

Starving cancer the key to new treatments

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Angelika Broeer. Credit: Image Stuart Hay, ANU

Researchers have identified a vital supply route that cancer cells use to obtain their nutrients, in a discovery that could lead to new treatments to stop the growth of tumours.

The research team blocked gateways through which the cancer cell was obtaining the amino acid glutamine and found the cells almost completely stopped growing.

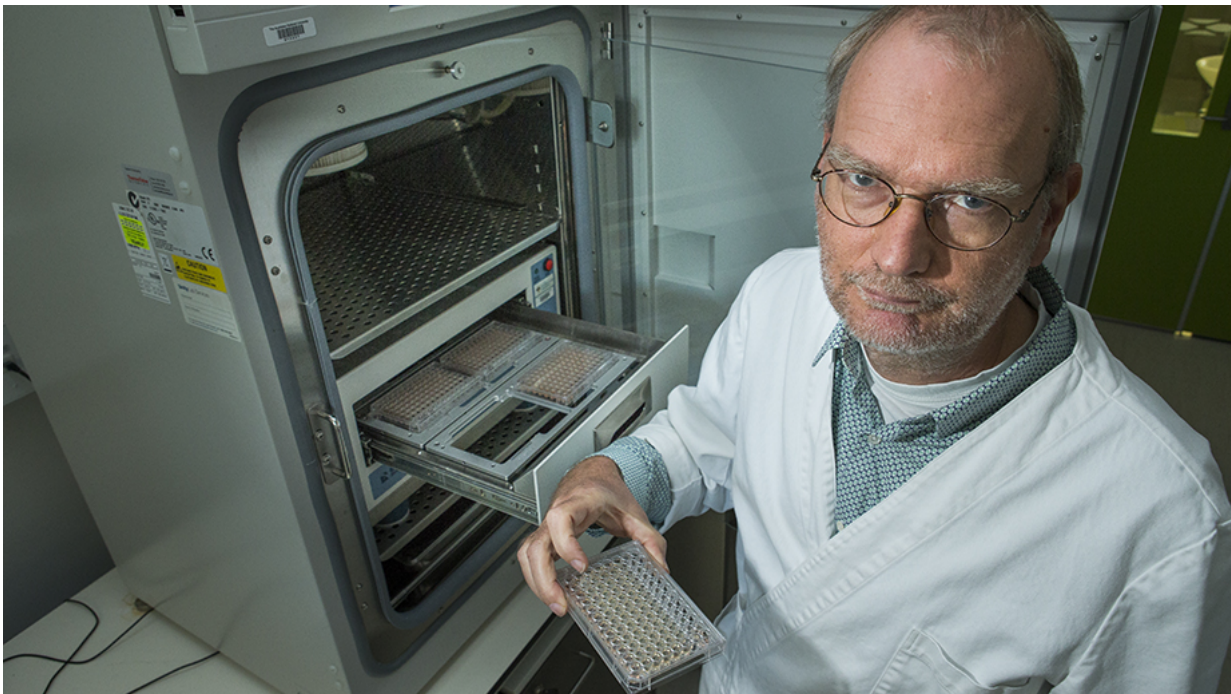
"This is likely to work in a wide range of cancers, because it is a very common mechanism in [cancer cells](#)," said lead researcher Professor Stefan Bröer from The Australian National University (ANU).

"Better still, this should lead to chemotherapy with much less serious side-effects, as [normal cells](#) do not use glutamine as a building material.

"Crucial [white blood cells](#), which current treatments damage, could be spared, and it could cut out the hair loss that chemotherapy causes."

There are 917 different types of cancer currently identified, and many cures work only for a single type of the disease or become ineffective as cancers develop resistance to chemotherapy.

However Professor Broer, a biochemist in the ANU Research School of Biology, said the new approach would be less prone to resistance because blocking the glutamine transport mechanism is an external process that would be hard for cancer cells to get around.



Stefan Broeer with an incubator. Credit: Stuart Hay, ANU

The team first attempted a glutamine blockade by genetically altering cancer cells to disable their main glutamine transporter. However, it was not very effective, Professor Bröer said.

"It was not quite as simple as we thought. The cells set off a biochemical alarm which opened a back door in the cell so they could still get the glutamine they needed," he said.

Once the team had disabled the second gateway by turning off the biochemical alarm with a technique known as RNA silencing, the cells' growth reduced by 96 per cent.

The results are published in the *Journal of Biological Chemistry*.

Lead author Angelika Bröer spearheaded the effort to identify and genetically knock out glutamine transporters.

"It is an exciting time to do cancer research. We now have precision tools in our hands to manipulate the genome of cancer cells, allowing us to address problems that were difficult to solve previously," she said.

Now the importance of glutamine gateways have been identified in cancer, the hunt is on to find drug treatments that will lock them down and kill the disease.

"We have developed a set of tests which make it very easy to determine if a drug is targeting glutamine transporters," Ms Broer said.

"This means we can set robots to work that will test tens of thousands of drugs for us over the next year or two."

Provided by Australian National University

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