# Blocking glutamine pumps suppresses melanoma cell growth

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Jeff Holst in his lab at the Centenary Institute

The latest research from Sydney's Centenary Institute and the University of Sydney suggests we could.

Last year the researchers showed they could starve prostate cancer. Now a further discovery opens up the prospect of a new class of drugs that could work across a range of cancers including melanoma.

Australia has the highest rate of melanoma in the world. It is the deadliest form of skin cancer, and third most common cancer in Australia.

Unlike normal cells, melanoma and other cancer cells rely on the amino acid glutamine instead of glucose for the energy required to divide and grow. Thus, in order to fuel their rapid growth, cancer cells need to pump glutamine into their cells.

New research published today in the *International Journal of Cancer* has found that not only do melanoma cells have more glutamine pumps on their surface, but that blocking these pumps stops their growth. The work was led by Dr Jeff Holst, who heads the Centenary Institute's Origins of Cancer Research Group, together with post-doctoral fellow Dr Qian (Kevin) Wang.

"We've shown that if we starve melanoma of these essential nutrients, we can stop the cancer from growing," says Dr Holst. "This involves blocking the protein pumps that move glutamine into tumour cells, which successfully slowed the growth of the tumours in cell cultures", he says.

Although often curable if detected early, melanoma is one of the most difficult cancers to treat once it has spread, says Dr Holst, because it rapidly develops resistance to known therapies. "But a drug that specifically targets and inhibits the glutamine pump will give us a new and different approach from current treatments."

"This work is leading a new wave with potential to develop cancer therapeutic agents. These drug targets, rather than mutations specific to the cancer, are exaggerated normal processes," says Centenary Executive Director Mathew Vadas.

"This is a long journey to the clinic, but it's an exciting development," Dr Holst says. He hopes such a compound can be developed and tested in five to 10 years.

Last year Dr Holst's group published a paper in the *Journal of the National Cancer Institute* showing that prostate cancer cells require another amino acid, leucine, for their growth. "We first demonstrated this nutrient pumping mechanism in prostate cancers, and it now looks like it occurs in a broad range of cancers, particularly solid cancers such as melanoma. This opens the possibility of designing therapies that can be used to block nutrient pumps across multiple cancers."

**More information:** Wang, Q., Beaumont, K. A., Otte, N. J., Font, J., Bailey, C. G., van Geldermalsen, M., Sharp, D. M., Tiffen, J. C., Ryan, R. M., Jormakka, M., Haass, N. K., Rasko, J. E.J. and Holst, J. (2014), "Targeting glutamine transport to suppress melanoma cell growth." Int. J. Cancer. DOI: 10.1002/ijc.28749

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