The role of human leukocyte antigen (HLA) matching in the United States in whites (A) and blacks (B). Recent large registry analyses of the role for HLA matching in renal transplantation consistently have shown a stepwise decrease in long-term graft survival rates with increasing antigen mismatches. Based on these results the United Network of Organ Sharing (UNOS) incorporated the level of HLA match into its algorithm used nationally for kidney allocation. The UNOS initially determined that transplantations for which all six HLA-A, -B, and -DR antigens matched in the donor and recipient should be performed. Each cadaveric donor type was compared by a computer search with the HLA types of all patients awaiting kidney transplantation. When a patient with six antigen matches was identified in an ABO-compatible recipient, the kidney was offered for that patient, and if accepted by the transplantation center, was shipped for transplantation. (Normally, kidneys from a patient with blood type O are allocated only to patients with type O blood, except in the case of patients with six antigen matches.) The UNOS policy regarding mandatory sharing of HLA-matched kidneys has been liberalized twice. The first time was in 1990 to include phenotypically matched pairs with fewer than six antigens. The policy was changed for a second time in 1995 to include zero-mismatched pairs in which the donor could have fewer antigens than the recipient, provided none were mismatched. (Adapted from Cecka [5]; with permission.)

Serologic testing and antigen assignment. Most of the published transplantation outcome data is based on serologic testing and assignment of antigens. These data include algorithm matching based on “broad” human leukocyte antigen (HLA) specificities such as HLA-DR6 that includes HLA-DR13 and HLA-DR14 and their many alleles. The question has now become one of what level of HLA testing is useful clinically for matching purposes in renal transplantation. Although this issue has not been resolved, recent data published from the European Registry upholds the positive effect that “correct” HLA matching has had on renal graft outcome.
Figure 8-19

Classes II and I mismatches in supposed 0 mm shared renal transplantations. The effect on graft survival of shared human leukocyte antigen (HLA) 0mm organs when defined by serologic typing and then confirmed by molecular typing. A strong effect of HLA matching is seen at even 1 year on the graft survival. A, Eighty-six first cadaveric kidney transplantations that were reported by serologic typing as HLA-A, -B, -DR "identical-compatible" were tested by molecular methods. Sixty-four transplantations were confirmed to be HLA-DR compatible; however, mismatches were found in the remaining 22 transplantations. Transplantations in which HLA compatibility was confirmed had a functional success rate of 90% at 1 year compared with 68% for transplantations in which the DNA typing revealed HLA-DR mismatches (P < 0.02). B, An analysis of the influence of HLA-class I DNA typing on kidney graft survival is shown. A total of 183 cadaveric transplantations were confirmed to be HLA-A and B compatible after DNA typing, whereas mismatches were found in the remaining 32 cases. Transplantations in which compatibility was confirmed had a functional success rate of 86.9% at 1 year compared with a 71.9% rate for those in which DNA typing revealed HLA-A or -B mismatches (P = 0.033.) (Panel A adapted from Opelz and coworkers [6]; panel B adapted from Mytilineous and coworkers [7]; with permission.)

Figure 8-20

Living donor kidney transplantation graft survival rates (A) and donor sources (B). The high graft survival rates reported for recipients of living donor kidneys improved from 89% in 1988 to 93% in 1991 (P < 0.001), even though a substantial increase has occurred in both the number of living donors and centers performing these transplantations. Some of the increase in living donations has been due to a growing acceptance of so-called unconventional donors, ie, spouses and other genetically unrelated donors, as well as distant relatives and half-siblings. In 1988–1989, unrelated donors accounted for 4% of living donor transplantations and distant relatives for 2%. These numbers have tripled and are now at 12% and 6%, respectively. (Panel A from Cecka [8]; panel B adapted from the United Network for Organ Sharing [9]; with permission.)
References