

PRODUCT MONOGRAPH

ALBUMIN (HUMAN) 25% SOLUTION, USP

Albumin (Human) 25%, USP

Intravenous Solution, 25%

Manufacturer's Standard

Plasma Substitute/Blood Derivative

Manufactured by:
Talecris Biotherapeutics, Inc.
8368 U.S. 70 West
Clayton, North Carolina
27520
U.S.A.

Imported and Distributed by:
Talecris Biotherapeutics Ltd.
5800 Explorer Drive
Suite 300
Mississauga, Ontario
L4W 5K9

Date of Approval:
June 30, 2006

Prepared for:
Canadian Blood Services
Ottawa, Ontario
K1G 4J5

Prepared for:
Héma-Québec
Saint-Laurent, Québec
H4R 2W7

Submission Control No: 104462

Table of Contents

PART I: HEALTH PROFESSIONAL INFORMATION.....	3
SUMMARY PRODUCT INFORMATION	3
DESCRIPTION.....	3
INDICATIONS AND CLINICAL USE.....	3
CONTRAINDICATIONS	6
WARNINGS AND PRECAUTIONS.....	6
ADVERSE REACTIONS.....	8
DRUG INTERACTIONS	8
DOSAGE AND ADMINISTRATION	9
OVERDOSAGE	11
ACTION AND CLINICAL PHARMACOLOGY	11
STORAGE AND STABILITY.....	11
DOSAGE FORMS, COMPOSITION AND PACKAGING	12
PART II: SCIENTIFIC INFORMATION	13
PHARMACEUTICAL INFORMATION.....	13
CLINICAL TRIALS	13
DETAILED PHARMACOLOGY	13
REFERENCES	15
PART III: CONSUMER INFORMATION.....	17

ALBUMIN (HUMAN) 25% SOLUTION, USP

Albumin (Human) 25%, USP

PART I: HEALTH PROFESSIONAL INFORMATION

SUMMARY PRODUCT INFORMATION

Table 1 – Product Information Summary

Route of Administration	Dosage Form, Strength	Clinically Relevant Nonmedicinal Ingredients
Intravenous injection	Intravenous solution, 25%	<i>For a complete listing see DOSAGE FORMS, COMPOSITION AND PACKAGING section.</i>

DESCRIPTION

ALBUMIN (HUMAN) 25% SOLUTION, USP (Albumin [Human] 25%, USP) is a 25% sterile solution of albumin in an aqueous diluent. The preparation is stabilized with 0.02 M sodium caprylate and 0.02 M acetyltryptophan and buffered with sodium carbonate. The approximate sodium content of the product is 145 mEq/L. It contains no preservative. ALBUMIN (HUMAN) 25% SOLUTION, USP must be administered intravenously.

ALBUMIN (HUMAN) 25% SOLUTION, USP is made from pooled human venous plasma using the Cohn cold ethanol fractionation process. It is prepared in accordance with the applicable requirements established by the U.S. Food and Drug Administration. Plasma used in the manufacture of the product has been collected in Canada from volunteer donors.

INDICATIONS AND CLINICAL USE

The oncotic and colloid properties of ALBUMIN (HUMAN) 25% SOLUTION, USP are used to restore and maintain circulating blood volume, when needed, and when the use of a colloid is appropriate. The choice of ALBUMIN (HUMAN) 25% SOLUTION, USP over artificial colloid or crystalloid solutions will depend on the clinical situation of the individual patient, according to current therapeutic guidelines and recommendations.

Emergency Treatment of Hypovolemic Shock

ALBUMIN (HUMAN) 25% SOLUTION, USP is hyperoncotic and on intravenous infusion will expand the plasma volume by an additional amount three to four times the volume actually administered, by withdrawing fluid from the interstitial spaces, provided the patient is normally hydrated interstitially or there is interstitial edema (1). If the patient is dehydrated, additional

crystalloids must be given (2) or alternatively, ALBUMIN (HUMAN) 25% SOLUTION, USP should be used. The patient's hemodynamic response should be monitored and the usual precautions against circulatory overload observed. The total dose should not exceed the level of albumin found in the normal individual, i.e., about 2 g per kg body weight in the absence of active bleeding. Although Albumin (Human) 5% is to be preferred for the usual volume deficits, ALBUMIN (HUMAN) 25% SOLUTION, USP with appropriate crystalloids may offer therapeutic advantages in oncotic deficits or in long-standing shock where treatment has been delayed (3,4).

Removal of ascitic fluid from a patient with cirrhosis may cause changes in cardiovascular function and even result in hypovolemic shock. In such circumstances, the use of an albumin infusion may be required to support the blood volume (3,4).

Burn Therapy

An optimal therapeutic regimen with respect to the administration of colloids, crystalloids, and water following extensive burns has not been established. During the first 24 hours after sustaining thermal injury, large volumes of crystalloids are infused to restore the depleted extracellular fluid volume. Beyond 24 hours ALBUMIN (HUMAN) 25% SOLUTION, USP can be used to maintain plasma colloid osmotic pressure.

Hypoproteinemia With or Without Edema

During major surgery, patients can lose over half of their circulating albumin with the attendant complications of oncotic deficit (2-5). A similar situation can occur in sepsis or intensive care patients. Treatment with ALBUMIN (HUMAN) 25% SOLUTION, USP may be of value in such cases (3,4).

Adult Respiratory Distress Syndrome (ARDS)

This is characterized by deficient oxygenation caused by pulmonary interstitial edema complicating shock and postsurgical conditions. When clinical signs are those of hypoproteinemia with a fluid volume overload, ALBUMIN (HUMAN) 25% SOLUTION, USP together with a diuretic may play a role in therapy (3-5).

Cardiopulmonary Bypass

With the relatively small priming volume required with modern pumps, preoperative dilution of the blood using albumin and crystalloid has been shown to be safe and well-tolerated. Although the limit to which the hematocrit and plasma protein concentration can be safely lowered has not been defined, it is common practice to adjust the albumin and crystalloid pump prime to achieve a hematocrit of 20% and a plasma albumin concentration of 2.5 g per 100 mL in the patient (3,4,6).

Acute Liver Failure

In the uncommon situation of rapid loss of liver function with or without coma, administration of albumin may serve the double purpose of supporting the colloid osmotic pressure of the plasma as well as binding excess plasma bilirubin (3,4).

Neonatal Hemolytic Disease

The administration of ALBUMIN (HUMAN) 25% SOLUTION, USP may be indicated prior to exchange transfusion, in order to bind free bilirubin, thus lessening the risk of kernicterus. A dosage of 1 g/kg body weight is given about 1 hour prior to exchange transfusion. Caution must be observed in hypervolemic infants (see [WARNINGS AND PRECAUTIONS](#)) (3,4,7).

Sequestration Of Protein Rich Fluids

This occurs in such conditions as acute peritonitis, pancreatitis, mediastinitis, and extensive cellulitis. The magnitude of loss into the third space may require treatment of reduced volume or oncotic activity with an infusion of albumin (8).

Erythrocyte Resuspension

Albumin may be required to avoid excessive hypoproteinemia, during certain types of exchange transfusion, or with the use of very large volumes of previously frozen or washed red cells. About 25 g of albumin per liter of erythrocytes is commonly used, although the requirements in preexistent hypoproteinemia or hepatic impairment can be greater. ALBUMIN (HUMAN) 25% SOLUTION, USP is added to the isotonic suspension of washed red cells immediately prior to transfusion (3,4).

Acute Nephrosis

Certain patients may not respond to cyclophosphamide or steroid therapy. The steroids may even aggravate the underlying edema. In this situation a loop diuretic and 100 mL ALBUMIN (HUMAN) 25% SOLUTION, USP repeated daily for 7 to 10 days may be helpful in controlling the edema and the patient may then respond to steroid treatment (3,4).

Renal Dialysis

Although not part of the regular regimen of renal dialysis, ALBUMIN (HUMAN) 25% SOLUTION, USP may be of value in the treatment of shock or hypotension in these patients. The usual volume administered is about 100 mL, taking particular care to avoid fluid overload as these patients are often fluid overloaded and cannot tolerate substantial volumes of salt solution.

Situations in Which Albumin Administration is Not Warranted

In chronic nephrosis, infused albumin is promptly excreted by the kidneys with no relief of the chronic edema or effect on the underlying renal lesion. It is of occasional use in the rapid "priming" diuresis of nephrosis. Similarly, in hypoproteinemic states associated with chronic

cirrhosis, malabsorption, protein losing enteropathies, pancreatic insufficiency, and undernutrition, the infusion of albumin as a source of protein nutrition is not justified (3,4).

CONTRAINDICATIONS

- ALBUMIN (HUMAN) 25% SOLUTION, USP should not be given to patients who are hypersensitive to albumin or to any ingredient in the formulation or component of the container. For a complete listing, see the [DOSAGE FORMS, COMPOSITION AND PACKAGING](#) section.
- ALBUMIN (HUMAN) 25% SOLUTION, USP should not be given to patients at special risk of developing circulatory overload (i.e., those with a history of congestive cardiac failure, renal insufficiency or stabilized chronic anemia).

WARNINGS AND PRECAUTIONS

Serious Warnings and Precautions

- Products made from human plasma may contain infectious agents such as viruses, and theoretically, the Creutzfeldt-Jakob (CJD) agent (see [WARNINGS AND PRECAUTIONS: General](#)).

General

ALBUMIN (HUMAN) 25% SOLUTION, USP is made from human plasma. Products made from human plasma may contain infectious agents, such as viruses, that can cause disease. The risk that such products will transmit an infectious agent has been reduced by screening plasma donors for prior exposure to certain viruses, by testing for the presence of certain current virus infections, and by inactivating and/or removing certain viruses. Despite these measures, such products can still potentially transmit disease. There is also the possibility that unknown infectious agents may be present in such products. Individuals who receive infusions of blood or plasma products may develop signs and/or symptoms of some viral infections, particularly hepatitis C. ALL infections thought by a physician possibly to have been transmitted by this product should be reported by the physician or other healthcare provider to Talecris Biotherapeutics Ltd. [1-866-482-5226].

Albumin is a derivative of human blood. Based on effective donor screening and product manufacturing processes, it carries an extremely remote risk for transmission of viral diseases. A theoretical risk for transmission of Creutzfeldt-Jakob Disease (CJD), including variant Creutzfeldt-Jakob disease (vCJD), also is considered extremely remote. No cases of transmission of viral diseases or CJD, including vCJD, have ever been identified for albumin (9,10).

The physician should discuss the risks and benefits of this product with the patient, before prescribing or administering to the patient.

ALBUMIN (HUMAN) 25% SOLUTION, USP must not be diluted with sterile water for injection as this may cause hemolysis and acute renal failure in recipients (see [DOSAGE AND ADMINISTRATION](#)).

Blood coagulation parameters, the hematocrit and serum electrolytes should be monitored when a large volume of ALBUMIN (HUMAN) 25% SOLUTION, USP solution is administered.

Patients should always be monitored carefully in order to guard against the possibility of circulatory overload. ALBUMIN (HUMAN) 25% SOLUTION, USP is hyperoncotic, therefore, in the presence of dehydration, albumin must be given with or followed by addition of fluids (2).

ALBUMIN (HUMAN) 25% SOLUTION, USP is not tested for aluminum content and may contain more than 200 µg/L of aluminum. It should, therefore, not be used to treat infants or patients on hemodialysis.

In hemorrhage the administration of albumin should be supplemented by the transfusion of whole blood to treat the relative anemia associated with hemodilution (11). When circulating blood volume has been reduced, hemodilution following the administration of albumin persists for many hours. In patients with a normal blood volume, hemodilution lasts for a much shorter period (2,12,13).

The rapid rise in blood pressure which may follow the administration of a colloid with positive oncotic activity necessitates careful observation to detect and treat severed blood vessels which may not have bled at the lower blood pressure.

Special Populations

Pregnant and Nursing Women

Animal reproduction studies have not been conducted with ALBUMIN (HUMAN) 25% SOLUTION, USP. It is not known whether it can cause harm to the fetus or nursing child. ALBUMIN (HUMAN) 25% SOLUTION, USP should be given to a pregnant or nursing woman only if the benefit outweighs any potential risk.

Pediatrics

The use of ALBUMIN (HUMAN) 25% SOLUTION, USP in children has not been associated with any special or specific hazard, if the dose is appropriate for the child's body weight. However, its use should be carefully evaluated for risk and benefit in pediatric treatment and ALBUMIN (HUMAN) 25% SOLUTION, USP should not be used in neonates and infants (see [WARNINGS AND PRECAUTIONS: General](#)).

ADVERSE REACTIONS

Adverse Drug Reaction Overview

Adverse reactions to albumin are rare. Such reactions may be allergic in nature or due to high plasma protein levels from excessive albumin administration. Allergic manifestations include urticaria, chills, fever, and changes in respiration, pulse and blood pressure. The possibility of an anaphylactic reaction occurring in association with albumin is considered extremely rare. In the case of an anaphylactic reaction, discontinue infusion and treat appropriately.

The Cochrane Injuries Group published a meta-analysis (July 1998) in which an increase in mortality was reported in albumin-treated patients compared to patients who had received crystalloids or no treatment. However, the analysis was criticized by many authors, due to substantial methodological concerns (15-20).

In 2001, Wilkes et. al. published a revised meta-analysis, which showed no evidence of excess albumin-associated mortality, but suggested that albumin might actually reduce mortality (16).

The Saline versus Albumin Fluid Evaluation (SAFE) Study (20) reported in the New England Journal of Medicine in May 2004, involving nearly 7,000 critically ill patients, addressed one of the most fundamental and contentious issues in critical care: the value of colloids as opposed to crystalloids in the resuscitation of seriously ill patients. Based on these results, the administration of albumin appears to be safe for up to 28 days in a heterogeneous population of critically ill patients, and may be beneficial in patients with severe sepsis. A greater number of patients with trauma involving brain injury died among those randomly assigned to albumin as opposed to saline (59 of 241 in the albumin group compared to 38 of 251 in the saline group with a relative risk of 1.62 and $p=0.009$). However, the overall number of these patients was relatively small. The study had insufficient power to detect differences in mortality among the predefined subgroups and the authors warn that the observed difference should be interpreted with caution.

A second review by the Albumin Reviewers of the Cochrane Collaboration, published in October 2004 (19), included the results of the SAFE study and concluded that “there is no evidence that albumin reduces mortality when compared with cheaper alternatives, such as saline”, for patients with hypovolemia or in critically ill patients with burns and hypoalbuminemia.

DRUG INTERACTIONS

Drug-Drug Interactions

ALBUMIN (HUMAN) 25% SOLUTION, USP is compatible with the standard isotonic carbohydrate and electrolyte solutions intended for intravenous use. It should not be mixed with protein hydrolysates, amino acid solutions or solutions containing alcohol. It should also not be mixed with whole blood, packed red cells, and other medicinal products. Specialized references

(e.g. Trissel's Handbook of Injectable Drugs) should be consulted for specific compatibility information.

DOSAGE AND ADMINISTRATION

Recommended Dose and Dosage Adjustment

The infusion rate must be adjusted to individual requirements, based on initial assessment and monitoring of the patient's status. It should normally not exceed 1 to 2 mL/minute.

Hypovolemic Shock

For treatment of hypovolemic shock, the volume administered and the speed of infusion should be adapted to the response of the individual patient.

Burn Therapy

After a burn injury (usually beyond 24 hours) there is a close correlation between the amount of albumin infused and the resultant increase in plasma colloid osmotic pressure. The aim should be to maintain the plasma albumin concentration in the region of $2.5 \text{ g} \pm 0.5 \text{ g}$ per 100 mL with a plasma oncotic pressure of 20 mmHg (equivalent to a total plasma protein concentration of 5.2 g per 100 mL) (3,4). This is best achieved by the intravenous administration of Albumin (Human) 25%, USP. The duration of therapy is decided by the loss of protein from the burned areas and in the urine. In addition, oral or parenteral feeding with amino acids should be initiated, as the long-term administration of albumin should not be considered as a source of nutrition.

Hypoproteinemia With or Without Edema

Unless the underlying pathology responsible for the hypoproteinemia can be corrected, the intravenous administration of ALBUMIN (HUMAN) 25% SOLUTION, USP must be considered purely symptomatic or supportive (see [INDICATIONS AND CLINICAL USE: Situations in Which Albumin Administration is Not Warranted](#)) (3,4). The usual daily dose of albumin for adults is 50 to 75 g and for children 25 g. Patients with severe hypoproteinemia who continue to lose albumin may require larger quantities. Since hypoproteinemic patients usually have approximately normal blood volumes, the rate of administration of ALBUMIN (HUMAN) 25% SOLUTION, USP should not exceed 2 mL per minute, as more rapid injection may precipitate circulatory embarrassment and pulmonary edema.

Adult Respiratory Distress Syndrome (ARDS)

See [INDICATIONS AND CLINICAL USE: Adult Respiratory Distress Syndrome \(ARDS\)](#).

Cardiopulmonary Bypass

See [INDICATIONS AND CLINICAL USE: Cardiopulmonary Bypass](#).

Acute Liver Failure

See [INDICATIONS AND CLINICAL USE: Acute Liver Failure](#).

Neonatal Hemolytic Disease

See [INDICATIONS AND CLINICAL USE: Neonatal Hemolytic Disease](#).

Sequestration of Protein Rich Fluids

See [INDICATIONS AND CLINICAL USE: Sequestration Of Protein Rich Fluids](#).

Erythrocyte Resuspension

See [INDICATIONS AND CLINICAL USE: Erythrocyte Resuspension](#).

Acute Nephrosis

See [INDICATIONS AND CLINICAL USE: Acute Nephrosis](#).

Renal Dialysis

See [INDICATIONS AND CLINICAL USE: Renal Dialysis](#).

Administration

ALBUMIN (HUMAN) 25% SOLUTION, USP should always be administered by intravenous infusion. If sodium restriction is required, ALBUMIN (HUMAN) 25% SOLUTION, USP may be administered either undiluted or diluted in a sodium-free carbohydrate solution such as 5% dextrose in water. ALBUMIN (HUMAN) 25% SOLUTION, USP must not be diluted with sterile water for injection to avoid hemolysis and acute renal failure in recipients (see [DRUG INTERACTIONS](#)).

Remove seal to expose stopper. Always swab stopper top immediately with a suitable antiseptic prior to entering vial.

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit.

Only 16 gauge needles should be used with 20 mL vial sizes and larger. Needles should only be inserted within the stopper area delineated by the raised ring. The stopper should be penetrated perpendicular to the plane of the stopper within the ring.

Solutions which have been frozen should not be used. Do not use if turbid. Do not begin administration more than 4 hours after the container has been entered. Partially used vials must be discarded. Vials which are cracked or which have been previously entered or damaged should not be used, as this may have allowed the entry of microorganisms. ALBUMIN (HUMAN) 25% SOLUTION, USP contains no preservative.

THERE EXISTS A RISK OF POTENTIALLY FATAL HEMOLYSIS AND ACUTE RENAL FAILURE FROM THE USE OF STERILE WATER FOR INJECTION AS A DILUENT FOR ALBUMIN (HUMAN) 25% SOLUTION, USP. ACCEPTABLE DILUENTS INCLUDE 0.9% SODIUM CHLORIDE OR 5% DEXTROSE IN WATER.

OVERDOSAGE

To date, there have been no reported cases of overdose for ALBUMIN (HUMAN) 25% SOLUTION, USP. No data are available in regard to overdosage in humans; however, because ALBUMIN (HUMAN) 25% SOLUTION, USP is hyperoncotic, patients should be monitored against the possibility of circulatory overload. If overdose occurs, provide standard supportive treatment as necessary.

Hypervolemia may occur if the dosage and rate of infusion are too high. If hypervolemia is suspected, the infusion should be stopped immediately and the patient's hemodynamic parameters should be carefully monitored.

ACTION AND CLINICAL PHARMACOLOGY

Mechanism of Action

Each 50 mL vial of ALBUMIN (HUMAN) 25% SOLUTION, USP supplies the oncotic (colloid osmotic) equivalent of approximately 250 mL citrated plasma: 100 mL supplies the oncotic equivalent of approximately 500 mL citrated plasma.

When administered intravenously to an adequately hydrated subject, the oncotic effect of 100 mL ALBUMIN (HUMAN) 25% SOLUTION, USP is such that it will draw approximately a further 350 mL of fluid from the extravascular tissues into the circulation within 15 minutes (1), thus increasing the total blood volume and reducing both hemoconcentration and whole blood viscosity. Accordingly, the main clinical indications are for hypoproteinemic states involving reduced oncotic pressure, with or without accompanying edema (3,4). ALBUMIN (HUMAN) 25% SOLUTION, USP can also be used as a plasma volume expander.

Albumin is a transport protein that binds to many substances, including drugs and bilirubin. Infused albumin may reduce the level of free bilirubin in the blood (7).

This could also be of importance in acute liver failure where albumin might serve the dual role of supporting plasma oncotic pressure, as well as binding excessive plasma bilirubin (3,4).

STORAGE AND STABILITY

Store at room temperature not exceeding 30°C (86°F). Do not freeze. Do not use after expiration date.

The product should be used within 4 hours after the container has been entered.

DOSAGE FORMS, COMPOSITION AND PACKAGING

ALBUMIN (HUMAN) 25% SOLUTION, USP is available in 50 mL, and 100 mL rubber-stoppered vials. Each vial contains albumin in the amounts listed in [Table 2](#).

Table 2 – Available ALBUMIN (HUMAN) 25% SOLUTION, USP -25 Vial Sizes

Size	Administration Set	Grams Albumin
50 mL	Not included	12.5
100 mL	Not included	25.0

Administration sets are available from Canadian Blood Services as a separate item.

ALBUMIN (HUMAN) 25% SOLUTION, USP is a 25% sterile solution of albumin in an aqueous diluent. The preparation is stabilized with 0.02 M sodium caprylate and 0.02 M acetyltryptophan and buffered with sodium carbonate. The approximate sodium content of the product is 145 mEq/L. It contains no preservative.

PART II: SCIENTIFIC INFORMATION

PHARMACEUTICAL INFORMATION

Drug Substance

Proper name: ALBUMIN (HUMAN) 25% SOLUTION, USP

Common name: Albumin (Human) 25%, USP

Product Characteristics

ALBUMIN (HUMAN) 25% SOLUTION, USP is a 25% sterile solution of albumin in an aqueous diluent. ALBUMIN (HUMAN) 25% SOLUTION, USP has a pH of 6.4 to 7.4 and a molecular weight of 66,563 Da. The preparation is stabilized with 0.02 M sodium caprylate and 0.02 M acetyltryptophan and buffered with sodium carbonate. The approximate sodium content of the product is 145 mEq/L. It contains no preservative. ALBUMIN (HUMAN) 25% SOLUTION, USP must be administered intravenously.

Viral Inactivation

In addition to the process relevant virus removal/inactivation steps, each vial of ALBUMIN (HUMAN) 25% SOLUTION, USP is heat treated at 60°C for 10 hours to reduce the possibility of transmission of some viruses, including HIV and the hepatitis viruses.

CLINICAL TRIALS

The clinical effectiveness of Albumin (Human), in the mentioned indications, has been determined through many years of clinical use and is described in a number of published studies and clinical practice guidelines.

DETAILED PHARMACOLOGY

See Product Monograph PART I: [ACTION AND CLINICAL PHARMACOLOGY](#).

Albumin regulates the volume of blood and accounts for 80% of the colloid osmotic pressure of plasma (25-33mmHg) (21). ALBUMIN (HUMAN) 25% SOLUTION, USP supplies the oncotic equivalent of approximately 5 times the volume of citrated plasma. ALBUMIN (HUMAN) 25% SOLUTION, USP is hyperoncotic and on intravenous infusion will expand the plasma volume by three to four times the volume actually administered by withdrawing fluid from interstitial spaces. In addition to restoring and maintaining blood volume through its stabilizing effect on the physical environment of blood, albumin also provides benefits as a transport vehicle for

metabolites, as a role player in lipid metabolism, and as a protective agent, binding to toxic waste. Some of the endogenous substances that bind to albumin and are subsequently transported include long chain fatty acids (crucial for lipid metabolism), steroid hormones (bind with low affinity to albumin allowing rapid delivery and release to tissues), peptide hormones, bilirubin (an exogenous toxin delivered to the liver for biliary excretion; also acts as an anti-oxidant when bound to albumin), tryptophan, vitamin D₃, folate, copper, zinc, calcium, magnesium, and chloride (21). For many hormones and vitamins, albumin does not serve as the main transport mechanism but functions as their reservoir, continuously replenishing the more specific transport proteins (21).

The half-life of albumin reported from multiple radiolabeled studies ranges between 14.8 days (using albumin prepared by cold-alcohol Cohn techniques [the method used in the manufacture of ALBUMIN (HUMAN) 25% SOLUTION, USP]) to 19.5 days (albumin prepared using gentle fractionation conditions). The degradation of albumin, occurring promptly after removal of albumin from circulation, is first-order with the amount of albumin degraded daily seemingly a function of total body albumin concentration (21). The large organs, the muscle and skin, account for most of the degradation of albumin with the kidney, spleen, and lower intestine being minor contributors as well (21). The end product of albumin degradation is free amino acids that remain available in the body for new protein formation.

REFERENCES

1. Heyl JT, Gibson JG, 2nd, Janeway CA. Studies on the plasma proteins. V. The effect of concentrated solutions of human and bovine serum albumin on blood volume after acute blood loss in man. *J Clin Invest* 1943;22(6):763-73.
2. Janeway CA, Gibson ST, Woodruff LM, Heyl JT, Bailey OT, Newhouser LR. Chemical, clinical, and immunological studies on the products of human plasma fractionation. VII. Concentrated human serum albumin. *J Clin Invest* 1944;23(4):465-90.
3. Tullis JL. Albumin. 1. Background and use. *JAMA* 1977;237(4):355-60.
4. Tullis JL. Albumin. 2. Guidelines for clinical use. *JAMA* 1977;237(5):460-3.
5. Skillman JJ, Tanenbaum BJ. Unrecognized losses of albumin, plasma, and red cells during abdominal vascular operations. *Curr Top Surg Res* 1970;2:523-33.
6. Zubiate P, Kay JH, Mendez AM, Krohn BG, Hochman R, Dunne EF. Coronary artery surgery. A new technique with use of little blood, if any. *J Thorac Cardiovasc Surg* 1974;68(2):263-7.
7. Comley A, Wood B. Albumin administration in exchange transfusion for hyperbilirubinaemia. *Arch Dis Child* 1968;43(228):151-4.
8. Clowes GH, Jr., Vucinic M, Weidner MG. Circulatory and metabolic alterations associated with survival or death in peritonitis: clinical analysis of 25 cases. *Ann Surg* 1966;163(6):866-85.
9. Lee DC, Stenland CJ, Hartwell RC, Ford EK, Cai K, Miller JL, et al. Monitoring plasma processing steps with a sensitive Western blot assay for the detection of the prion protein. *J Virol Methods* 2000;84(1):77-89.
10. Lee DC, Stenland CJ, Miller JL, Cai K, Ford EK, Gilligan KJ, et al. A direct relationship between the partitioning of the pathogenic prion protein and transmissible spongiform encephalopathy infectivity during the purification of plasma proteins. *Transfusion* 2001;41(4):449-55.
11. Heyl JT, Janeway CA. The use of human albumin in military medicine. I. The theoretical and experimental basis for its use. *US Navy Med Bull* 1942;40:785-91.
12. Janeway CA, Berenberg W, Hutchins G. Indications and uses of blood, blood derivatives and blood substitutes. *Med Clin North Am* 1945;29:1069-94.

13. Woodruff LM, Gibson ST. The clinical evaluation of human albumin. *US Navy Med Bull* 1942;40:791-6.
14. Stenland CJ, Lee DC, Brown P, Petteway SR, Jr., Rubenstein R. Partitioning of human and sheep forms of the pathogenic prion protein during the purification of therapeutic proteins from human plasma. *Transfusion* 2002;42(11):1497-500.
15. Cochrane Injuries Group Albumin Reviewers. Human albumin administration in critically ill patients: systematic review of randomised controlled trials. *BMJ* 1998;317(7153):235-40.
16. Wilkes MM, Navickis RJ. Patient survival after human albumin administration. A meta-analysis of randomized, controlled trials. *Ann Intern Med* 2001;135(3):149-64.
17. LeLorier J, Gregoire G, Benhaddad A, Lapierre J, Derderian F. Discrepancies between meta-analyses and subsequent large randomized, controlled trials. *N Engl J Med* 1997;337(8):536-42.
18. Petros A, Schindler M, Pierce C, Jacobe S, Mok Q. Human albumin administration in critically ill patients. Evidence needs to be shown in paediatrics. *BMJ* 1998;317(7162):882.
19. Alderson P, Bunn F, Lefebvre C, Li WP, Li L, Roberts I, et al. Human albumin solution for resuscitation and volume expansion in critically ill patients. *Cochrane Database Syst Rev* 2004(4):CD001208.
20. Finfer S, Bellomo R, Boyce N, French J, Myburgh J, Norton R. A comparison of albumin and saline for fluid resuscitation in the intensive care unit. *N Engl J Med* 2004;350(22):2247-56.
21. All About Albumin: Biochemistry, Genetics, and Medical Applications. Theodore Peters, Jr. San Diego, CA: Academic Press, 1996, pp. 76-132, 234-243, 245-250.

PART III: CONSUMER INFORMATION

ALBUMIN (HUMAN) 25% SOLUTION, USP

Albumin (Human) 25%, USP

This leaflet is Part 3 of a three-part "Product Monograph" published when ALBUMIN (HUMAN) 25% SOLUTION, USP was approved for sale in Canada and is designed specifically for Consumers. This leaflet is a summary and will not tell you everything about ALBUMIN (HUMAN) 25% SOLUTION, USP. Contact your doctor or pharmacist if you have any questions about the drug.

ABOUT THIS MEDICATION

What the medication is used for:

Albumin is a protein manufactured by the liver. It is most abundant in human plasma. Normally it constitutes about 55% of all plasma proteins. Albumin has multiple functions, including transport of many small molecules in the blood, such as bilirubin, calcium, and magnesium. Albumin also binds to toxins and heavy metals, thereby preventing damage they might otherwise cause to your body. One of albumin's major roles is in the maintenance of "osmotic or oncotic pressure" that causes fluid to remain within the blood stream instead of leaking out into the tissues.

Possible causes of a decrease in the level of albumin in the blood include liver or kidney disease or increased loss of albumin from circulation (e.g., due to shock). A diseased liver produces less albumin. In kidney disease, albumin can escape into the urine in large amounts. Severe malnutrition or a very low protein diet can also reduce the albumin level.

If the concentration of albumin gets very low, fluid moves from the blood vessels into the tissues, resulting in swelling in the ankles (edema). This fluid can also accumulate in the abdomen (ascites) and in the lungs (pulmonary edema).

What it does:

ALBUMIN (HUMAN) 25% SOLUTION, USP given by intravenous administration can help restore the fluid balance and help improve the problems that led to the low albumin level.

When it should not be used:

You should not use ALBUMIN (HUMAN) 25% SOLUTION, USP if you are allergic to albumin or to any ingredient in the formulation or component of the container.

You should not use ALBUMIN (HUMAN) 25% SOLUTION, USP if you have a history of the following conditions:

- congestive heart failure (the heart does not pump enough blood to the other organs)
- renal insufficiency (a loss of kidney function)
- stabilized chronic anemia (a decrease in the ability of red blood cells to carry oxygen for a prolonged period)

See also SIDE EFFECTS AND WHAT TO DO ABOUT THEM.

What the medicinal ingredient is:

ALBUMIN (HUMAN) 25% SOLUTION, USP contains human albumin (at a concentration of 25%).

What the nonmedicinal ingredients are:

ALBUMIN (HUMAN) 25% SOLUTION, USP also contains sodium caprylate (at a concentration of 0.02 M), acetyltryptophan (at a concentration of 0.02 M), which act as stabilizers. In addition, ALBUMIN (HUMAN) 25% SOLUTION, USP contains sodium carbonate as a buffer.

What dosage forms it comes in:

ALBUMIN (HUMAN) 25% SOLUTION, USP comes in 50 mL and 100 mL vials (with rubber stoppers).

WARNINGS AND PRECAUTIONS

Serious Warnings and Precautions

- ALBUMIN (HUMAN) 25% SOLUTION, USP like other products made from human plasma, part of our blood, may contain viruses or other agents that can cause infection and illness. However, the processes used to make ALBUMIN (HUMAN) 25% SOLUTION, USP are specifically designed with the ability to reduce these agents if they are present. You should discuss the risks and benefits of this product with your healthcare provider.

BEFORE you use ALBUMIN (HUMAN) 25% SOLUTION, USP talk to your doctor or pharmacist if:

- you are pregnant or breastfeeding
- you have had an allergic reaction to immune globulin or any of the other ingredients in the medicine
- you have had a history of congestive heart failure, renal insufficiency, or stabilized chronic anemia

INTERACTIONS WITH THIS MEDICATION

ALBUMIN (HUMAN) 25% SOLUTION, USP should not be mixed with protein hydrolysates, amino acid solutions or solutions containing alcohol. ALBUMIN (HUMAN) 25% SOLUTION, USP should not be mixed with whole blood, packed red cells, and other medicinal products.

See also ABOUT THIS MEDICATION: When it should not be used, and SIDE EFFECTS AND WHAT TO DO ABOUT THEM.

PROPER USE OF THIS MEDICATION

Usual dose

Your doctor will determine the amount of ALBUMIN (HUMAN) 25% SOLUTION, USP that is right for you and when your treatments should be given. A doctor, nurse or other caregiver trained to give injections will give you your treatment.

Overdose

If you or your healthcare professional suspects that you have received an overdose of ALBUMIN (HUMAN) 25% SOLUTION, USP, additional supportive treatment may be required.

Missed Dose

It is important that you receive ALBUMIN (HUMAN) 25% SOLUTION, USP as instructed by your healthcare professional. You should consult him/her if a treatment appointment is missed.

SIDE EFFECTS AND WHAT TO DO ABOUT THEM

Side effects following ALBUMIN (HUMAN) 25% SOLUTION, USP treatment are rare; however, high plasma protein levels may cause allergic reactions. Talk with your doctor immediately and stop your treatment if you experience any of these side effects:

- wheezing or trouble breathing
- chest tightness
- severe abdominal cramps
- severe vomiting
- severe diarrhea
- rash or hives (swelling, redness, intense itching, and burning)
- swelling of the lips, other parts of the parts of the mouth and throat, eyelids, genitals, hands or feet

This is not a complete list of side effects. For any unexpected effects while taking ALBUMIN (HUMAN) 25% SOLUTION, USP, contact your doctor or pharmacist.

HOW TO STORE IT

ALBUMIN (HUMAN) 25% SOLUTION, USP should be stored at room temperature not exceeding 30°C (86°F). It should not be frozen or used past the expiration date. The product should be used within 4 hours after the container has been entered.

REPORTING SUSPECTED SIDE EFFECTS

To monitor drug safety, Health Canada collects information on serious and unexpected effects of drugs. If you suspect you have had a serious or unexpected reaction to this drug you may notify Health Canada by:

toll-free telephone:	866-234-2345
toll-free fax:	866-678-6789
By email:	cadtmp@hc-sc.gc.ca
By regular mail:	National AR Centre Marketed Health Products Safety and Effectiveness Information Division Marketed Health Products Directorate Tunney's Pasture, AL 0701C Ottawa ON K1A 0K9

NOTE: Before contacting Health Canada, you should contact your physician or pharmacist.

MORE INFORMATION

This document, plus the full product monograph prepared for health professionals, can be obtained by contacting Talecris Biotherapeutics Ltd., at 1-866-482-5226.

This leaflet was prepared by:

Talecris Biotherapeutics, Inc. (Manufacturer)
8368 US 70 West
Clayton, NC 27520

Talecris Biotherapeutics Ltd. (Importer and Distributor)
5800 Explorer Drive, Suite 300

Mississauga, Ontario
L4W 5K9

Last revised: June 30, 2006