TABLE 2. Comparison of studies results

Study results	Group O	Non-group O	Statistical test p value
Hoffmann et al.[1]: 195 patients*			
Patients receiving a low dose (<3.0 CD34+ cells × 10^6/kg)	18	36	
Days to PLT count of >20 × 10^9/L (mean ± SD)	16 ± 2.6	14.6 ± 4.2	NS†
Days to PLT count of >50 × 10^9/L (mean ± SD)	32.4 ± 13.3	19.6 ± 7.9	<0.001†
Percent engrafting <20 days	13	73.7	<0.005‡
Percent engrafting >40 days	50	4.5	<0.005‡
This report: 249 patients			
Patients receiving low dose (<3.0 CD34+ cells × 10^6/kg)	18	25	
Days to PLT count of >20 × 10^9/L (mean ± SD)	14.5 ± 3.2	20.2 ± 14.6	0.14†, NS
Days to PLT count of >50 × 10^9/L (mean ± SD)	27.8 ± 20	36.1 ± 22	0.29†, NS
Percent engrafting <20 days	33	20	0.32‡, NS
Percent engrafting >40 days	33	48	0.33‡, NS

* Data regarding PLT engraftment were only available on 87 percent of patients; 54 patients receiving a low CD34+ cell dose were reviewed.
† According to t-test.
‡ According to chi-square test for the analysis of the categorical factors.
NS = not significant.

CD34 cell dose, as in the study by Travers and colleagues; 18 percent of patients (23/128) received a CD34 cell dose of fewer than 3.5×10^6/kg, whereas in the series by Hoffman and colleagues, 39 percent of patients (76/195) received a low (<3.0×10^6/kg) CD34 cell dose. Statistical analysis of early and late PLT engraftment according to ABO type and in patients receiving a low CD34 cell dose was only available on 54 patients. Further studies are needed to clarify the effective role of ABO type in influencing time to PLT engraftment.

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In Reply

Several in vitro studies have suggested a potential role for fucose-containing glycans in hematopoietic differentiation. In umbilical cord human progenitor cells (HPCs), group O is associated with increased ex vivo proliferation and self-renewal capacity.[1] An early differentiation antigen on CD34+ pleuripotent and early megakaryocyte precursors, H or a related glycan is implicated in megakaryocyte adhesion to stromal fibroblasts.[2] Schmitz and colleagues[3]

demonstrated specific inhibition of megakaryocyte-fibroblast adhesion by fucose and fucose-specific lectins. Although the specific glycan was not identified, ABO antigens are expressed on many megakaryocyte glycoproteins implicated in megakaryocyte adhesion and differentiation.

Based on published in vitro findings, we initially hypothesized that group O individuals would exhibit faster platelet (PLT) recovery after autologous HPC transplant.[3] Much to our surprise, we observed delayed PLT engraftment among group O patients, but only at low CD34+ cell doses (less than 3 million/kg). We speculated that a group O phenotype may be associated with delayed terminal differentiation relative to group A and B patients due to prolonged fucose-mediated adhesion to stromal fibroblasts.

Our study had several weaknesses including the relatively small number of group O patients (n = 18) and non–group O patients (n = 36) transplanted at low CD34 per kg cell doses, the lack of an A_1/A_2 red blood cell (RBC) subtype for group A patients, and the absence of any flow cytometric phenotyping on circulating PLTs before transplant. The last two deficiencies may be of critical importance based on subsequent studies by our laboratory and others. The group A_2 phenotype, which constitutes 20 percent of all group A donors, is associated with an absence of A antigen on PLTs.[4] Furthermore, a substantial number of A_1 (20%) and most group B individuals (50%-80%) have extremely low ABO expression on PLTs when examined by flow cytometry and solid phase.[4] Because PLTs arise from megakaryocytes, these findings are applicable to ABO expression on megakaryocytes as well. Finally, ABO expression on megakaryocytes exhibits clonal variation even in individual donors, possibly reflecting asynchronous maturation during normal megakaryocyte differentiation.[5,6]

We read with interest the findings of De Matteis and colleagues,[7] who also examined the relationship between PLT engraftment, CD34 dose, and ABO type in autologous donors. Unlike our findings, they did not find delayed PLT engraftment. However, it is interesting to note that their findings suggest a trend toward enhanced PLT engraftment among group O donors—in line with our original hypothesis. Not surprisingly, their study suffers from the same weaknesses as our own study relative to small patient numbers (43 total), lack of an A_1/A_2 RBC subtype and PLT ABO phenotype.

Because of the inherent heterogeneity of ABO expression between individuals, it may be difficult to study the role of H antigen in human megakaryocytopoiesis in vivo using autologous HPC transplantation as a model. Most autologous transplants now require 3 to 5 million CD34+ cells per kg per autologous transplant because of the direct effect of CD34 cell dose on PLT engraftment. The potential biologic role of H antigen on HPC proliferation, megakaryocyte differentiation, and adhesion could be dissected in vitro, however, using human HPCs from well-characterized ABO phenotypes with extreme differences in A and H expression. These include the A_1-high expressor PLT phenotype,[3] blood group O, and Bombay, a rare FUT1 null phenotype lacking H and AB antigens.

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The importance of objectivity in an accreditation program

A recent commentary in **TRANSFUSION** presented the historical role of peer review in the accreditation of relationship testing. Although peer review continues to play an