Human Leukocyte Differentiation Antigens: Monoclonal Antibody Nomenclature
“So ‘CD’ doesn’t stand for ‘compact disc’?”
By David Zwick, MD

With development of the technique for producing monoclonal antibodies by Kohler and Milstein in 1975, came an explosion in the production of a large variety of monoclonal antibodies that recognized human leukocyte antigens. The methods for naming the newly created monoclonal antibodies were not standardized and resulted in a confusing nomenclature. By one convention, cell surface molecules were named according to a particular function affected by an anti-leukocyte monoclonal antibody. For example, the lymphocyte function-associated antigen 1, or LFA-1, was so named because antibodies recognizing this structure interfere with lymphocyte cell adhesion events and optimal lymphocyte function. The second convention is effectively no convention at all; antibodies are named arbitrarily according to individual laboratory preferences. For example, no obvious logic follows in the designations B7 and B220, except that the leading "B" reminds us that these antigens are typically expressed on B lymphocytes. By a third convention, leukocyte cell surface molecules are named systematically by assigning them a cluster of differentiation (CD) antigen number that includes any antibody having an identical and unique reactivity pattern with different leukocyte populations. CD names or numbers can be assigned without having to know the particular function of the antigen defined.

A series of workshops were staged over the last 2 decades dedicated to defining cross-reacting antibodies and standardizing the nomenclature.

This resulted in the so-called “CD” designation for monoclonal antibodies where different clones that recognized the same antigen were grouped under the same CD designation.

The original principle of the CD nomenclature is that when at least two independent monoclonal antibodies have been shown to recognize an identical leukocyte surface antigen not previously defined, these antibodies are then clustered as a new CD. The evaluation of monoclonal antibodies prior to establishing their CD number is extensive. Hundreds to thousands of monoclonal antibodies are evaluated prior to each workshop by a number of dedicated participating laboratories worldwide that carry out serologic, biochemical and histochemical characterization of new antibodies. The Data Management section of these workshops organizes a cross-lineage blind panel study for all monoclonal antibodies including every CD, every known candidate for CD status and all antibodies of unknown specificity. The blind panel antibodies are studied by selected flow cytometry laboratories. This study complements those done by individual sections. The results of all these studies are reviewed at the workshops and new CDs are established and old ones redefined if appropriate. There have been a total of 7 workshops. A CD database is available on the World Wide Web (WWW) server so that anyone can access it via the Internet and has valuable links with antigen / protein function, structure, molecular genetic features and associated disease.

Transfusion Services Laboratory
By Marilyn Hamilton, MD, PhD

Concurrent Audit

Both JCAHO and the American Association of Blood Banks require a blood utilization review program. This is performed by the Transfusion Committee (TC) which published new transfusion audit criteria in 2003. These are found under Indications on the Transfusion Requisition and were established after extensive review of our own needs, how other children’s hospitals function and published guidelines specifically for children. It is important to understand that these Audit Criteria are NOT clinical guidelines. They should not be interpreted to mean that a patient needs to be transfused at some particular laboratory value. In addition, there are clinical situations where a patient will need to be transfused when the laboratory value does not support the transfusion. Transfusion is a clinical decision. Audit Criteria are simply reasons for transfusion where the situation so commonly justifies a transfusion that the TC does not need to review it.

There are three types of transfusion review: Retrospective, Concurrent and Prospective. In the past CMH has audited one transfusion in five retrospectively. The problem with this approach is that the clinician is asked to discuss the transfusion many weeks after it occurred and the clinical situation is hard to reconstruct. At their last visit JCAHO recommended that CMH use Prospective Audit. In this situation, if established criteria are not met, the patient’s physician is asked to furnish the additional data BEFORE the component is released for transfusion. The TC completed a study and concluded that the number of inappropriate transfusions at CMH did not merit such a limitation. Starting the first of April we have adopted Concurrent Audit. This audit is performed in proximity to the time of the transfusion while the events surrounding the transfusion are still fresh in the clinician’s memory.

In practical terms this is what happens: when blood is ordered the staff in the Transfusion Services Laboratory (TSL) reviews the indications on the requisition and compares them to the available laboratory data. If the criteria are met, that audit is complete. If the criteria are not met, the blood is still issued but the transfusion is given to the Medical Director of the TSL, Marilyn Hamilton, for review. Medical director review of transfusions occurs 24-48 hours after the transfusion and may require additional information from the physician. Transfusions still in question following this review will be brought before the TC.

Please note there are two situations which will always be reviewed; if no indication is checked and if the indication “Other” is checked. The first case should never occur. The second case should only occur if absolutely necessary. In situations where the indication checked is inappropriate to the case and an alternative indication should have been used, Marilyn Hamilton will email the clinician. It is hoped that this whole process will be more educational than the retrospective approach and will result in more appropriate utilization.

Please – print your name on the Transfusion Requisition unless your signature is very clear - Thanks

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