

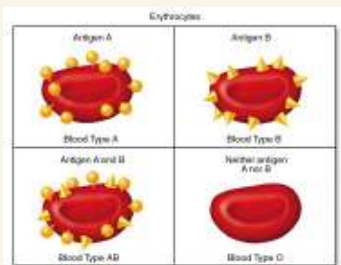
Subtyping Blood Type A and AB for Organ Transplantation

A. Background: a number of questions have been raised recently about the significance of ABO subtyping, and in particular about the reporting of A subgroups. In this newsletter, our intent is to inform the reader of the latest guidance given by UNOS (OPTN) in this confusing area. To understand this better, let us briefly review the principles behind this testing, as given in a previous newsletter.

- If you will recall, human red blood cells possess on their membranes molecules, termed antigens.
- The major blood group antigens are A and B; either or both antigens can be present on the red cell surface, so there are 4 potential major blood type combinations: A, B, AB (in which both antigens are present) and O, in which none of the antigens is present. Thus, a type B donor will lack antibodies to B but show antibodies to A in his serum while a type O donor will have antibodies to both A and B.

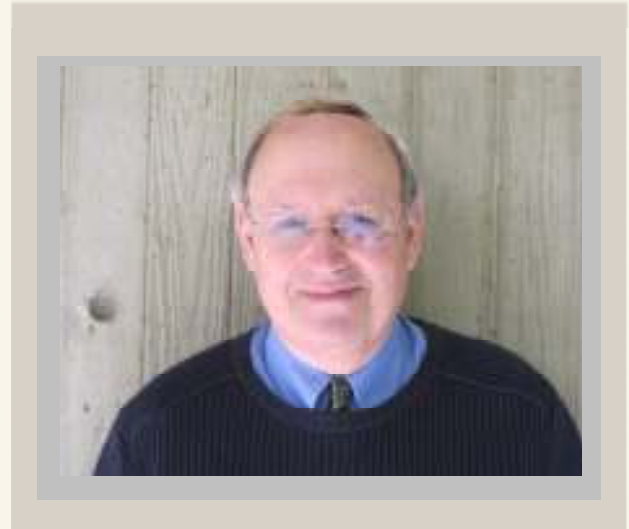
B. Subtyping: Complications in this otherwise simple system arise because:

- Blood group A can be further subtyped into A1 and A2, representing about 77-80% and about 19% of cases, respectively, but there are also nearly 20 other rarer subtypes such as A3, A (el) and Ax (representing about 1% of cases).
- Anti-blood group A antibody will react with all of these subtypes of A antigen, but anti-A1 reacts only with A1 and not with A2 or the rest.
- Donors whose red cells express A2 or any of the remaining rare subgroups of A other than A1 can have anti-A1 antibodies in their blood, causing an ABO reverse group discrepancy on testing.



C. The OPTN guidance on A subtyping:

- If the patient has blood group A or AB and is found on testing to have A1, then he is reported to have A1 or A1B.
- If the patient has blood group A or AB and is found on testing to have any of the subtypes other than A1, he is reported to have non-A1 or non-A1B.



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- Here is the OPTN interpretative chart:

BLOOD TYPE	A1 SUBTYPING RESULT	REPORT RESULT
A	Positive	A1
A	Negative	Non-A1
AB	Positive	A1B
AB	Negative	Non-A1B

D. Effect of pre-TX Transfusions:

- Errors in blood typing can occur in organ donors with a history of previous transfusions because transfused red cells can remain in the recipient's blood for weeks to months (their half-life is 30 days with a maximum up to 120 days).
- The OPTN notes that it is unclear how many group A red cell transfusions are needed to change a donor's original non-A1 subtype to A1, but this is a distinct risk nevertheless.
- Because of this, OPTN suggests that if the donor is blood type A or AB, has been transfused within the last 120 days, and has no pre-transfusion blood type available, it is best to allocate the donor to the main blood group (A or AB) and not provide a subtype.