AAV Vectors for Direct Delivery of shRNA into Islet Cells to Treat Pancreatic Cancer

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Technology description

Inhibits Neuroendocrine Tumor Development by Reducing Abnormally High Levels of Thymidylate Synthase

This AAV vector treatment reduces the oncogenic effect of overexpressed thymidylate synthase to inhibit the development of pancreatic neuroendocrine tumors. Each year doctors diagnose about 1,000 people in the United States with pancreatic neuroendocrine tumors (PanNET), which account for about 3 to 5 percent of all pancreatic cancer. Though incidences of pancreatic neuroendocrine tumors continue to increase, few therapeutic options are available. The lack of animal models suitable to represent the human disease limits the development and testing of treatments. Elevated levels of thymidylate synthase (TS) accelerate tumor growth. These high levels correlate with poor prognoses and low overall survival rates of pancreatic neuroendocrine cancer patients.
Researchers at the University of Florida have developed an adeno-associated virus (AAV) particle vector that delivers and expresses TS-inhibiting small hairpin RNA (shRNA) into pancreatic islet cells. This treatment can reduce thymidylate synthase levels and incorporate within active pancreatic cancer treatment to inhibit tumor development and increase patient survival rates.

Technology

This treatment employs an AAV-TS vector that specifically targets pancreatic islet cells. The vector contains small hairpin RNA (shRNA) molecules and releases them into identified pancreatic islet cells. This reduces thymidylate synthase (TS) levels, significantly decreasing the progression of pancreatic neuroendocrine tumors (PanNETs). TS acts as a biomarker and therapeutic target. Although TS plays a central role in DNA synthesis/repair and is essential for cell proliferation, high levels of TS correlate strongly with tumorigenesis, poor therapeutic outcomes, and low overall survival rates in cancer patients. A mouse with an hTS/Men1 (-/-) allele established a model to replicate the human disease of PanNET to test how the interfering RNA targeted the TS.

Application area

Cancer treatment that delays pancreatic neuroendocrine tumor growth by delivering shRNA directly to pancreatic islet cells

Advantages

Reduces pancreatic cell tumor growth due to high thymidylate synthase (TS) levels, increasing the survival rate of patients with pancreatic cancer
Improves thymidylate synthase targeting strategies in combination with other FDA-approved drugs, creating more efficient treatment options to eradicate PanNETs

Institution

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