ANIMAL BLOOD BANK®

"Blood Banking for Every Hospital" Series

Title: **Canine Blood Types -- Significance in Transfusion**

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In our ever shrinking world it is important when veterinarians, scientists, or technicians speak of an animal with a specific blood type, that this blood type terminology means the same thing around the globe. The International Society of Animal Genetics (ISAG) is responsible for the standardization of test reagents for blood typing and blood typing nomenclature of animals throughout the world. To achieve this, many animal species have an international standing committee within the ISAG. This committee works with professionals in hematology and other disciplines toward nomenclature that clearly identifies proper blood groups and factors, and tests and compares blood typing reagents to insure consistency in typing. There are eight canine blood group systems and fifteen or more blood group factors identified in the dog world wide, but most are not yet standardized. Some of these are extremely rare and are not at this time considered to be significant. With the increased interest in blood group research, it can be expected that the number of blood group systems and factors will increase.[1,2,5,7]

Currently eight blood groups are found to be common and are categorized under the DEA (dog erythrocyte antigen) system. Most laboratories in the U.S. and internationally who perform blood typing have a standardized procedure to test for the most significant blood factor in the dog, the lytic factor DEA 1 and its subsets. Dogs negative for these factors are said to be DEA 1 negative and are sometimes referred to as "universal donors". There is no officially recognized term "universal donor". There is work under way to standardize the remaining blood groups. Standardization is expected to be completed for the most commonly identified blood group factors in the future.[5] The table below outlines the eight common blood groups of the DEA system used in the US.

Nomenclature	Old nomenclature	Incidence
DEA-1.1	A1	40
DEA-1.2	A2	20
DEA-3	B	5
DEA-4	C	98
DEA-5	D	25
DEA-6	F	98
DEA-7	Tr	45
DEA-8	He	40

Of these blood factors, the significant blood antigen in canine transfusion medicine is the lytic factor DEA 1.1. DEA 1.1 is highly antigenic and the transfusion of blood positive for this factor may lead to the development anti-DEA 1.1 antibodies .[2,3,5] Approximately 25% of first time transfusions of untyped donor blood to a recipient of unknown blood type will result in the development of anti DEA 1.1 antibodies in the recipient.[3] Subsequent transfusions of blood positive for DEA 1.1 may result in transfusion reactions characterized by hemoglobinemia, hemoglobinuria, thrombocytopenia, leukopenia, fever, emesis, incontinence, urticaria and/or weakness. Development of anti-DEA 1 is especially problematic where DEA 1 negative breeding bitches have been either transfused with positive blood or have been repeatedly bred to DEA 1.1 positive sires. Puppies may develop neonatal isoerythrolysis after nursing due to the development of anti-DEA 1 antibodies in the colostrum. [1,3,4]

DEA 7 has been discussed as a possible factor in transfusion reactions, although controversy exists regarding its degree of importance.[4,7] DEA 7 is a cold agglutin and a naturally occurring isoantibody. Cold agglutins generally are reactive at temperatures below 22 degrees C in vitro, and agglutination is reversible at 37 degrees C. Generally, antibodies that react in vitro only at temperatures below 37 degrees C are considered to have very low clinical significance and are rarely contributory to the destruction or sequestration of transfused cells, except where large volumes of cold blood is to be transfused or hypothermia is present.[6,7]

All transfusions carry some degree of risk due to incompatibility. Animals have different blood types and complete compatibility is nearly impossible. Crossmatching prior to transfusion reveals potential reactions due to natural isoantibodies and antibodies developed by sensitization. It greatly reduces the risk associated with transfusion. It is important to remember that crossmatching will not identify incompatibility to DEA 1 blood types unless previous sensitization has occurred and that it is not a substitute for blood typing.

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6. American Association of Blood Banks: Technical Manual, ed 14. Bethesda MD, American Association of Blood Banks, 2005
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