Abstract. Dendritic cells (DCs) constitute a specialised system of antigen-presenting cells with a high capacity to induce and to modulate the immune response against microbial, tumour and self-antigens. New techniques to generate large amounts of DCs together with the molecular identification of human tumour-associated antigens (TAA) have opened new ways for antigen-specific cancer immunotherapies. DCs loaded either with TAA-derived MHC class I-specific synthetic peptides or with whole tumour cell preparations have been used in numerous clinical trials evaluating the efficacy of DCs in patients with cancer. However, the disadvantages of DCs pulsed with synthetic peptides from TAA include the uncertainty regarding the longevity of antigen presentation, the re-
striction by the patient’s haplotype and the relatively low number of known MHC class I and in particular of MHC class II helper cell-related epitopes. Whole tumour cell preparations are difficult to standardise, and they depend on the availability of tumour cells. Thus the utilisation of viral vectors genetically modified to express TAA for the ex vivo transduction of DCs is an attractive alternative to achieve a MHC I- and MHC II-restricted presentation of tumoural antigens. To induce protective anti-tumoural immune response an increasing number of modified viral vectors have been used to transduce DCs. Although high transduction efficacies were reported for several viruses, analysis of the interaction of viral vectors with DCs has revealed several viral mechanisms that interfere with main functions of DCs, dampening somewhat the initial optimism in the field of DC transduction. However, promising results with different vectors have been achieved. In this review we summarise available data and discuss advantages and drawbacks of currently available vectors.

1 Introduction

Dendritic cells (DCs) constitute a specialised system of antigen-presenting cells (APCs) that are initiators and modulators of the immune response against microbial, tumour and self-antigens (Banchereau et al. 2001). Their unique capacity to induce or boost immunity makes them an attractive tool for immunotherapy, in particular for the induction of anti-tumoural immunity. The development of techniques to generate clinical-grade DCs together with molecular identification of human cancer antigens in the last decade has ushered in a new era of antigen-specific cancer immunotherapy specifically targeting these antigens. Numerous phase I and II clinical trials evaluating the efficacy of DCs in patients with cancer have been initiated, mostly in the post-adjuvant setting (for review see Jenne and Bhardwaj 2001). In these trials, DCs were loaded either with MHC class I-specific synthetic peptides or with whole tumour cell preparations. The disadvantages of using DCs pulsed with synthetic peptides from TAA include the uncertainty regarding the longevity of antigen presentation, the restriction by the patient’s haplotype and the relatively low number of known MHC class I and in particular of MHC class II helper cell-related epitopes. Whole tumour cell preparations such as tumour lysates, apoptotic tumour cells or DC tumour cell