

World's first chemical guided missile could be the answer to wiping out cancer

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Deakin University medical scientists have created the world's first cancer stem cell-targeting chemical missile, placing them a step closer to creating a medical 'smart bomb' that would seek out and eradicate the root of cancer cells.

The Deakin researchers have worked with scientists in India and Australia to create the world's first RNA aptamer, a chemical antibody that acts like a guided missile to seek out and bind only to [cancer stem cells](#). The aptamer has the potential to deliver drugs directly to the stem cells (the root of cancer cells) and also to be used to develop a more effective cancer imaging system for early detection of the disease. Their discoveries have been published recently in an international cancer research journal, *Cancer Science*.

The Director of Deakin Medical School's [Nanomedicine](#) Program, Professor Wei Duan, said the development of the aptamer had huge implications for the way cancer is detected and treated.

"Despite technological and medical advances, the survival rates for many cancers remain poor, due partly to the inability to detect cancer early and then provide targeted treatment," Professor Duan said.

"Current cancer treatments destroy the cells that form the bulk of the tumour, but are largely ineffective against the root of the cancer, the cancer stem cells. This suggests that in order to provide a cure for cancer we must accurately detect and eliminate the cancer stem cells."

The aptamer is the first part of the 'medical smart bomb' the researchers have been developing.

"What we have created is the 'guided missile' part of the 'smart bomb'," Professor Duan explained.

"The aptamer acts like a guided missile, targeting the tumour and binding to the root of the cancer.

"The aim now is to combine the aptamer with the 'bomb' (a microscopic fat particle) that can carry anti-cancer drugs or [diagnostic imaging](#) agents directly to the cancer stem cells, creating the ultimate medical smart bomb."

Professor Duan said the medical smart bomb opened up exciting possibilities for detection and treatment of cancer.

"The cancer stem cell-targeting missile and the smart bomb could revolutionise the way cancer is diagnosed," he explained.

"The minute size of the aptamer means it could locate [cancer cells](#) in their very early stages. Attaching radioactive compounds to the aptamer could lead to the development of sensitive diagnostic scans for earlier detection, more accurate pinpointing of the location of cancer, better prediction of the chance of cure and improved monitoring of the response to treatment.

"More accurate identification of the type of cancer present would lead to more personalised treatment that is more successful and cost-effective.

"This could ultimately lead to better cancer survival rates and greatly improved quality of life for patients."

Provided by Research Australia

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