rejection of the transplanted marrow. Next, the marrow, stem cells, or cord blood obtained from a family member or volunteer donor (allogeneic) or the cells previously stored from the patient (autologous) are given to the patient by IV infusion. The newly transfused marrow or stem cells begin to produce functioning nonmalignant blood cells. In essence, the recipient accepts a new blood-forming organ.

The selection process for a suitable donor and the potential complications in transplantation are related to the human leukocyte antigen (HLA) system complex. Some of the major HLA antigens are A, B, C, D, DR, and DQ. There is a wide diversity for each of these HLA loci. For example, more than 20 different HLA-A antigens and more than 40 different HLA-B antigens can be inherited. The genes are inherited as a single unit, or haplotype. A child inherits one unit from each parent; thus a child and each parent have one identical and one nonidentical haplotype. Because the possible haplotype combinations among siblings follow the laws of Mendelian genetics, there is a one in four chance that two siblings have two identical haplotypes and are perfectly matched at the HLA loci.

The importance of HLA matching is to prevent the serious complication of graft-versus-host disease (GVHD). Because the child's immune system is essentially rendered nonfunctional, the recipient is unlikely to reject the bone marrow. However, the donor's marrow may contain antigens not matched to the recipient's antigens, which begin attacking body cells. The more closely the HLA systems match, the less likely GVHD is to develop. However, GVHD can occur even with a perfect HLA match because of unidentified and thus unmatched histocompatibility antigens (Gottschalk, Naik, Hegde, et al, 2016).

Complications of Therapy

Although tremendous advances have been achieved through current modes of cancer therapy, the successes are not without consequences. Numerous side effects are expected with chemotherapy and radiotherapy. Other complications that are less common but generally more serious are described here.