

# Equine Blood Typing

Horses have 7 different red blood cell groups or systems, named A, C, D, K, P, Q, and U. Each system corresponds to a particular gene for which two or more alleles exists. The blood group genes produce surface molecules that contain antigenic sites known as factors. Over 30 different factors have been identified. The blood groups are named with an upper-case letter to denote the system and a lower-case letter to designate the factor (antigen). There are variable numbers of factors for each blood group. The VMTH Hematology laboratory types for the blood factors: A (a,b,c), Ca, Ka, P (a,b), Q (a,b,c), and Ua.

For either a potential whole blood or plasma donor, a blood type and antibody screen are indicated.

## Blood Factor Frequencies

BREED	A system		C system		Q system		U system		K system	
	Aa+	Aa-	Ca+	Ca-	Qa+	Qa-	Ua+	Ua-	Ka+	Ka-
Thoroughbred <sup>2</sup>	95%	5%	93%	7%	82%	18%	17%	83%	5%	95%
Arabian <sup>1</sup>	82%	8%	83%	7%	21%	79%	21%	79%	0%	100%
Standardbred <sup>1</sup>	57%	43%	59%	41%	0%	100%	34%	66%	32%	68%
Morgan <sup>1</sup>	57%	43%	69%	31%	1%	99%	27%	73%	1%	99%
Quarter Horse <sup>2</sup>	73%	27%	93%	7%	36%	64%	43%	57%	12%	88%
Paso Fino <sup>1</sup>	50%	50%	37%	63%	8%	92%	35%	65%	0%	100%
Peruvian Paso <sup>1</sup>	54%	46%	74%	26%	2%	98%	33%	67%	3%	97%
Tennessee Walking Horse <sup>2</sup>	70%	30%	93%	7%	3%	97%	88%	12%	4%	96%
Friesian <sup>2</sup>	38%	62%	83%	17%	0%	100%	32%	68%	0%	100%

1. Bowling AT, Clark RS. Blood group and protein polymorphism gene frequencies for seven breeds of horses in the United States. *Animal Blood Groups and Biochemical Genetics* 16 (1985) 93-108.

2. UC Davis VMTH Clinical Laboratories patient data 2/2005 to 7/2023.

## Whole Blood Transfusions

Whole blood transfusions are useful in the treatment of acute hemorrhage in the horse. We recommend donors have a negative antibody screen and a blood type of AaCa positive, since most horses have this blood type. We do not recommend whole blood transfusions without knowing the blood type of the recipient. Many veterinary laboratories can perform a simple hemagglutination crossmatch that should identify a large percentage of potential incompatibilities. The majority of horses lack naturally occurring antibodies, so a first whole blood transfusion is usually without consequence. Whenever a mare is given a whole blood transfusion, she is potentially being sensitized to blood group factors that may lead to NI problems in future foals.

Subsequent transfusions increase the likelihood of transfusion reactions and thus should always undergo more extensive workup. Contact the VMTH Hematology Laboratory for more details.

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## Plasma Transfusions

Often a transfusion is needed to restore fluid loss or colloid replacement, but the red blood cells are not essential. In this case, a plasma transfusion may fulfill the clinical requirements. Plasma can be collected and stored frozen to administer when needed. Potential plasma donors should be positive for the blood factors Aa and Ca and free of antibodies. Horses that are negative for these factors usually have naturally occurring antibodies (anti-Aa or anti-Ca) or may eventually develop these antibodies.

## Samples for testing

For NI antibody screen of the mare or any antibody screen for determining a donor, a minimum of 2 ml of serum is required. Allow the blood from a 10 ml red top tube to clot for at least 30 minutes, spin and separate the serum into another tube. If the mare has had a previous NI foal, (in addition to the serum) submitting EDTA (purple top) whole blood from the mare and stallion is recommended. For blood typing, whole blood either in EDTA (purple top) or ACD (yellow top) is necessary.

The samples should be stored in a refrigerator until shipment. For an antibody screen (serum) or blood type (whole blood in EDTA or ACD), send samples overnight with an ice pack. Protect the samples from direct contact with the ice pack. Please ship the samples overnight via FedEx, Monday – Thursday only.

**Send the samples to:** Central Lab Receiving, VMTH Room 1033  
Attn: Hematology  
One Garrod Drive  
University of California, Davis  
Davis, CA 95616

**Contact Information:** Central Lab Receiving (530) 752-8684  
UCDVetClinicalLabs@ucdavis.edu  
  
Hematology (technical questions only) (530) 752-1303  
vethematology@ucdavis.edu

**Website:** [www.vetmed.ucdavis.edu/clinical-laboratory](http://www.vetmed.ucdavis.edu/clinical-laboratory)

## Results Reporting of Results

Generally, testing turn-around-time is 1-2 business days after sample receipt. Results will be transmitted through email or fax.