Treatment of tumors by protocols based on combination of surgery, radiotherapy and systemic chemotherapy resulted in the improved prognosis of many human cancers. Despite the continuous introduction of new drugs and further improvements of chemotherapy protocols, it´s likely that at some point chemotherapy will reach its limits and clinical efficacy will plateau. Immunotherapy has emerged as another treatment modality with the potential to contribute to further improvements in the survival. The products of advanced cellular terapies must be generated using GMP-approved reagents and number of studies have addressed the need to generate large numbers of DCs for clinical trials according to regulatory authorities and to current legislation. The rising knowledge about dendritic cells (DCs) in the immune response against tumors and the ability to prepaire DCs in vitro leaded to the establishment of immunotherapy protocols. Breakthrough studies that identified markers of immunogenic tumor cell death after chemotherapy treatment challenge the long-time perception of chemotherapy and immunotherapy as opposing and incompatible treatment modalities. My PhD thesis is a contributiont to this topic. In the first paper we identified monocyte-derived DCs that were generated in CellGro and activated using PolyI:C as the most potent clinical-grade DCs for the induction of antigen-specific T cells. This protocol has been approved for clinical use by regulatory authorities and represents a platform for the manufacturing of DC-based active cancer immunotherapy in the settings of prostate cancer. Furthermore we identified the immunogenicity of human primary tumor cells and tumor cell lines after antracyclines treatment. Furthermore these results identified in human correlates with data obtained in mice models. The last part of thesis is conclussion of chemo-immunotherapy principles on the case-report of prostate patient treated by chemo-immunotherapy.