white powder in the front compartment and a clear solution in the rear compartment.

4. CLINICAL PARTICULARS

4.1 Therapeutic Indications

Children

Growth disturbance due to insufficient secretion of growth hormone and growth disturbance associated with Turner syndrome or chronic renal insufficiency. Prader-Willi syndrome, for improvement of growth and body composition.

Adults

Replacement therapy in adults with pronounced growth hormone (GH) deficiency as diagnosed in two different dynamic tests for GH deficiency. Patients must also fulfil the following criteria.

Childhood onset: Patients who were diagnosed as growth hormone deficient during childhood must be retested and their growth hormone deficiency confirmed before replacement therapy with GENOTROPIN is started.

Adult onset: Patients must have growth hormone deficiency as a result of hypothalamic or pituitary disease and at least one other hormone deficiency diagnosed (except for prolactin) and adequate replacement therapy instituted, before replacement therapy with GH may begin.

Prader-Willi syndrome, for improvement of body composition.

4.2 Dose and method of administration

The dosage and administration schedule should be individualised.

The maximum recommended daily dose should not be exceeded.

The injection should be given subcutaneously and the site varied to prevent lipoatrophy.

Growth disturbance due to insufficient secretion of growth hormone in children:

Generally a dose of 0.025 - 0.035 mg/kg body weight per day or 0.7 - 1.0 mg/m² body surface area per day is recommended. Even higher doses have been used.

Prader-Willi syndrome, for improvement of growth and body composition in children:

Generally a dose of 0.035 mg/kg body weight per day or 1.0 mg/m² body surface area per day is recommended.

Growth disturbance due to Turner syndrome:

A dose of 0.045 - 0.05 mg/kg body weight per day or 1.4 mg/m² body surface area per day is recommended.

Growth disturbance in chronic renal insufficiency:

A dose of 1.4 mg/m² body surface area per day (approximately 0.045 - 0.05 mg/kg body weight per day) is recommended. Higher doses can be needed if growth velocity is too low. A dose correction can be needed after six months of treatment.

Dosage recommendations in children:

	mg/kg body weight	mg/m² body surface area
	dose per day	dose per day
Growth hormone deficiency	0.025 - 0.035	0.7 - 1.0
Prader-Willi syndrome	0.035	1.0
Turner syndrome	0.045 - 0.05	1.4
Chronic renal insufficiency	0.045 - 0.05	1.4

Adult patients with growth hormone deficiency or Prader-Willi syndrome:

The recommended starting dose is 0.15 to 0.30 mg per day. The final dose should be individually titrated as needed with respect to age and gender. The daily maintenance dose seldom exceeds 1.3 mg per day. Women may require higher doses than men. This means that there is a risk that women, especially those on oral oestrogen replacement may be undertreated. As normal physiological growth hormone production decreases with age, dose

requirements may be reduced. Clinical response, side effects, and determination of IGF-I in serum may be used as guidance for dose titration.

4.3 Contraindications

GENOTROPIN should not be used when there is any evidence of tumour activity and anti-tumour therapy must be completed prior to starting therapy.

GENOTROPIN should not be used for growth promotion in children with closed epiphyses.

Patients with acute critical illness suffering complications following open heart surgery, abdominal surgery, multiple accidental trauma, acute respiratory failure or similar conditions should not be treated with GENOTROPIN. (Regarding patients undergoing substitution therapy, see section 4.4).

GENOTROPIN is contraindicated in patients with Prader-Willi syndrome who are severely obese or have severe respiratory impairment (see section 4.4).

Hypersensitivity to the active substance or to any of the excipients.

4.4 Special warnings and precautions for use

Diagnosis and therapy with GENOTROPIN should be initiated and monitored by physicians who are appropriately qualified and experienced in the diagnosis and management of patients with growth disturbance.

There have been reports of fatalities associated with the use of growth hormone in paediatric patients with Prader-Willi syndrome who had one or more of the following risk factors: severe obesity, history of respiratory impairment or sleep apnoea, or unidentified respiratory infection. Another possible risk factor may be male gender. Patients with Prader-Willi syndrome should be evaluated for upper airway obstruction before initiation of treatment with somatropin. If during treatment with somatropin patients show signs of upper airway obstruction (including onset of or increased snoring), treatment should be interrupted. All patients with Prader-Willi syndrome should be evaluated for sleep apnoea and monitored if sleep apnoea is suspected. These patients should also have effective weight control and be monitored for signs of respiratory infections, which should be diagnosed as early as possible and treated aggressively (see section 4.3).

In patients with Prader-Willi syndrome, treatment should always be in combination with a calorie-restricted diet.

Myositis is a very rare adverse event that may be related to the preservative meta-cresol. In the case of myalgia or disproportionate pain at injection site, myositis should be considered and if confirmed, a GENOTROPIN presentation without meta-cresol should be used.

The maximum recommended daily dose should not be exceeded (see section 4.2).

Somatropin reduces insulin sensitivity and therefore patients should be observed for evidence of glucose intolerance. In rare cases, therapy with somatropin may produce sufficient glucose intolerance to meet diagnostic criteria for Type 2 diabetes mellitus. The risk of developing diabetes during treatment with somatropin is greatest in those patients with other risk factors for Type 2 diabetes mellitus, such as obesity, family history of diabetes, treatment with steroids, or prior impaired glucose tolerance. In patients with pre-existing diabetes mellitus, the dose of anti-diabetic therapy might require adjustment when somatropin is instituted.

During treatment with somatropin an enhanced T4 to T3 conversion has been found which may result in a reduction in serum T4 and an increase in serum T3 concentrations. In general, the peripheral thyroid hormone levels have remained within the reference ranges for healthy subjects. The effects of somatropin on thyroid hormone levels may be of clinical relevance in patients with central subclinical hypothyroidism in whom hypothyroidism theoretically may develop. Conversely, in patients receiving replacement therapy with thyroxine mild hyperthyroidism may occur. It is therefore particularly advisable to test thyroid function after starting treatment with somatropin and after dose adjustments.

Introduction of somatropin treatment may result in inhibition of 11 β -hydroxysteroid dehydrogenase type 1 (11 β -HSD-1) and reduced serum cortisol concentrations. In patients treated with somatropin, previously undiagnosed central (secondary) hypoadrenalism may be unmasked and glucocorticoid replacement may be required. In addition, patients treated with glucocorticoid replacement therapy for previously diagnosed hypoadrenalism may require an increase in their maintenance or stress doses, following initiation of somatropin treatment (see section 4.5 - Interaction with other medicines and other forms of interaction).

If a woman taking somatropin begins oral oestrogen therapy, the dose of somatropin may need to be increased to maintain the serum insulin-like growth factor-I (IGF-I) levels within the normal age-appropriate range. Conversely, if a woman on somatropin discontinues oral oestrogen therapy, the dose of somatropin may need to be reduced to avoid excess of growth hormone and/or side effects (see section 4.5 - Interaction with other medicines and other forms of interaction).

In growth hormone deficiency secondary to treatment of malignant disease, it is recommended to pay attention to signs of relapse of the malignancy.

In patients with endocrine disorders, including growth hormone deficiency, slipped epiphysis of the hip may occur more frequently than in the general population. Children limping during treatment with somatropin should be examined clinically (see section 4.8, Post-marketing experience).

In case of severe or recurrent headache, visual problems, nausea and/or vomiting, a funduscopy for papilloedema is recommended. If papilloedema is confirmed, a diagnosis of benign intracranial hypertension should be considered and, if appropriate, the growth hormone treatment should be discontinued. At present there is insufficient evidence to guide clinical decision making in patients with resolved intracranial hypertension. If growth hormone treatment is restarted, careful monitoring for symptoms of intracranial hypertension is necessary.

Progression of scoliosis can occur in patients who experience rapid growth. Because growth hormone increases growth rate, physicians should be alert to the abnormality, which may manifest during growth hormone therapy. Scoliosis is commonly seen in patients with Prader-Willi syndrome.

Experience in patients above 60 years is limited.

Experience with prolonged treatment in adults is limited.

In chronic renal insufficiency, renal function should be below 50 percent of normal before institution of therapy. To verify growth disturbance, growth should be followed for a year preceding institution of therapy. During this period, conservative treatment for renal

insufficiency (which includes control of acidosis, hyperparathyroidism and nutritional status) should have been established and should be maintained during treatment.

The treatment should be discontinued at renal transplantation.

To date, no data on final height in patients with chronic renal insufficiency treated with GENOTROPIN are available.

The effects of GENOTROPIN on recovery were studied in two placebo controlled trials involving 522 critically ill adult patients suffering complications following open heart surgery, abdominal surgery, multiple accidental trauma or acute respiratory failure. Mortality was higher in patients treated with 5.3 or 8 mg GENOTROPIN daily compared to patients receiving placebo, 42% vs. 19%. Based on this information, these types of patients should not be treated with GENOTROPIN. As there is no information available on the safety of growth hormone substitution therapy in acutely critically ill patients, the benefits of continued treatment in this situation should be weighed against the potential risks involved. In all patients developing other or similar acute critical illness, the possible benefit of treatment with GENOTROPIN must be weighed against the potential risk involved (see section 4.3).

4.5 Interaction with other medicines and other forms of interaction

Concomitant treatment with glucocorticoids inhibits the growth-promoting effects of somatropin containing products. Patients with adrenocorticotrophic hormone (ACTH) deficiency should have their glucocorticoid replacement therapy carefully adjusted to avoid any inhibitory effect on growth. Therefore, patients treated with glucocorticoids should have their growth monitored carefully to assess the potential impact of glucocorticoid treatment on growth.

Growth hormone decreases the conversion of cortisone to cortisol and may unmask previously undiscovered central hypoadrenalism or render low glucocorticoid replacement doses ineffective (see section 4.4 - Special warnings and precautions for use).

Data from an interaction study performed in GH deficient adults suggest that somatropin administration may increase the clearance of compounds known to be metabolised by cytochrome P450 isoenzymes. The clearance of compounds metabolised by cytochrome P450 3A4 (e.g. sex steroids, corticosteroids, anticonvulsants and cyclosporin) may be especially increased resulting in lower plasma levels of these compounds. The clinical significance of this is unknown.

In women on oral oestrogen replacement, a higher dose of growth hormone may be required to achieve the treatment goal (see section 4.4 - Special warnings and precautions for use).

See also statements under section 4.4 regarding diabetes mellitus and thyroid disorder.

4.6 Fertility, pregnancy and lactation

Pregnancy

Category B2:

No clinical experience of use in pregnant women is available. Animal reproduction studies have not shown evidence of harmful effects on the foetus. Treatment with GENOTROPIN should be interrupted if pregnancy occurs.

During normal pregnancy levels of pituitary growth hormone fall markedly after 20 gestation weeks, being replaced almost entirely by placental growth hormone by 30 weeks. In view of this, it is unlikely that continued replacement therapy with somatotropin would be necessary in growth hormone deficient women in the third trimester of pregnancy.

Breastfeeding

It is not known if somatotropin is excreted into breast milk, but absorption of intact protein from the gastrointestinal tract of the infant is extremely unlikely.

4.7 Effects on ability to drive and use machines

Somatotropin does not influence the ability to drive and use machines.

4.8 Undesirable effects

Patients with growth hormone deficiency are characterised by extracellular volume deficit. When treatment with somatotropin is started this deficit is rapidly corrected. In general, in adult patients, adverse effects related to fluid retention, such as peripheral oedema, musculoskeletal stiffness, arthralgia, myalgia and paraesthesia are mild to moderate, arise within the first months of treatment, and subside spontaneously or with dose-reduction. The incidence of these adverse effects is related to the administered dose, the age of the patients, and possibly inversely related to the age of the patients at the onset of growth hormone deficiency.

Adverse reactions for adults and children are presented under headings of system organ class and frequency using the following convention: 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).

System Organ Class	Very Common (≥1/10)	Common (≥1/100 to <1/10)	Uncommon (≥1/1,000 to <1/100)	Rare (≥1/10,000 to <1/1,000)	Frequency Not Known (cannot be estimated from the available data)
Neoplasms Benign, Malignant, and Unspecified (including cysts and polyps)				<i>Children</i> Leukaemia	
Metabolism and Nutrition Disorders					Type 2 diabetes mellitus
Nervous System Disorders		<i>Adults</i> Paraesthesia	<i>Children</i> Paraesthesia	<i>Children</i> Benign intracranial hypertension	<i>Adults</i> Benign intracranial hypertension
Musculoskeletal and Connective Tissue Disorders	<i>Adults</i> Arthralgia	<i>Adults</i> Myalgia Musculoskeletal stiffness <i>Children</i> Arthralgia		<i>Children</i> Myalgia	<i>Children</i> Musculoskeletal stiffness
General Disorders and Administration Site Conditions	<i>Adults</i> Oedema peripheral	<i>Children</i> Injection-site reactions	<i>Children</i> Oedema peripheral		<i>Adults</i> Injection-site reaction
Investigations					Blood cortisol decreased

Transient injection site reactions in children have been reported.

Somatropin has given rise to the formation of antibodies in approximately 1% of the patients. The binding capacity of these antibodies has been low and no clinical changes have been associated with their formation.

Somatropin has been reported to reduce serum cortisol levels, possibly by affecting carrier proteins or by increased hepatic clearance. The clinical relevance of these findings is not known. Nevertheless, corticosteroid replacement therapy should be optimised before initiation of GENOTROPIN therapy.

Rare cases of leukaemia have been reported in growth hormone deficient children treated with somatropin, but the incidence appears to be similar to that in children without growth hormone deficiency.

Post-marketing experience

In the post-marketing experience, rare cases of sudden death have been reported in patients affected by Prader-Willi syndrome treated with somatropin, although no causal relationship has been demonstrated.

Slipped capital femoral epiphysis and Legg-Calve-Perthes disease have been reported in children treated with growth hormone. No causal relationship has been demonstrated with somatropin.

Reporting of suspected adverse reactions

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

<http://nzphvc.otago.ac.nz/reporting/>

4.9 Overdose

Acute overdosage could lead initially to hypoglycaemia and subsequently to hyperglycaemia.

Long-term overdosage could result in signs and symptoms consistent with the known effects of human growth hormone excess.

Contact the National Poisons Centre on 0800 POISON (0800 764 766) for advice on the management of an overdose.

5. PHARMACOLOGICAL PROPERTIES

5.1 Pharmacodynamic properties

Pharmacotherapeutic group: Anterior pituitary lobe hormones and analogues, ATC code: H01A C01

Mechanism of action

Somatropin is a potent metabolic hormone of importance for the metabolism of lipids, carbohydrates and proteins. In children with inadequate endogenous growth hormone and in children with Prader-Willi syndrome, somatropin stimulates linear growth and increases growth rate. In adults, as well as in children, somatropin maintains a normal body composition by increasing nitrogen retention and stimulation of skeletal muscle growth, and by mobilisation of body fat. Visceral adipose tissue is particularly responsive to somatropin. In addition to enhanced lipolysis, somatropin decreases the uptake of triglycerides into body fat stores. Serum concentrations of IGF-I (Insulin-like Growth Factor-I), and IGFBP3 (Insulin-like Growth Factor Binding Protein 3) are increased by somatropin. In addition, the following actions have been demonstrated:

- Lipid metabolism: Somatropin induces hepatic LDL cholesterol receptors, and affects the profile of serum lipids and lipoproteins. In general, administration of somatropin to growth hormone deficient patients results in reductions in serum LDL and apolipoprotein B. A reduction in serum total cholesterol may also be observed.
- Carbohydrate metabolism: Somatropin increases insulin but fasting blood glucose is commonly unchanged. Children with hypopituitarism may experience fasting hypoglycaemia. This condition is reversed by somatropin.
- Water and mineral metabolism: Growth hormone deficiency is associated with decreased plasma and extracellular volumes. Both are rapidly increased after treatment with somatropin. Somatropin induces the retention of sodium, potassium and phosphorus.
- Bone metabolism: Somatropin stimulates the turnover of skeletal bone. Long-term administration of somatropin to growth hormone deficient patients with osteopenia results in an increase in bone mineral content and density at weight-bearing sites.
- Physical capacity: Muscle strength and physical exercise capacity are improved after long-term treatment with somatropin. Somatropin also increases cardiac output, but the mechanism has yet to be clarified. A decrease in peripheral vascular resistance may contribute to this effect.
- GENOTROPIN improves energy, vitality, memory functions and subjective well-being.

5.2 Pharmacokinetic properties

Absorption

The bioavailability of subcutaneously administered GENOTROPIN is approximately 80% in both healthy subjects and growth hormone deficient patients. A subcutaneous dose of 0.035 mg/kg of GENOTROPIN results in plasma C_{max} and t_{max} values in the range of 13-35 ng/ml and 3-6 hours respectively.

Elimination

The mean terminal half-life of GENOTROPIN after intravenous administration in growth hormone deficient adults is about 0.4 hours. However, after subcutaneous administration, half-lives of 2-3 hours are achieved. The observed difference is likely due to slow absorption from the injection site following subcutaneous administration.

Sub-populations

The absolute bioavailability of GENOTROPIN seems to be similar in males and females following s.c. administration.

Information about the pharmacokinetics of GENOTROPIN in geriatric and paediatric populations, in different races and in patients with renal, hepatic or cardiac insufficiency is either lacking or incomplete.

5.3 Preclinical safety data

In studies regarding general toxicity, local tolerance and reproduction toxicity no clinically relevant effects have been observed.

In vitro and in vivo genotoxicity studies on gene mutations and induction of chromosome aberrations have been negative.

An increased chromosome fragility has been observed in one in-vitro study on lymphocytes taken from patients after long term treatment with somatropin and following the addition of the radiomimetic drug bleomycin. The clinical significance of this finding is unclear.

In another study, no increase in chromosomal abnormalities was found in the lymphocytes of patients who had received long term somatropin therapy.

6. PHARMACEUTICAL PROPERTIES

6.1 List of excipients

Powder: Front compartment	Solvent: Rear compartment
Glycine	Water for injections
Monobasic sodium phosphate	Meta-cresol
Dibasic sodium phosphate	Mannitol.
Mannitol.	

6.2 Incompatibilities

Should be reconstituted only in the supplied solvent.

6.3 Shelf life

3 years.

6.4 Special precautions for storage

The product should be stored and transported at 2°C - 8°C. The product should not be frozen and should be protected from light.

Unreconstituted GENOTROPIN can be stored at room temperature (at or below 25°C) by the patient for 1 month.

After reconstitution GENOTROPIN can be stored in the refrigerator for 4 weeks at 2°C-8°C protected from light. It should not be carried in the shirt pocket or in a school bag but should be kept in the refrigerator.

6.5 Nature and contents of container

GENOTROPIN is dispensed in a special glass ampoule, a so-called two-chamber cartridge, with the active substance in one chamber and solvent in the other. GENOTROPIN cartridges are supplied for use in a re-usable Pfizer injection device (GENOTROPIN Pen), or sealed in a disposable pre-filled pen (GENOTROPIN *GoQuick*).

The GENOTROPIN Pens are colour coded, and **must** be used with the matching colour coded GENOTROPIN cartridge to give the correct dose: GENOTROPIN Pen 5 (green) **must** be used with GENOTROPIN 5 mg cartridge (green); GENOTROPIN Pen 5.3 (blue) **must** be used with GENOTROPIN 5.3 mg cartridge (blue); GENOTROPIN Pen 12 (purple) **must** be used with GENOTROPIN 12 mg cartridge (purple).

The GENOTROPIN 5 mg *GoQuick* pen is colour coded green. The GENOTROPIN 5.3 mg *GoQuick* pen is colour coded blue. The GENOTROPIN 12 mg *GoQuick* pen is colour coded purple.

GENOTROPIN / GENOTROPIN *GoQuick* 5 mg cartridge, 1's and 5's
GENOTROPIN / GENOTROPIN *GoQuick* 5.3 mg cartridge, 1's and 5's

GENOTROPIN / GENOTROPIN *GoQuick* 12 mg cartridge, 1's and 5's

Not all presentations and/or pack sizes may be marketed.

6.6 Special precautions for disposal and other handling

The solution is prepared by screwing the injection device or *GoQuick* pen sections together so that the solvent will be mixed with the powder in the two-chamber cartridge. Gently dissolve the drug with a slow, swirling motion. Do not shake vigorously, this might cause denaturation of the active ingredient.

When using an injection device or the *GoQuick* prefilled pen the injection needle should be screwed on before reconstitution.

The reconstituted solution is almost colourless or slightly opalescent. The reconstituted solution for injection is to be inspected prior to use and only clear solutions without particles should be used.

Any unused medicine or waste material should be disposed of in accordance with local requirements. Empty GENOTROPIN *GoQuick* pens should never be refilled and must be disposed of properly.

7. MEDICINE SCHEDULE

Prescription Medicine.

8. SPONSOR

Pfizer New Zealand Limited
PO Box 3998
Auckland, New Zealand 1140
Toll Free number: 0800 736 363

9. DATE OF FIRST APPROVAL

3 February 1989

10. DATE OF REVISION OF THE TEXT

3 September 2018

Summary Table of Changes

Section changed	Summary of new information
Section 4.2	Inclusion on information that women, especially those on oral oestrogen may require a higher dose compared to men
Section 4.4	Inclusion of warning for hypoadrenalism
Section 4.4	Inclusion of warning for women that start or stop taking oral oestrogen
Section 4.5	Inclusion of interaction with glucocorticoids

Section 4.5	Inclusion of information on hypoadrenalism
Section 4.5	Inclusion of interaction with oral oestrogen