

## CURRENT TRANSFUSION THERAPY FOR ANEMIC CATS

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With the increased interest in feline medicine and surgery, transfusion therapy has become an integral part of the supportive management of critically ill and anemic cats. At the Veterinary Hospital of the University of Pennsylvania, the number of blood transfusions has more than tripled over the last decade, and anemia is by far the most common medical indication for transfusion in a cat (74% of all cases). Feline anemia may be caused by 1) blood loss due to fleas, surgery, or trauma; 2) hemolysis induced by toxins (Heinz bodies), hemobartonellosis, and FeLV infection; and 3) reduced hematopoiesis associated with FeLV infection and chronic renal failure. A quarter of all transfusions were given to non-anemic cats for other reasons (e.g., cats with hepatopathy-induced coagulopathy scheduled to undergo a percutaneous ultrasound-guided liver biopsy). Because of the difficulties in preparing blood components from small whole blood units, anemic cats are most commonly transfused with fresh/stored whole blood rather than blood components. Furthermore, bleeding disorders and hypoalbuminemia occur relatively rarely in cats and are often associated with anemia; these cats most commonly receive fresh whole blood rather than component therapy.

The AB blood group system - the only one recognized in cats - consists of 3 blood types: type A, type B, and type AB. Although type A is the most common blood type, the frequency of type A and B in domestic shorthair cats varies worldwide and markedly among breeds. Type AB, the third feline blood type, occurs extremely rarely in domestic shorthair and purebred cats and is, therefore, not included in the following table on the blood type frequency in cats of the United States with over 100 typed cats in each breed.

	Percentage (%)			Percentage (%)	
	Type A	Type B		Type A	Type B
Abyssinian	86	14	Himalayan	93	7
Birman	84	16	Japanese Bobtail	84	16
British shorthair	60	40	Maine Coon	98	2
Burmese	100	0	Norwegian Forest	93	7
Cornish Rex	66	34	Persian	84	14
Devon Rex	59	41	Scottish Fold	82	18
Domestic shorthair			Siamese	100	0
Northeast	99.7	0.3	Sphinx	82	19
North Central	99.6	0.4	Somali	83	17
Southeast	98.5	1.5	Tonkinese	100	0
Southwest	97.5	2.5			
West Coast	95.3	4.7			

In contrast to dogs, cats possess naturally-occurring alloantibodies against the blood type antigen they lack. In particular, all type B cats have very strong anti-A antibodies which are responsible for the life-threatening incompatibility reactions such as neonatal isoerythrolysis and transfusion reactions. Transfused type A blood given to a type B cat will survive only minutes to hours and only 1 ml may result in a fatal reaction. The generally weak anti-B antibodies of type A cats shorten the survival of transfused type B red blood cells when given to a type A cat, but do not appear to cause any neonatal isoerythrolysis. Since cats do not need to be sensitized by a prior blood transfusion or pregnancy to develop alloantibodies, incompatibility reactions can occur with the first blood transfusion and in kittens from a primiparous queen.

For feline blood typing, a small amount of EDTA-anticoagulated blood is needed. Over the past 8 years our laboratory has typed more than 10,000 cats (0.5 ml blood shipped by regular mail to Dr. Giger/Typing, Veterinary Hospital, University of Pennsylvania, 3900 Delancey Street, Philadelphia, PA 19104-6010 [\$10/cat]). In addition, commercial veterinary laboratories and other veterinary schools are now routinely blood typing cats. Most recently, a blood typing card as a simple in-practice test kit has become commercially available to classify cats as type A, B, or AB from DMS Laboratories, Inc. (2 Darts Mill Road, Flemington, NJ 08822; 1-800-567-4367). The assay, requiring a small amount of anticoagulated blood, is based upon the agglutination reaction that occurs within 2 minutes when erythrocytes with anti-A and/or anti-B reagents

interact. As long as the simple instructions are followed, the typing kit is very accurate and practical. However, cats whose erythrocytes are reacting with both reagents may be retyped in a reference laboratory, such as ours, to confirm the very rare AB blood type.

Because of the presence of naturally-occurring alloantibodies, no universal feline blood donors exist and only typed, matched blood can be used for effective and safe transfusion. Eastern Veterinary Blood Bank (Annapolis, MD; 1-800-949-3822) is presently the only commercial blood bank providing feline type A and type B blood. In addition, the Veterinary Hospital of the University of Pennsylvania will ship type B blood on special request on an emergency basis.

### **Feline blood donors**

Most clinics have identified a couple of typed cats for their needs. Type A is the most common blood type and, thus, the common donors should have type A blood. Type B donors may be located by typing purebred cats from their clientele. The ideal feline blood donor is a shorthaired, large but lean, young cat who is healthy and is kept strictly indoors. Our in-house cats are examined regularly and screened twice yearly for viral infections such as FeLV, FIV and FIP, and for hemobartonellosis. Donors should be regularly vaccinated and should not receive any medications. Splenectomy is not recommended. Cats may donate up to 10-12 ml of whole blood per kilogram of body weight, corresponding to a feline unit of 50-75 ml from a 5-6 kg cat. However, because of the small circulatory blood volume of cats, feline donors should receive replacement IV fluids if more than 50 ml are removed. Cats may need to be sedated during collection of blood with a combination of ketamine (1-2 mg/kg) and diazepam, or midazolam (0.1 mg/kg) and atropine (0.01 mg/kg) administered intravenously. Recently, we have been using a combination of butorphenol (0.1-0.2 mg/kg) and diazepam (0.5 mg/kg) IV to effect.

Recent reviews:

- Callan MB, Giger U: Transfusion medicine. In: August JR (ed): Consultations in Feline Internal Medicine. WB Saunders, Philadelphia, pp 525-532, 1994.
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