

ing storage. Most somatropin products result in clear solutions when reconstituted correctly. Shaking may result in cloudiness, rendering the products unacceptable for use. Reconstituted Nutropin Depot is a thick, milky suspension. (2)

Stability after reconstitution is variable among the products and depends on whether a preservative-containing diluent is used. See Table 1. Unpreserved reconstituted products of Genotropin and Humatrope should be stored under refrigeration and used within 24 hours. Nutropin Depot suspension should be used immediately upon reconstitution, discarding any unused remainder. Products reconstituted with the specified preserved diluents are stable for longer periods. After reconstitution with the appropriate preserved diluent, Norditropin and Nutropin are stable for 14 days, Genotropin for 21 days, and Humatrope for 28 days stored under refrigeration. Nutropin AQ is stable for 28 days after initial stopper penetration when stored under refrigeration. (2)

Intact containers of somatropin products derived from mammalian cells should be stored at controlled room temperature. Saizen reconstituted with the preserved diluent provided is stable for 14 days after reconstitution when stored under refrigeration. Serostim reconstituted with the unpreserved diluent provided is stable for 24 hours stored under refrigeration. Freezing of reconstituted solutions should be avoided. (2)

Syringes — Somatropin (Humatrope) was reconstituted to concentrations of 1 and 3.33 mg/mL with the accompanying diluent; the diluent contains glycerin 1.7% and *m*-cresol 0.3% as a preservative. The reconstituted product at each concentration was packaged in 1-mL plastic syringes with barrels composed of polypropylene (Becton-Dickinson) or propylene-ethylene copolymer (Terumo) and capped and

Table 1. Recommended Stability Periods for Somatropin Products Using Diluents with and without Preservatives and Stored under Refrigeration (2)

Product	Stability Period
<u>Diluent with Preservative</u>	
Genotropin 5.8 and 13.8 mg	21 days
Humatrope	28 days
Norditropin	14 days
Nutropin	14 days
Nutropin AQ	28 days ^a
Saizen	14 days
<u>Diluent without Preservative</u>	
Genotropin 1.5 mg	24 hr
Humatrope	24 hr
Serostim	24 hr

^aPeriod after initial penetration of the vial stopper of this liquid product.

stored under refrigeration at about 5 °C for 28 days. HPLC analysis found little or no loss of somatropin stored in either syringe. The solutions remained visually acceptable for 28 days in the polypropylene syringes, but an unacceptable turbidity formed within 21 days in the propylene-ethylene copolymer syringes, which became a precipitate by 28 days. The preservative, *m*-cresol, concentrations fell up to 4% but remained above the minimum acceptable concentration. The authors stated that somatropin should be stored no more than 14 days at 5 °C in propylene-ethylene copolymer syringes. Storage up to 28 days was acceptable in the polypropylene syringes. (2210)

STERILE WATER FOR INJECTION AHFS 96:00

Products — Sterile water for injection is available in ampuls, vials, and plastic bags in sizes ranging from 5 mL to 5 L. This diluent is a pharmaceutical aid that contains no antimicrobial preservative or any other solute but must have drugs or other solutes added prior to administration. (1-2/08; 29)

pH — From 5 to 7. (1-2/08; 17)

Osmolality — Sterile water for injection has an osmolality of 0 mOsm/kg. It is incompatible with blood and will cause hemolysis if administered intravenously in sufficient quantity. (1-2/08)

Administration — Sterile water for injection is intended for use as a pharmaceutical aid in dissolving or diluting drugs for subcutaneous, intramuscular, and intravenous injection. It must not be administered intravenously without the addition of a sufficient amount of drugs or

other solutes to provide adequate osmolality to make the solution approximately isotonic. (1-2/08) Death and injury have resulted from hemolysis caused by intravenous administration of a sufficient volume of sterile water for injection and other low-osmolality solutions. (4; 1942; 2072; 2073; 2481; 2482)

For patient safety, medical orders for large volumes of sterile water for injection, especially plastic bags of any size, without the addition of sufficient drug or solute to render the solutions approximately isotonic (about 308 mOsm/kg) should not be permitted. Immediate consultation with the prescriber or referral to the institutional medical peer review process may be necessary to avoid possible patient harm. Large-volume containers of sterile water for injection should be stored only in pharmacies and not in patient care areas. Suitable warnings near the stored product and computer system alerts should remind staff that sterile water for injection is for diluent use only. (2481)

Stability — The intact single-use containers of sterile water for injection should be stored at controlled room temperature. (1-2/08)