Breast cancer rules rewritten in 'landmark' study

By James Gallagher Health and science reporter, BBC News
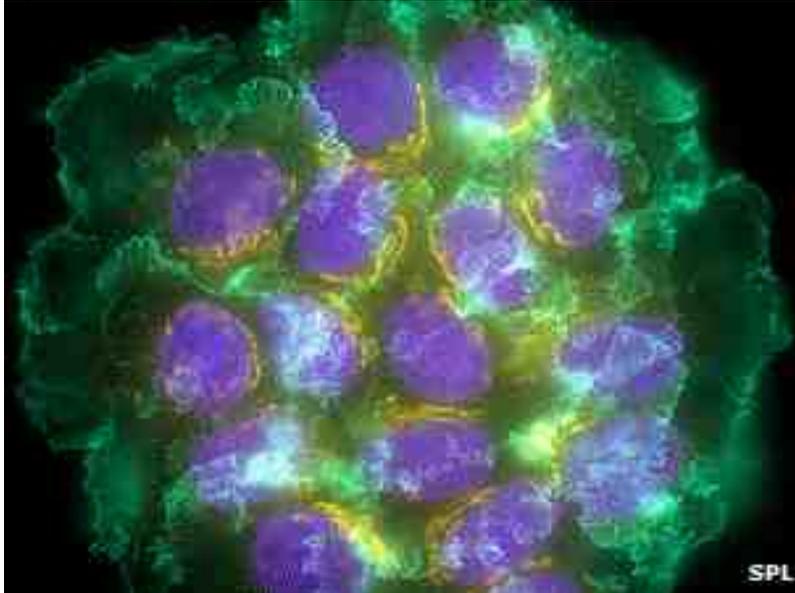
Breast cancer cells should be classified into one of 10 different diseases, say researchers.

What we currently call breast cancer should be thought of as 10 completely separate diseases, according to an international study which has been described as a "landmark".

The categories could improve treatment by tailoring drugs for a patient's exact type of breast cancer and help predict survival more accurately.

The study in Nature analysed breast cancers from 2,000 women.

It will take at least three years for the findings to be used in hospitals.

Cancer cartography
Researchers compared breast cancer to a map of the world. They said tests currently used in hospitals were quite broad, splitting breast cancer up into the equivalent of continents.

The latest findings give the breast cancer map far more detail, allowing you to find individual "countries".

"Breast cancer is not one disease, but 10 different diseases," said lead researcher Prof Carlos Caldas.

Analysis: What does this mean for patients?

The potential here is huge and it could have a transformative role in breast cancer care. However, we are a long way from using the new definitions in hospitals and the immediate

impact on patients will be limited.

There are clear survival differences among the 10 categories. Clusters two and five seem to have a 15-year survival of around 40%. Clusters three and four have around 75% survival over the same period. This could help better inform patients.

In terms of treatments, there is bad news. There is a targeted therapy for just one of the 10 breast cancers groups. That is Herceptin, which is already used in a targeted group of patients. Other groups will still have "standard" therapies such as chemotherapy or radiotherapy.

The hope is that by identifying the 10 breast cancers it will be possible for researchers to design drugs for each one, but that is still a work in progress.

He added: "Our results will pave the way for doctors in the future to diagnose the type of breast cancer a woman has, the types of drugs that will work and those that won't, in a much more precise way than is currently possible."

At the moment, breast cancers are classified by what they look like under the microscope and tests for "markers" on the tumours.

Those with "oestrogen receptors" should respond to hormone therapies such as tamoxifen; those with a "Her2 receptor" can be treated with Herceptin.

The vast majority of breast cancers, more than 70%, should respond to hormone therapies. However, their reaction to treatment varies wildly. Prof Caldas said: "Some do well, some do horribly. Clearly we need better classification."

Unprecedented scale
His team looked at frozen breast cancer samples from 2,000 women at hospitals in the UK and Canada.

They looked in huge detail at the genetics of the tumour cells - which genes had been mutated, which genes were working in overdrive, which were being shut down.

Breast cancer is the most common cancer in the UK, with around 50,000 women diagnosed each year.

The study, by researchers in the UK and Canada, showed that all the different ways the cells changed when they became cancerous could be grouped into 10 different categories - named IntClust one to 10.

Prof Caldas said this was a "completely new way of looking at breast cancer".

The study was funded by Cancer Research UK. Its chief executive, Dr Harpal Kumar, said: "This is the largest ever study looking in detail at the genetics of breast tumours.

Analysis: A new beginning

This is one of the prime examples of what could be a revolution in healthcare - "personalised medicine".

Cancers tend to be named after the place you find them; breast, colon, prostate, lung - the list goes on. It has long been known that this is not good enough, that some breast cancers can have more in common with an ovarian cancer than another breast tumour.

This study shows we should be thinking of breast cancer as 10 different diseases. Genes are going haywire in broadly 10 different ways and each category of mistake would require a different treatment.

This is the essence of personalised medicine - tailoring treatments to the genetics of a disease.

Similar studies could break other cancers down into several separate diseases, but the effects of personalised medicine could be much wider.

There are investigations into using genetic tests to predict which patients will respond well, or very badly, to blood thinners, bipolar medication and anti-HIV drugs.

The Health Secretary, Andrew Lansley, has already described the promise of the field as "immense".

There is a long way to go, as only one of the 10 breast cancer categories has a personalised treatment at the moment. But as is so often the case, breast cancer research is leading the way.

"This will change the way we look at breast cancer, it will have an enormous impact in the years to come in diagnosing and treating breast cancer.

"We think this is a landmark study."

He said the charity would begin using the new criteria in clinical trials it funded.

Outside of trials for new cancer drugs, the new breast cancer rulebook could take some time to directly benefit patients.

The researchers need to prove that the 10 classifications actually provide any benefit to people with breast cancer, before they can be used by doctors.

That process is expected to take three to five years.

Cancer revolution
The chief executive of the Breast Cancer Campaign, Baroness Delyth Morgan, said the study could "revolutionise the way breast cancer is diagnosed and treated".

"Being able to tailor treatments to the needs of individual patients is considered the Holy Grail for clinicians and this extensive study brings us another step further to that goal."

A Department of Health spokesperson said: "We are always looking at new ways to improve outcomes for cancer patients and that is why we are investing more than £750m to make sure people are diagnosed with cancer earlier and have better access to the latest treatments.

"We look forward to seeing the future results of this ongoing work and will continue to work with Cancer Research UK to find the best possible way to improve outcomes for people with breast cancer."