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10 JUN

# Study reveals how cancers spread to the brain

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[Health](#)

Research has shown for the first time how cancers that spread to the brain establish themselves and begin to grow.

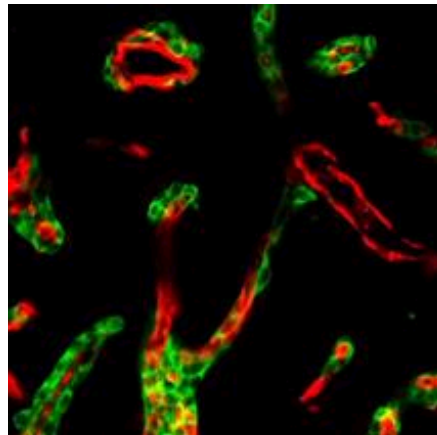
The Oxford University study, published in the journal PLoS ONE, has identified the mechanism that metastatic cancer cells use to anchor themselves to blood

vessels in the brain. This could allow new drugs to be developed to stop cancers from spreading and growing in the brain.

Metastasis is the process where cancer breaks out from where a tumour has initially grown and spreads to other parts of the body. It is usually the reason why cancer is fatal.

Brain metastases are the most common malignant tumours of the central nervous system, outnumbering by ten times those that originate in the brain. Once such cancers have reached the brain the prognosis is not good: the median survival is 9 months with maximal treatment. Over 20% of all cancer patients will eventually develop metastatic cancer in the central nervous system.

' Metastasis to the brain is essentially terminal, and very little is known about the process by which it occurs,' says Dr W Shawn Carbonell, a post-doctoral research scientist at the MRC/CRUK Gray Institute for Radiation Oncology and Biology at the University of Oxford. ' But by quickly remedying our lack of knowledge, we hope to be able to come up with new and better



Breast cancer cells (in green) grow only on blood vessels (red) in the brain of a mouse

## Further information

- › PLoS ONE
- › MRC/CRUK Gray Institute for Radiation Oncology and Biology
- › Cancer Research UK
- › Medical Research Council
- › National Institutes of Health

## Media Coverage

- › BBC Online



ways of treating such cancers.'

The Oxford University team, led by Professor Ruth Muschel at the Gray Institute for Radiation Oncology and Biology with funding from Cancer Research UK, the Medical Research Council and the US National Institutes of

## **The dependency of early brain metastases on the host blood vessels might provide a target for new drug therapies.**

Professor Ruth Muschel

Health, set out to answer the question: how do tumour cells grow in the brain. They looked at a comprehensive range of cancer cell types from humans and mice – breast cancer cell lines, melanoma cells and a lymphoma cell line – and examined how the cells establish themselves in the brain in laboratory studies.

The researchers found that the metastatic cancer cells start to grow on the walls of blood vessels in the brain in over 95% of cases, and not on the nerve cells. The researchers suggest that by 'co-opting' the vascular networks in the brain, the cancer cells can get all the nutrients and oxygen they need to start growing without having to grow new blood vessels of their own first. In addition the cancer cells require the brain blood vessels to invade into the brain for further cancer growth.

The team also discovered that a particular protein called an integrin on the outside surface of the cancer cells is necessary for them to stick to the blood vessels. Removal of the integrin stopped the cancer cells from attaching and starting to grow. This discovery is promising, as it may be possible to develop drugs to target the integrin and stop brain metastasis.

'Our research describes a novel mechanism which explains how tumour cells metastasize to the brain. The dependency of early brain metastases on the host blood vessels might provide a target for new drug therapies,' says Professor Muschel.

Dr Helen George, Cancer Research UK's head of science information, says: 'This is an important part of the puzzle. Our research shows that cancer cells which spread to the brain latch on to blood vessels, paving the way for new and much-needed treatments to tackle cancers that have spread to the brain, in the future.'

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