

LETTER TO THE READERS

Introduction to the review articles

We celebrate the 20th anniversary of *Immunohematology* this year by publishing four special issues that are primarily devoted to review articles. The reviews in this, the first, issue focus on the major RBC blood group systems. Each blood group system is genetically discrete and consists of one or more antigens. The antigens are surface markers on the outside of the RBC membrane and are proteins and carbohydrates attached to lipid or protein. Exposure to RBCs carrying an antigen lacking on the RBCs of the recipient can elicit an immune response in some people. The ability to detect and identify blood group antigens and antibodies by simple hemagglutination techniques is the foundation of safe, supportive blood transfusion practice and the appropriate management of pregnancies at risk for HDN.

Currently there are 29 blood group systems, containing 229 antigens, recognized by the International Society of Blood Transfusion (ISBT). Twenty years ago, at the launch of *Immunohematology*, there were 16 systems with 144 antigens and quite a collection of antigens waiting to be assigned to systems, pending the discovery of new information about their relationship to the established systems. During the last 10 to 15 years, major advances, particularly at the molecular level, have occurred in our understanding of blood group antigens, the structures that carry them, and the red cell membrane that houses them. The study of people who have a null phenotype for a certain blood group system and thus have RBCs that lack or have altered membrane protein(s) has provided a key to the function of that protein. The reviews in this issue, each in a unique way, address the exciting findings of recent years and consider the molecular events that generate diversity in blood group antigens and phenotypes and relate them back to possible applications at the clinical level.

The discovery of the ABO groups at the beginning of the 20th century made blood transfusion possible. Therefore, it is fitting that ABO is the first system to be reviewed and that Dr. Fumiichiro Yamamoto, who was a member of the team that cloned the *ABO* genes, does so. Dr. Yamamoto's article begins with Landsteiner's work, then guides us through the elucidation of the

biochemical nature of the ABO antigens, the isolation of the transferases involved in the syntheses of A and B antigens, the cloning of the *ABO* genes, and the molecular basis of the serologically defined phenotypes. The *ABO* genes in other species; the evolution of the *ABO* genes; and changes in antigen expression during development, differentiation, and carcinogenesis are also discussed. He concludes the review by leaving us to muse over the question of "Why does the ABO polymorphism exist?"

The Rh system, after ABO, is the most clinically significant in transfusion medicine. The identification of the Rh antigens led to the understanding and prevention of HDN. Dr. Franz Wagner and Dr. Willy Flegel review the Rh system in this issue of *Immunohematology*. The authors, through their work in recent years, have contributed to our understanding of this, the most polymorphic and complex of the blood group systems. The Rh antigens are considered at the level of the gene, the protein, and the antigen. Current knowledge of the molecular bases of Rh antigen expression is used to shed light on the serologic complexity of the Rh blood group system. In particular, the molecular bases of D antigen expression, of the partial D, weak D, D_{ce}, and D-negative phenotypes, is extensively reviewed, as is the phylogeny of *RHD* alleles. The available molecular information for each of the 48 Rh antigens is also presented in a tabulated format for easy reference. The authors conclude their review by drawing our attention to the many unresolved questions about the Rh system and in particular the "astounding Rh antigenic variability."

Dr. Connie Westhoff and Dr. Marion Reid focus on the Kell, Duffy, and Kidd blood group systems. The antibodies to antigens in these three systems are the most clinically significant, after those of ABO and Rh. Because of the association between Kx and Kell, the Kx system is included. The authors have distilled the wealth of information about these systems into a few pages of text and several informative tables and figures. The history of each system is addressed (e.g., Kell was the first system to be identified after the introduction of the antiglobulin test), then the antigens, the antibodies, and their involvement in HDN. The recent advances at the gene and protein levels and the molecular bases of the antigens and phenotypes are

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summarized. The biological role of the Kell, Kidd, and Duffy proteins and their significance in health and disease are also discussed.

The authors of the fourth review, Karen and Peter Byrne, faced a daunting challenge, that of describing "Other Blood Group Systems." They selected those systems considered to be of clinical importance or to have interesting features and made the scope of the presented information "What you need to know for the SBB exam." The eight blood group systems featured in this review are Diego, Yt, Xg, Scianna, Dombrock, Colton, Landsteiner-Wiener, and Indian. The

information presented by the authors should prove valuable to those immunohematologists studying for the SBB exam

Finally, in addition to the four reviews, two original articles are published in this information-rich anniversary issue of *Immunohematology*.

Christine Lomas-Francis, MSc
Technical Editor and Guest Editor of this issue

Manuscripts: The editorial staff of *Immunohematology* welcomes manuscripts pertaining to blood group serology and education for consideration for publication. We are especially interested in case reports, papers on platelet and white cell serology, scientific articles covering original investigations, and papers on the use of computers in the blood bank. **Deadlines** for receipt of manuscripts for consideration for the March, June, September, and December issues are the first weeks in November, February, May, and August, respectively. Instructions for scientific articles and case reports can be obtained by phoning or faxing a request to Mary H. McGinniss, Managing Editor, *Immunohematology*, at (301) 299-7443, or see "Instructions for Authors" in every issue of *Immunohematology* or on the Web. **Include fax and phone numbers and e-mail address with your manuscript.**

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