PL3. CANCER GENE THERAPY

Adisak Wongkajornsilp

Department of Pharmacology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, THAILAND

ABSTRACT

The current cancer treatments consist of surgery, radiation, and chemotherapy. These standard treatments are effective in curing or suppressing the progression of some types of cancers especially in early stages. However, many types of cancers resist even the combination of these standard treatments. Novel models of cancer treatment are therefore required for the eradication of these resistant cancers. Gene therapy constitutes one of the recent promising models for the control of cancer, single gene inherited disorders, as well as severe infection (i.e., AIDS). Gene therapy involves the insertion of recombinant DNA(s) into the cells of a patient either *in vivo* or *ex vivo* to correct a genetic material or to provide a new function to the cell. More than a half of the approved gene therapy protocols in the US aim at the treatment of cancer. The vectors used for gene therapy have ranged from adenovirus, retrovirus, herpes virus, parainfluenza virus to more recent non-viral vectors. The strategies employed in cancer gene therapy consist of (1) enhancing anti-tumor immunity through the expression of cytokines, immune costimulators and strong tumor associated antigens; (2) the expression of tumor-suppressor genes; (3) the suppression of immunosuppressor and oncogene expression; and (4) the expression of a suicidal gene to enhance the susceptibility to prodrug. Cytokine gene therapy has an advantage over direct cytokine injection since the transduced cytokine genes will express constitutively and locally. The expressed cytokines will be continuously produced and have limited volume of distribution that closely simulates their physiological characteristics. Therefore, the need for frequent re-injections is obviated and the redundant toxicity to other vasculature-riched organs is negligible. Gene therapy is still in an infancy state. The study for the improvement of vectors for gene therapy as well as the study for logical approaches to ineffective protocols is currently at the forefront of biomedical research. The proposals for developing vectors, animal experiments, and clinical trials have been submitted in Thailand.