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Survivin si-RNA nano particles are capable of inhibiting cancer cell growth both *in vitro* and *in vivo*

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Abstract

Introduction: Since the stability of siRNA molecules in the blood and efficiency of siRNA delivery into target organs or tissues following systemic administration have been the major issues that limit applications of siRNA in human patients, we try to explore if siRNA liposome entrapment works in the development of novel therapeutics. Our study aims to evaluate the therapeutic effect of survivin siRNA nano particles, on liver cancer, colon cancer and cervical cancer both *in vitro* and *in vivo*.

Methods: First, sequences of survivin siRNA we designed had been screened for their efficacy, and the most effective one was chosen for the next study. Second, we have tested the biological effect of survivin si-RNA nano particles on cancer cell lines *in vitro*, and resulted that, the survivin mRNA and its protein expression was significantly inhibited in MHCC-97H cells, He-La cells and Lo-Vo cells, also proliferation of those cell lines was inhibited and apoptosis was promoted. Third, subcutaneous xenograft Balb/c nude mice of MHCC-97H cells, He-La cells or Lo-Vo cells were established. Survivin si-RNA nano particles (70.7±29.077nm in size), with dosage of 3 mg/kg survivin si-RNA was given via local or intravenous injection, twice a week continuously for 4 weeks.

Results: As results, significant tumor growth inhibition both in local injection and venous injection was observed, compared to control mice who received scribbled siRNA nan particles at the same dosage, with inhibition rate of 32.22% and 36.67%, at the end of study in venous injection and local injection respectively, the relative tumor volume in mice with local injection showed significant less than control group from 10 days after first injection ($P<0.05$), till 31 days, it was also the same situation in mice with venous injection compared to control, ($P<0.05$) except day 17, survivin mRNA and its protein were down regulated at the end of study, compared to control group. Our study also showed some inhibition activity of survivin si-RNA nano particles in subcutaneous xeno-graft balb/c nude mice of He-La or Lo-Vo cells, survivin mRNA and protein expression was all down regulated in tumor tissue compared to control. We labeled the survivin si-RNA with Cy3 florescence and intravenous injection to nude mice with MHCC-97H cells and found intense Cy3 distribution in tumor mass, liver and spleen, but scant distribution in heart, brain, lung, bone marrow and gastrointestinal tract.

Conclusion: Our study revealed that survivin si-RNA nano particles were capable of inhibiting tumor growth both *in vitro* and *in vivo*.

Biography

Suoqin Tang has completed his MD from The Fourth Medical University in China and Post-doctoral studies from University of Southern California School of Medicine. He is Chief Physician and Professor of Department of Pediatrics, Chinese PLA General Hospital, a famous and one of the best hospitals in China. He has published more than 65 papers both in China and overseas. He is an international member of Childrens Oncology Group (US), standing member of Chinese Pediatric Society, and Editor of *Chinese Journal of Pediatrics*. He is doing clinical work on chemotherapy of leukemia and solid tumors, including lymphoma, neuroblastoma and PNET, his research work focus on target therapy of cancer.