305a Cancer Therapy Using Targeted and Nanoparticle Systems

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Current cancer therapy usually involves intrusive processes including application of catheters to allow chemotherapy, initial chemotherapy to shrink any cancer present, surgery to then remove the tumor(s) if possible, followed by more chemotherapy and radiation. The purpose of the chemotherapy and radiation is to kill the tumor cells as these cells are more susceptible to the actions of these drugs and methods because of their growth at a much faster rate than healthy cells, at least in adults. Research efforts to improve chemotherapy over the past 25 years have led to an improvement in patient survival but there is still a need for improvement. Current research areas include development of carriers to allow alternative dosing routes, new therapeutic targets such as blood vessels fueling tumor growth and targeted therapeutics that are more specific in their activity.

Clinical trials have shown that patients are open to new therapeutic options and the goal of these new chemotherapeutics is to increase survival time and the quality of life for cancer patients. In all cases, the effectiveness of the treatment is directly related to the treatment's ability to target and to kill the cancer cells while affecting as few healthy cells as possible. The degree of change in the patient's quality of life and eventual life expectancy is directly related to this targeting ability of the treatment. Most current cancer patients' only selectivity in their treatment is related to the inherent nature of the chemotherapeutic drugs to work on a particular type of cancer cell more intensely than on healthy cells. However, by administering bolus doses of these intense drugs systematically some side effects will always occur and sometimes are so intense that the patient must discontinue therapy before the drugs have a chance to eradicate the cancer.

Unfortunately, not all treatments, even if carried through to the oncologists specifications, are effective in killing the cancer before the cancer kills the patient. The advances in treatment of cancer are progressing quickly both in terms of new agents against cancer and new ways of delivering both old and new agents. Hopefully this progress can move us away from near-toxic doses of non-specific agents.

This presentation will primarily address new methods for delivering therapies, both old and new, with a focus on nanoparticle formulations and ones that specifically target tumors.