

# Canine Serum Albumin

Updated September 2016

Albumin serves as a carrier for endogenous and exogenous compounds, serves as a buffer molecule during acid-base derangements, is the primary protein responsible for maintenance of colloid oncotic pressure, and also acts as a scavenger of reactive oxygen species. Hypoalbuminemia can be the result of numerous conditions, such as protein losing nephropathy, protein losing enteropathy, intra-cavitary effusions, liver failure, or severe hemorrhage. Hypoalbuminemia in critical illness can lead to fluid retention, deranged drug metabolism, poor healing, and increased morbidity and mortality. The use of albumin replacement for the treatment of hypotension, hypoalbuminemia, and decreased oncotic pressure is well documented in human (Dubois 2006, Dellinger 2013) and veterinary medicine. Prior to the availability of canine serum albumin, albumin replacement required transfusion of plasma or the use of human serum albumin. Although effective, both options carry potential risk. Use of frozen plasma to correct hypoalbuminemia requires a dose 22.5ml/kg for an expected increase by 0.5mg/dL in albumin. This volume may be of concern in small patients or in patients at risk for fluid overload. Human serum albumin requires a much smaller volume to replenish patient albumin level. Because the product is not from a canine source, however, it is highly antigenic and complications including glomerulonephritis, polyarthropathy, and acute or delayed allergic reactions may occur.

Canine albumin is considered a safer alternative to both plasma and human serum albumin. The product contains 98% albumin with no components of plasma or preservatives. It may be less likely than plasma to induce allergic reactions and acute lung injury. A prospective veterinary study evaluating the use of canine serum albumin in cases of septic peritonitis (Craft 2012). Of the seven patients randomized to receive canine albumin, only one patient displayed potential adverse effects.

## Dosing Recommendations:

Canine albumin is most commonly administered to hypoalbuminemic patients with the goal of raising the serum albumin to 2 g/dL. A 5% solution of canine albumin is administered based on the following calculation:

$$\text{Volume of 5\% albumin} = BW_{kg} \times 90 \frac{ml}{kg} \times \left( 2 \frac{g}{dL} - \text{Albumin} \frac{g}{dL} \right) \times 0.2 \frac{g}{dL}$$

Canine albumin can also be administered to hypotensive canine patients for the purpose of volume expansion and maintenance of intravascular volume. Fluid overload is a concern when using the concentrated solution.

$$\text{Volume of 16\% albumin} = \left( BW_{kg} \times 800 \frac{mg}{kg} \right) \div 166 \frac{mg}{mL}$$



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## Dosage form:

- 5 gram vial of lyophilized product
- Store at room temperature for up to 24 months

## Preparation:

- For albumin supplementation, add **100ml** of 0.9% NaCl to the vial to make a **5% solution**.
- For volume expansion, add **30ml** of 0.9% NaCl to the vial to make a **16% solution**.
- Swirl gently to reconstitute. Avoid bubbling. Rehydration may take 15-30 minutes.
- Once reconstituted, any unused portions must be refrigerated and used within six hours

## Administration:

- Administer via syringe pump through a standard extension set and in-line filter (Hemo-Nate)
- Administer dose over 6 hours, monitoring vitals as with any other transfusion according to hospital protocol
- 5% solution can be given via any IV catheter
- 16% solution *requires* a central IV catheter
- No other fluids may be administered through the same catheter during infusion

## Adverse Effects:

- Vomiting, urticaria, and fever are most common
- Hypotension, vasodilation, and nausea could occur
- Anaphylaxis is considered rare
- Fluid overload (16% solution)
- Repeated dosing may be performed with caution

## Example and price comparison (as of December 2016)

If you have a 50# (22.7kg) dog with an albumin of 1.2 g/dL and the goal is to raise the albumin to 2 g/dL:

- Canine albumin dose = 326ml of 5% lyophilized albumin. **The cost for 3 vials of albumin is \$1431.**
- Frozen plasma dose = 817ml or 3.5 double units. **The cost for 3 double units of FP is \$1431.**

## References:

1. Craft, EM, Powell LL. The use of canine-specific albumin in dogs with septic peritonitis. *JVECC* 22(6); 2012:631-639.
2. Canine Albumin Package Insert. Animal Blood Resources International 2011.
3. Dubois MJ et al. Albumin administration improves organ function in critically ill hypoalbuminemic patients: A prospective, randomized, controlled pilot study. *Crit Care Med* 34(10);2006:2536 – 2540.
4. Dellinger RP et al. Surviving sepsis campaign: international guidelines for management of severe sepsis and septic shock: 2012. *Crit Care Med* 41(2); 2013: 580-637.
5. Mazzaferro E, Powell LL. Fluid therapy for the emergent small animal patient. Crystalloids, colloids, and albumin products. *Vet Clin North Amer* 43;2013:721-734.