Abstract

Photodynamic therapy (PDT) is an emerging treatment for various solid cancers. We recently reported that tumor cell lines and patient specimens from adult T cell leukemia/lymphoma (ATL) are susceptible to specific cell death by visible light exposure after a short-term culture with 5-aminolevulinic acid, indicating that extracorporeal photopheresis could eradicate hematological tumor cells circulating in peripheral blood. As a bridge from basic research to clinical trial of PDT for hematological malignancies, we here examined the efficacy of ALA-PDT on various lymphoid malignancies with circulating tumor cells in peripheral blood. We also examined the effects of ALA-PDT on tumor cells before and after conventional chemotherapy. With 16 primary blood samples from 13 patients, we demonstrated that PDT efficiently killed tumor cells without influencing normal lymphocytes in aggressive diseases such as acute ATL. Importantly, PDT could eradicate acute ATL cells remaining after standard chemotherapy or anti-CCR4 antibody, suggesting that PDT could work together with other conventional therapies in a complementary manner. The responses of PDT on indolent tumor cells were various but were clearly depending on accumulation of protoporphyrin IX, which indicates the possibility of biomarker-guided application of PDT. These findings provide

important information for developing novel therapeutic strategy for hematological malignancies.