

4.2 Overview

Prostate cancer is the most commonly diagnosed cancer, and the second leading cause of cancer-related death among men in the United States (1). The American Cancer Society estimates that in 1998, over 39,200 men will die from prostate cancer, and another 184,500 will be diagnosed with prostate cancer (2). With the advent of serum prostate-specific antigen (PSA) testing in 1988, and increased public awareness, the rate of diagnosis for prostate cancer has dramatically increased during the last decade (3). Earlier detection has resulted in a significant stage migration toward clinically organ-confined disease, allowing the radical prostatectomy to take on a more important role (3). Presently, approximately 60% of men newly diagnosed with prostate cancer are believed to have clinically organ-confined disease (4). Despite this stage migration, approximately 40-60% of patients are found to have pathologically detected extracapsular disease after examination of prostatectomy specimens (5). Approximately 20-40% of patients treated with a radical prostatectomy or radiation eventually have disease progression. For this population, there is no curative treatment (6).

Cytokine treatment has been shown to effectively alter several prostate cancer properties closely associated with tumor invasion and a metastatic phenotype (7). IL-2 has been shown to have the greatest bioactivity of all the cytokines studied so far. IL-2 can stimulate cytotoxic T cell reactions against tumors, and has shown a mild to moderate growth inhibition to prostate cancer cells (7). However, systemic treatment with IL-2 does not allow for adequate levels within the tumor without dose-limiting toxicities, and intralesional IL-2 protein therapy is limited by a short half-life and rapid renal clearance. Gene-based therapy offers a different approach to treating prostate cancer. Gene-based therapy with IL-2 potentially allows for a steady IL-2 production within the tumor, allowing for prolonged, elevated cytokine levels, while minimizing the side effects seen in patients who receive systemic therapy.