In augmenting systemic anti-tumor immune response, the authors evaluated the genetic modification of Ewing family tumor (EFT) cell lines for use as allogeneic vaccines. EFT cell lines A673 and RD-ES were transfected with cDNAs for human interleukin (IL)-2 and/or HSV1 thymidine kinase (HSV1-tk), respectively. Clones with high and stable secretion of IL-2 alone or with coexpression of functional HSV1-tk were obtained and their features were analyzed. IL-2 expressing clones derived from the A673 cell line demonstrated decreased expression of HLA class I molecules compared with the parental cell line and corresponding clones derived from RD-ES. However, IFN-gamma could upregulate the expression of HLA class I antigens by IL-2 transfected A673 cells. Ganciclovir induced apoptosis in double-transfected cell clones. IL-2/HSV1-tk cells continued to produce and release IL-2 after initial ganciclovir treatment. After gamma-irradiation, transfected clones released bioactive IL-2 in a quantity sufficient to activate T and natural killer cells in culture. A polyvalent allogeneic vaccine was also obtained using fusion of two different transgenic cell lines. The resulting hybrids inherited antigenic and transgenic characteristics of both parental cell lines. It is presumed that the cell lines generated here could be used as allogeneic vaccines for treatment of
patients with EFTs.