somatropin (recombinant) (see ma-tree-pin)

**SALT**

**Classification**
Therapeutic: Hormones
Pharmacologic: Growth hormones

**Pregnancy Category C**

**Indications**
Growth failure in children due to inadequate secretion of growth hormone. Growth hormone deficiency in adults as a result of pituitary disease, hypopituitarism, surgery, radiation or trauma.

**Action**
Producer: growth (skeletal and cellular). Metabolic actions include: increased protein synthesis, increased carbohydrate metabolism; lipid mobilization; retention of sodium, phosphorus, and potassium. Somatropin has the same amino acid sequence as naturally occurring growth hormone and is produced by recombinant DNA techniques. Growth hormone enhances GI tract mucosal transport of water, electrolytes and nutrients.

**Therapeutic Effects:**
Increased skeletal growth in children with growth hormone deficiency. Replacement of somatropin in deficient adults. Increased bone density in adult growth hormone–deficient patients.

**Pharmacokinetics**

**Absorption:** Well absorbed.

**Distribution:** Localize to highly perfused organs (liver, kidneys).

**Metabolism and Excretion:** Broken down in renal cells to amino acids that are recirculated; some liver metabolism.

**Half-life:** Subcut—3.8 hr; IM—4.9 hr.

**TIME/ACTION PROFILE (growth)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM</td>
<td>within 3 mo</td>
<td>unknown</td>
<td>12–48 hr</td>
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**Contraindications/Precautions**

**Contraindicated in:**
Closure of epiphyses; Active neoplasia; Hypersensitivity to growth hormone or benzyl alcohol preservative; Acute critical illness (therapy should not be initiated) or respiratory failure; Diabetic mitigative; Prader-Willi syndrome with obesity and respiratory impairment. Risk of fatal complications; can be used only if growth hormone deficiency is documented.

Use Cautiously in:
Growth hormone deficiency due to intracranial lesion; Coexisting adrenocorticotropic hormone (ACTH) deficiency; Diabetes (may cause insulin resistance). Geriatric patients (7 sensitivity); Risk of adverse reactions; Thyroid disorders; Na. cromoglicate, monobenzone, nisentil, sulfasalazine, thalidomide, prednisone, thyroid hormones (growth hormone is ineffective in these patients). Thyroid function tests prior to and during therapy. May increase T4, T3, TSH, or PTH levels.

**Adverse Reactions/Side Effects**

**CV:**
edema of the hands and feet.

**Derm:**
exacerbation of pre-existing psoriasis.

**Endo:**
hyperglycemia, hypothyroidism, increased hepatic function tests.

**Local:**
pain at injection site, local lipoatrophy or lipodystrophy with subcutaneous use.

**MS:**
arthralgia, musculoskeletal pain, swelling, stiffness.

**Interactions**

**Drug-Drug:**
Excessive corticosteroid use (equivalent to 10–15 mg/m2/day) may decrease response to growth hormone.

**Route/Dosage**

**Subcut, IM (Adults):**
initially 0.005 mg/kg/day, may be increased to 0.01 mg/kg/day after 4 wk.

**Subcut, IM (Children):**
0.06 mg (0.18 unit/kg) 3 times weekly.

**NURSING IMPLICATIONS**

**Assessment**

**Growth Failure:**
Monitor bone age annually and growth rate determinations, height, and weight every 3–6 mo during therapy.

**Lab Test Considerations:**
Monitor thyroid function prior to and during therapy. May decrease T4, T3, TSH, and PTH levels. Hyperglycemia necessitates concurrent thyroid replacement for growth hormone to be effective. Serum magnesium, phosphorus, alkaline phosphatase, and parathyroid hormone may be decreased.

**Monitor blood glucose periodically during therapy. Diabetics patients may require 2–3 mo to reach goal.

**Monitor for development of neutralizing antibodies if growth rate does not exceed 2.5 cm/6 mo.**

**Adverse Reactions:**

**Discontinued**
Monitor alkaline phosphatase closely in patients with adult growth hormone deficiency.

Potential Nursing Diagnoses
Disturbed body image (Indications)

Implementation
- Rotate injection sites with each injection.
- Solution: Reconstitute each 5-mg vial with 1–3 mL of bacteriostatic water for injection; use 2–3 mL for 8.8-mg vial. Aim the liquid against glass vial wall. Do not shake, swirl gently to dissolve. Solution is clear; do not use solutions that are cloudy or contain a precipitate. Reconstituted vials are stable for 14 days if refrigerated. To use cool, lock needle-free injector, wind the device to energize the spring, and draw medication into the Crystal Check nozzle. Using firm pressure at the injection site, hold the injector at a 90° angle and press the blue actuator button.
- Subcut: Injection volume should not exceed 1 mL.

Patient/Family Teaching
- Instruct patient and parents on correct procedure for reconstituting medication, site selection, technique for subcut injection, and disposal of needles and syringes. Review dosage schedule. Parents should report persistent pain or edema at injection site.
- Explain rationale for prohibition of use for increasing athletic performance. Administration to persons without growth hormone deficiency or after epiphyseal closure may result in acromegaly (coarsening of facial features; enlarged hands, feet, and internal organs; increased blood glucose; hypertension).
- Emphasize need for regular follow-up with endocrinologist to ensure appropriate growth rate, to evaluate lab work, and to determine bone age by x-ray exam.
- Assure parents and child that these dose forms are synthetic and therefore not capable of transmitting Creutzfeldt-Jakob disease, as was the original somatropin, which was extracted from human cadavers.

Evaluation/Desired Outcomes
- Child’s attainment of adult height in growth failure secondary to pituitary growth hormone deficiency. Therapy is limited in period before closure of epiphyseal plates (approximately up to 14–15 yr in girls, 15–16 yr in boys).
- Replacement of growth hormone in deficient adults.

Why was this drug prescribed for your patient?