New cancer nanomedicine reduces pancreatic tumour growth

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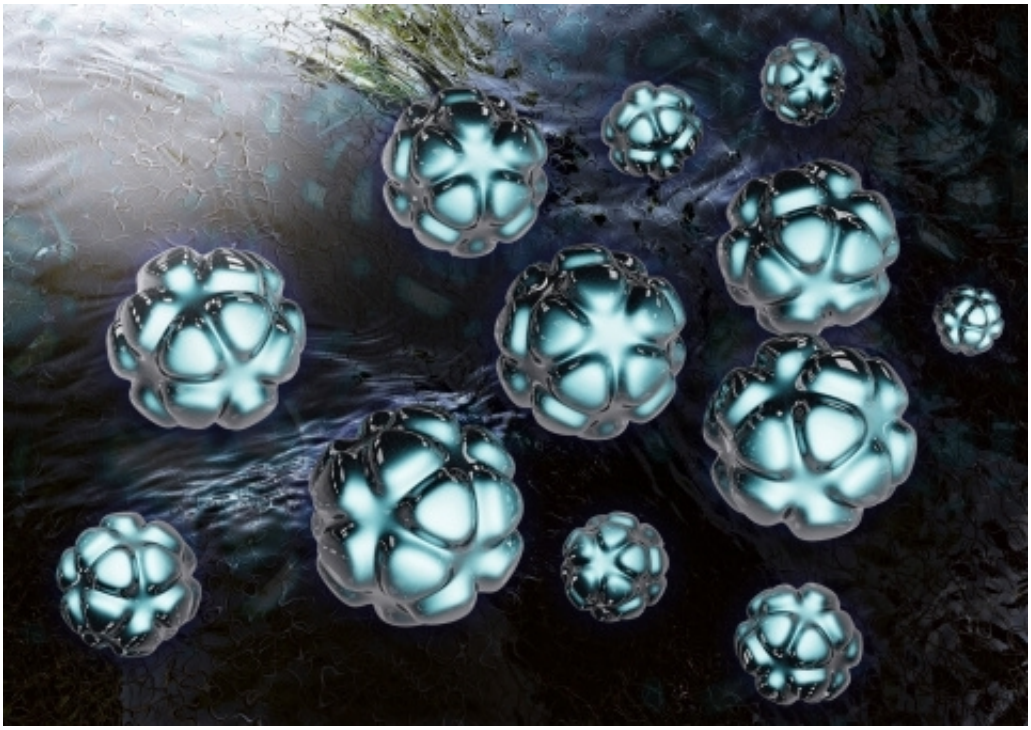

Nanoparticles. Credit: Thinkstock

Australian cancer researchers have developed a highly promising nanomedicine that could improve treatment for pancreatic cancer – the most deadly cancer in Australia.

Australian cancer researchers have developed a highly promising technology to deliver gene-silencing drugs to treat pancreatic cancer –

the most chemo-resistant and deadly cancer in Australia.

When tested in mice, the new nanomedicine resulted in a 50 per cent reduction in the growth of tumours and reduced the spread of pancreatic cancer.

The UNSW-led research, published in the *Biomacromolecules* journal, provides new hope for pancreatic cancer patients, most of whom succumb to the disease within three to six months of diagnosis.

Lead researcher Dr Phoebe Phillips, from UNSW's Lowy Cancer Research Centre, said it was devastating for her clinical colleagues when they had to tell pancreatic cancer patients that the best chemotherapy drug available could prolong life by only 16 weeks.

"A major reason for the lack of response to chemotherapy is that pancreatic tumours have an extensive scar tissue which makes up to 90 per cent of the tumour," Dr Phillips said.

"This scar causes pancreatic cancer cell chemotherapy resistance and is a physical barrier to chemotherapy drug delivery to tumours.

"We recently identified a key promoter of tumour growth, cancer spread and chemo-resistance in pancreatic tumours called βIII-tubulin. Inhibition of this gene resulted in a 50 per cent reduction in tumour growth and reduced the spread of the cancer in mice," Dr Phillips said.

The problem with therapeutically targeting this gene is that it is difficult to deliver drugs to it. To overcome this problem, the researchers have developed a nanomedicine which consists of a state-of-the-art nanoparticle that can package small RNA molecules (DNA photocopies of cells) and greatly inhibit βIII-tubulin.

The researchers have shown that their novel nanoparticle can deliver therapeutic doses of small RNAs to pancreatic tumours in mice, despite the presence of scar tissue, and successfully inhibit βIII-tubulin.

"The significance of our nanomedicine technology lies in its potential to inhibit any tumour-promoting gene or a cocktail of genes personalised to the genetic profile of a patient's tumour," Dr Phillips said.

"This work has the potential to develop new therapies to target this drug-resistant cancer and improve the effectiveness of current chemotherapies, which may increase survival and quality of life for pancreatic cancer patients."

More information: Joann Teo et al. A Rationally Optimized Nanoparticle System for the Delivery of RNA Interference Therapeutics into Pancreatic Tumors in Vivo, *Biomacromolecules* (2016). DOI: 10.1021/acs.biomac.6b00185

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