Mixed Lymphocyte Culture in Histocompatibility Testing for Familial Renal Transplantation

JOHN C. MCDONALD, CHI F. SU, MARIA O. HORNUNG

From the Department of Surgery and Department of Microbiology and Immunology, Tulane University, and the Department of Nephrology and Transplantation, Charity Hospital of Louisiana, New Orleans, Louisiana

AN INTERNATIONAL EFFORT to discover methods of predicting tissue compatibility has been underway for several years. The HL-A system of tissue antigens has received much attention, and is now established as a major histocompatibility system in man. HL-A serotyping of human lymphocytes has been the most widely used method of evaluating histocompatibility in human transplantation. As yet, HL-A serotyping is of proven value in only two situations. One is the detection of patients presensitized to donor antigens, and the other is the establishment of genotypic HL-A identity. Kidneys transplanted into individuals presensitized to donor antigens almost always fail[7, 10] while kidneys transplanted between HL-A identical siblings almost always succeed.[13, 14]

It has not been possible to predict with HL-A serotyping which transplants will succeed or fail in the presence of incompatibility because of the substantial incidence of success even when incompatibility is present, and because there is no consistent relationship between the incidence of failure and the number of HL-A incompatibilities.[9] In this study we sought to determine the role of mixed lymphocyte cultures (MLC) in clinical histocompatibility testing.

The stimulation to lymphocytes which occurs in MLC's has been found to be a specific immunologic event.[11, 12] When human lymphocytes are used, the response is primarily due to HL-A differences,[3] and has been reported to vary quantitatively with quantitative differences in HL-A incompatibility.[1] It, therefore, seemed possible that MLC studies might provide useful clinical information impossible to obtain at present by lymphocyte serotyping. The questions which have been considered are these:

1) Does the MLC response vary quantitatively with differences in HL-A incompatibility?
2) Under what circumstances can the MLC be used to select the most appropriate kidney donor?
3) Do some HL-A antigens induce less blastogenic transformation than others, thus implying that certain antigenic differences are relatively unimportant?
4) In instances in which individuals phenotype with less than four antigens, can the MLC be used to determine if an additional antigen is present but serologically undetected?
5) Is MLC stimulation due solely to HL-A incompatibilities?

Materials and Methods

Mixed Lymphocyte Cultures. Leukocytes were obtained from heparinized blood

Presented at the Southern Surgical Association Meeting held at Hot Springs, Virginia, December 6–8, 1971.

Supported by a grant of the Edward A. Schlieder Foundation and the Frost Foundation.

Reprint request to: Department of Surgery, 1430 Tulane Avenue, New Orleans, Louisiana 70112 (Dr. McDonald).