

# Gene 'switches' could predict when breast cancers will spread to the brain

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Scientists have found a pattern of genetic 'switches' – chemical marks that turn genes on or off - that are linked to breast cancer's spread to the brain, according to research\* presented at the National Cancer Research Institute Cancer Conference in Liverpool today.

The researchers, based at the University of Wolverhampton, studied 24 breast cancers that had spread to the brain, along with samples from the original breast tumour, and found a handful of genes with faulty switches.

Crucially, two of the genetic switches became faulty early on in the development of breast cancer, suggesting they may be an early warning signal for tumours that will spread to the brain. The scientists are now working to develop a blood test that might be able to detect these signals at an early stage, before the disease has spread.

Up to 30 per cent of breast cancers will eventually spread to the brain, often many years after the first tumour was treated. Tackling secondary [brain tumours](#) with radiotherapy and surgery has limited success, with most women surviving just seven months after the brain metastasis has been diagnosed.

By comparing chemical switches, known as DNA methylation, between the original breast cancer and the secondary brain tumour the researchers were able to narrow down from 120 potential candidates to find a 'signature' for cancers that had spread.

Study author Dr Mark Morris, based at the University of Wolverhampton, said: "Each year the number of women whose breast cancer spreads to the brain is increasing. While we know many of the genetic changes behind breast cancer, we know very little about why the disease can spread to the brain.

"By identifying the genes that are switched off or on in breast cancers before they spread to the brain we hope to be able to develop a [blood test](#) to spot this change. There's also potential for our findings to be used as a starting point to develop treatments that might prevent the spread."

Each year almost 50,000 women are diagnosed with breast cancer in the UK and around 11,600 die from the disease.

Dr Abeer Shaaban, member of the NCRI Breast Clinical Studies Group, said: "Tackling the problem of [brain](#) metastases is one of the greatest challenges facing [breast cancer](#) researchers. This is an intriguing new angle to explore which underlines the importance of understanding how genes are controlled as cancer grows and spreads. We're understanding more and more about cancer's biology and this is opening exciting new avenues of research that could lead to new tests and treatments."

Provided by Cancer Research UK

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