Novel Oncolytic Treatment For Neuroblastoma

Newly developed, this stably attenuated poliovirus with enhanced replication properties in human tumor cells is effective in treating human solid tumors, particularly neuroblastoma. The novel oncolytic poliovirus induces a robust antitumor immune response with no new tumor growth observed in mice cured of neuroblastoma after reinoculation via subcutaneous injection with neuroblastoma tumor cells.

Background:
Neuroblastoma is one of the most common solid tumors in children and is responsible for 15 percent of their cancer deaths. Available treatment is limited for high-risk neuroblastoma and prognosis is poor. Children with high-risk neuroblastoma are treated with radiotherapy, dose-intensive cycles of multi-drug chemotherapy or, if patients respond poorly, with myeloablative dose of chemotherapy supported by stem cell rescue. Despite an aggressive treatment strategy, disease relapse is frequent and both short- and long-term toxicities, including treatment-related acute myeloid leukemia, occur in a significant percentage of survivors. Researchers are searching for novel therapeutic approaches to reduce the high incidence of resistance of advanced stage neuroblastoma to conventional therapies.

Technology Description:
Eckard Wimmer, Ph.D., a distinguished professor in the Department of Molecular Genetics and Microbiology at Stony Brook University who is world renowned for his work on the poliovirus, has developed a stably attenuated poliovirus with enhanced replication properties in human tumor cells. The oncolytic virus is effective in treating human solid tumors, particularly neuroblastoma. Through genetic manipulation of the poliovirus genome, Dr. Wimmer and his team have reduced the neurovirulence of poliovirus 10,000 fold, while enhancing its ability to replicate in neuroblastoma cells, a characteristic not found in oncolytic poliovirus strains under clinical investigation. Using a novel poliovirus susceptible animal model, Dr. Wimmer eliminated lethal neuroblastoma tumors through intratumoral administration. This effect is observed even in the presence of high titers of anti-poliovirus antibodies after prior immunization. This novel attenuated oncolytic poliovirus induces a robust antitumor immune response with no new tumor growth observed in mice cured of neuroblastoma after reinoculation via subcutaneous (S.C.) injection with neuroblastoma tumor cells.

Advantages
- Stably attenuated
- Lyses variety of human and mouse neuroblastoma cell lines
- Effective even with an established immunity to poliovirus
- Strong anti-tumor immune response after treatment
- Validated in a mouse model of neuroblastoma

Applications
- Treatment of neuroblastoma and other solid tumors.

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Patents / Publications:
- Patent Pending
- Oncolytic treatment and cure of neuroblastoma by a novel attenuated poliovirus in a novel poliovirus-susceptible animal model.
  Toyoda et al. Cancer Res. 2007 Mar 15;67(6):2857-64.