



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP180196

Project Title:
Microwafers as Novel Drug or Gene Delivery Vehicles for Noninvasive
Treatment of Retinoblastoma

Award Mechanism:
Individual Investigator Research Awards for Cancer in Children and
Adolescents

Principal Investigator:
Hurwitz, Richard

Entity:
Baylor College of Medicine

Lay Summary:

We have developed novel, non-invasive microwafers that can deliver nanoparticles (small beads) containing drugs to tissues or tumors. We hypothesize that this system would be ideal for treating retinoblastoma. Retinoblastoma, an ocular cancer that occurs in young children, can affect one or both eyes. Removal of the eye (enucleation) with the tumor is often curative but ophthalmologists are opting for local therapies to control small tumors or systemic chemotherapy to control larger tumors with the goal of saving vision. Sometimes small pieces of tumor break off to form vitreous seeds. There is no good option other than enucleation for this condition. The development of alternative treatments that could potentially preserve vision, reduce the risk of developing other cancers, and reduce the impact of the emotional and physical scars of enucleation is important. We have completed the first clinical trial that used suicide gene therapy (a method of forcing the tumor cells to produce a protein that converts a drug to a locally toxic agent) to treat children with advanced retinoblastoma. The successful reduction of vitreous seeds was encouraging. However, the gene therapy approach as well as intraocular drug injections or implants that are used for other eye diseases all require accessing the inside of the eye either with a needle or scalpel. For retinoblastoma tumors, these procedures increase the risk that tumor may escape the eye and cause metastatic disease. We will manufacture small, flexible discs similar to contact lenses that have wells on one side. The wells can be filled with tiny beads that can carry the drug or gene of the doctors' choice. The disc can then be placed on the side of the eye and the beads will move through the outer layers of the eye into the chamber where the tumor is growing. Before this approach can be used clinically, we will manufacture the discs and the small beads and show that retinoblastoma can effectively be treated in animal models.