Chemotherapy hope for hard-to-treat childhood cancers

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Children with a particularly lethal cancer could benefit from potentially life-saving treatment, following breakthrough work led by researchers at the University of New South Wales (UNSW).

A whole new class of drugs has been developed that, for the first time, targets the structure of the cancer cell.

UNSW researchers have provided proof that the therapy is effective in two types of cancers in the animal model. They are neuroblastoma, a cancer that affects children, and melanoma. The resulting paper has been published in *Cancer Research*.

"It is much like what happens when you see a building collapse on the TV news," says the lead author, Professor Peter Gunning, from UNSW Medicine. "Our drug causes the structure of the cancer cell to collapse – and it happens relatively quickly.

"We've been surprised and excited by the potential of this treatment," says Professor Gunning, the Head of the Oncology Research Unit, in the School of Medical Sciences.

The drug looks to be effective against every type of cancer cell.

The work could lead to an entirely new type of chemotherapy, which could have more positive outcomes for hard-to-treat cancers and have fewer long-term side-effects for survivors.

"Attacking the architecture of the cancer cell has long been an obvious target, but until now, attempts have failed because the building blocks of the structure of the cancer cell are also used to build the heart and muscle, so the toxicity was unacceptable," says the first author on the paper, Dr Justine Stehn, also from the Oncology Research Unit.

But the team recognised there was a second "building block", the protein tropomyosin, in the cancer cell structure that was sufficiently different from those in the heart and muscle, which could be safely targeted.

This latest work is vindication for Professor Gunning's team which was alone in its theory about the architecture of cells. The UNSW team is believed to be the only one working in this area internationally.

As toxicity had been a major stumbling block in earlier research, possible funders were scarce. Professor Gunning says the financial support of The Kids' Cancer Project is the only way this research has been possible.

"This research opens up a door on something the pharmaceutical industry and science gave up on 25 years ago," says the CEO of the Kids' Cancer Project, Peter Neilson.

"It shows that our founder's faith in this work was right," he says. "We will continue to invest in this and we are determined to see it going into clinical trials in children with hard-to-treat neuroblastoma.

"Normally it would go into adults and it would take 7 to 8 years to be trialled in kids," says Mr Neilson.

The first clinical trials are expected in 2015.

"Cancer in children is not the result of lifestyle issues, so you're relying

on medical research to see any improvement in survival rates," says the Dean of UNSW Medicine, Professor Peter Smith, who is also the Chair of the Research Advisory Committee of The Kids' Cancer Project.

Childhood cancer is the single greatest cause of death from disease in Australian children, with three children a week dying from the condition.

"In the 1960s, less than 10 per cent of children survived cancer and now it's 80 per cent," says Professor Smith, who campaigned to have chemotherapy used in children in the 1970s, dramatically improving survival rates. "That improvement is all down to research. So it shows how important these partnerships are."

Provided by University of New South Wales