Table 2. nano-siRNA therapeutic agents in clinical trials for the pancreatic cancer therapy.

Therapeutic siRNAs/interventions	Targeted gene	Delivery	Diseased Condition	Phase	Status	Sponsor	Results/comments	NCT number
siG12D-LODER/ Gemcitabine+nab-Paclitaxel	KRAS-G12D	Intratumor placement, Surgical implantation/ LODER polymer	Pancreatic Cancer	II	Recruiting	Silenseed Ltd	siG12D-LODER™ consists of two major parts. The first part is a polymeric matrix which encapsulates the second part, anti-KRASG12D siRNA. This therapeutic agent shows prolonged antitumor effect, due to slow release.	NCT0167625
siG12D LODER	KRAS-G12D	Intratumor placement, Surgical implantation/ LODER polymer	Pancreatic Cancer	I	Completed	Silenseed Ltd	KRAS oncogene mutations (commonly G12D) has been mostly observed in the PDAC, as a result, stable KRASG12D siRNA drug treatment is promising strategy to cause apoptosis of such pancreatic tumor cells.	NCT0118878
KRAS-G12D siRNA	KRAS-G12D	i.v. infusion/ Mesenchymal Stromal Cells-derived Exosomes	Pancreatic Cancer	I	Not yet recruiting	M.D. Anderson Cancer Center	In these clinical trial studies, the most suitable dose and adverse effects of using exosomes derived from mesenchymal stromal cells for KrasG12D siRNA (iExosomes) delivery in treating participants with metastatic pancreatic cancer with KrasG12D mutation has been studied. iExosomes can show higher efficacy in pancreatic cancer therapy.	NCT0360863
Atu027 & gemcitabine	PKN3	i.v./ cationic lipoplex	Metastatic Pancreatic Cancer	I/II	Completed	Silence Therapeutics GmbH	Atu027, which has great antimetastatic effect, is a siRNA-encapsulated liposome. This drug can suppress the expression of protein kinase N3 (PKN3) in the vascular endothelium. PKN3 is believed to be a Rho effector, which mediates the growth of pancreatic cancer cell downstream of PI3K. It has been shown that gemcitabine and Atu027 combination is safe for advanced pancreatic cancer therapy.	NCT0180863

TKM-080301	PLK1	i.v./ LNP	Pancreas Cancer with Hepatic Metastasis	I	Completed	National Cancer Institute (NCI)	TKM-080301 is a lipid nanoparticle siRNA delivery system. This therapeutic agent can efficiently suppress polo-like kinase 1 (PLK1) expression. It has been demonstrated that TKM-080301 has antitumor efficacy for pancreas cancer with hepatic metastases.	NCT0143700

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