

A new phenogroup in the horse D system of red cell alloantigens found in the Caspian Pony.

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Summary. A new D blood group phenogroup consisting of the specificities adeo was observed in a stallion family of Caspian ponies from Iran. An additional six undescribed genetic variants were seen in a total of 82 Iranian horses. This result suggests extensive new genetic variation may be present in domestic horses from geographic regions that have not yet received scientific attention.

Keywords: alloantigens, blood typing, equine, erythrocyte, genetics, horse

The D blood group is among the most variable genetic systems of the horse. There are currently 17 internationally recognized specificities and 25 phenogroups (Bowling and Williams, 1991) assigned to the D red cell alloantigen system. Since the current nomenclature was established, most new variants have resulted from the discovery of new specificities that have split known phenogroups (e.g. Bowling, 1987) rather than new combinations of factors (e.g. Aguilar et al., 1987). Here we report a new combination of factors in a phenogroup found in the Caspian pony from Iran.

A total of 41 Caspian ponies from Iran were tested using hemagglutinating, alloimmune reagents. The D system reagents tested were a, b, c, d, e, f, g, h, k, m, n and o. Included within this sample was a stallion with an unusual combination of D system factors that did not conform to any described phenogroup. Seven offspring of this stallion also were typed along with the dams for six of the offspring. Absorption tests were run to confirm the types of all these individuals. The results are shown in Table 1. The stallion appears to have the phenogroups Ddfk/Dadeo. The new phenogroup Dadeo was passed on to five of the seven offspring of the stallion. We presume this phenogroup is actually Dadelo although we were unable to test for the D1 factor. Also, we were unable to test for Dq and Dr which frequently occur with the Dadl or Ddelo phenogroups (Bowling and Williams, 1991).

A total of eight D system phenogroups were found in this population of Caspian ponies. Included in this number was one individual that appeared to have the unusual phenogroup Ddlno (1 presumed) previously reported by Bowling and Williams (1991). No family data was available for this horse. The other variants present were Dbcm, Dcgm, Ddeo, Ddfk, Ddghm, and Ddk. An additional 53 Caspian ponies from England have been tested. With one possible exception this group did not have the Dadeo phenogroup. The exception was an individual that was positive for the factors Da, Dd, De and Do. However, this individual could have been Dad/Ddeo. The D system variants present in the English Caspians were Dad, Dbcm, Dcgm, Ddeo, Ddfk, Ddghm, and Ddk. The English population was derived from 20 ponies brought to England from Iran in the 1970s.

The observation of a new phenogroup within the equine D blood group system is not remarkable. However, this new D system variant was not the only new marker found in Iranian horses. We have tested 82 horses from Iran that are of breeds that are rare or unknown in the west. In addition to the Dadeo and Ddno, we observed six variants that, to our knowledge, represent new genetic variants for the horse. Two were in the A-1-B (alpha-1-beta glycoprotein) system, one was in Tf (transferrin) and three were in the Pi (protease inhibitor) system. Unfortunately, there was little or no family data to demonstrate Mendelian inheritance of these variants. The number of Asian and African horse breeds that have not been examined genetically means that there is likely to be considerably more genetic diversity in domestic horses than is now recognized.

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Table 1. Family data of Caspian ponies with the new D system phenogroup.

Sire phenotype	Dam phenotype	Offspring phenotype	Phenogroup inherited from sire	Phenogroup inherited from dam
Dadefko	Dcgm	Dacdegmo	Dadeo	Dcgm
	Dcdegmo	Ddefko	Ddfk	Ddeo
	Dbcdkm	Dadeko	Dadeo	Ddk
	Dbcdkm	Dbcdfkm	Ddfk	Dbcm
	Dcdegmo	Dadeo	Dadeo	Ddeo
	Ddeo	Dadeo	Dadeo	Ddeo
	unknown	Dacedegmo	Dadeo	Dcgm

D system factors tested were a, b, c, d, e, f, g, h, k, m, n, o