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Way to spot breast cancer years in advance

By Michelle Roberts Health editor, BBC News website



Dr James Flanagan, Imperial College London: The more information an individual has, the more they can do to change their lifestyle to hopefully prevent the disease.

A genetic test could help predict breast cancer many years before the disease is diagnosed, experts hope.

Ultimately the findings, in the journal [Cancer Research](#), could lead to a simple blood test to screen women, they say.

The test looks for how genes are altered by environmental factors like alcohol and hormones - a process known as epigenetics.

One in five women is thought to have such a genetic "switch" that doubles breast cancer risk.

The scientists from Imperial College London analysed blood samples from 1,380 women of various ages, 640 of whom went on to develop breast cancer.

And they found a strong link between breast cancer risk and molecular modification of a single gene called ATM, which is found on white blood cells.

Predicting cancer

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detecting it earlier to give people the best possible chance of survival”

Baroness Delyth Morgan Breast Cancer Campaign

- [BBC Health: Breast cancer symptoms](#)

They then looked for evidence of what was causing this change. Specifically, they looked for a chemical effect called methylation, which is known to act as a "gene switch".

Women showing the highest methylation levels affecting the ATM gene were twice as likely to develop breast cancer compared with those with the lowest levels.

In some cases the changes were evident up to 11 years before a breast tumour was diagnosed.

Dr James Flanagan, of Imperial College London, who led the new research, said: "We know that genetic variation contributes to a person's risk of disease.

"With this new study we can now also say that epigenetic variation, or differences in how genes are modified, also has a role.

"We hope that this research is just the beginning of our understanding about the epigenetic component of breast cancer risk and in the coming years we hope to find many more examples of genes that contribute to a person's risk.

"The challenge will be how to incorporate all of this new information into the computer models that are currently used for individual risk prediction."

Epigenetics

- The focus is on targeting cancer-causing errors in the way the body reads DNA code, rather than errors in the genetic code itself
- A series of chemical switches determine whether genes are turned on or off, and ultimately what the cell will look like and how it will function
- Alterations in this "epigenetic" control can lead to cancer
- Environmental factors like hormones can act as triggers for these errors
- Scientists are working on new drugs that can regulate gene expression and effectively solve epigenetic problems

It is not yet clear why breast cancer risk might be linked to changes in a white blood cell gene.

But the team envisage that a blood test could be used in combination with other information about breast cancer risk, such as family history and the presence of other known breast cancer genes, to help identify those women at greatest risk of developing the disease in the future.

These women could then be closely monitored and offered pre-emptive treatment, such as surgery.

Baroness Delyth Morgan of the Breast Cancer Campaign, which funded the work, said: "By piecing together how this happens, we can look at ways of preventing the disease and detecting it earlier to give people the best possible chance of survival."

Laura Bell of Cancer Research UK said: "This study gives us a fascinating glimpse of the future and the promise that the emerging field of epigenetics holds. But it's too early to say

exactly how these particular changes might affect our ability to detect who is likely to develop certain types of cancer.

"With further studies, scientists will increase our knowledge of how genetic switches like this interplay together to affect breast cancer risk, with the hope that one day this could lead to a blood test that could help predict a woman's chance of getting the disease."