'Missile' targets cancer in the brain

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SUE DUNLEVY

RESEARCHERS have developed a brain cancer drug "missile" that can cut through the brain's protective coating – the blood-brain barrier – in a major breakthrough that could save thousands of lives.

While the skull, for example, protects against physical damage, the blood-brain barrier provides a defence against disease-causing pathogens and toxins present in our blood.

But a new delivery method for brain cancer treatment that worked in mice and human clinical trials could begin at the end of this year.

Professor Kris Thurecht, from the ARC Centre of Excellence, said the nanomedicine his team has developed not only gets into the tumour tissue, it also travels to the core of the tumour.

About 1800 Australians are diagnosed with brain cancer every year but it has among the lowest survival rate of any cancer, with just 4 per cent of people still alive after five years.

One of the reasons is that the brain has a protective barrier of blood vessels that block most substances from the bloodstream, including medicines, entering the brain.

"It's exquisite until you need to treat something in the brain," Prof Thurecht said.

It means the main form of treatment for brain cancer is surgery, which can damage the brain and which often fails to remove all the tumour.

To overcome this defence mechanism, Prof Thurecht (pictured) has designed nanomedicines to shuttle the medicine into the brain. A synthetic nanoparticle called polyethelene glycol (PEG) is wrapped around a small dose of the medicine doctors wish to use.

The PEG acts like a lolly wrapper, making it invisible to the immune system.

Once in the brain tumour the high acid levels in cancer cells trigger the release of the drug from its wrapper.

"Nanomedicines have been called guided missiles," Prof Thurecht said.

Tiny missile cancer cure

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Breakthrough brain nano drug

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bloodstream, including medicines, entering the brain.

"It's exquisite until you need to treat something in the brain," Professor Thurecht (pictured) said. It means the main form of treatment for brain cancer is surgery which can damage the brain and often fails to remove all the tumour. Chemotherapy and radiotherapy are the next steps.

To overcome this defence mechanism in brain cancer patients Professor Thurecht has designed nanomedicines to shuttle the medicine into the brain.

A synthetic nanoparticle called polyetheylene glycol (PEG) is wrapped around a small dose of the medicine doctors wish to use. Once in the brain tumour the high acid levels in cancer cells trigger the release of the drug from its wrapper. The drug then goes to work destroying the tumour cells while leaving healthy cells untouched.

"Nanomedicines have been called guided missiles," said Professor Thurecht.