

Breast cancer isn't a comfortable topic to bring up, but it seems to be everywhere these days. You've probably heard about the drug Herceptin, or read features on the music artist Kylie Minogue and her experience with breast cancer.

The good news is that according to national statistics, the prognosis for breast cancer is improving. Elizabeth Reed, a Breast Cancer Care researcher looking at women living with secondary breast cancer, tells us "Seventy percent of women who develop breast cancer are successfully treated, so the survival rate for this is good." But we're not out of the woods yet. Breast cancer is still the leading cause of death for women aged 35-55, so cancer researchers are scrutinizing our genes to find the culprits.

Professor Andrew Sharrocks at the University of Manchester has found that a protein called LPP plays an important role in breast cancer spread, a process where the cancer cells go out of the breast and form secondary tumours. "Technically the cells could go anywhere, but the most common sites for secondaries are the bone and then the lung, liver and brain," explains Reed.

One crucial protein that LPP interacts with is PEA3. PEA3 is used by the body to switch on, or 'activate', a specific gene which then produces enzymes that degrade the net-like structure that contains cells and holds them all in place. Once this net disintegrates, there is nothing left to keep the cells in the breast area, so they are free to move out.

But why focus on LPP? "LPP is a co-activator, and PEA3 doesn't function well without it," says Sharrocks. "The genes making LPP and PEA3 are over-expressed in cancer, so these proteins work non-stop rather than at specific times like in normal cells." By disabling LPP, it would prevent PEA3 from overshooting and the cancer from spreading.

This knowledge may help to develop a treatment preventing breast cancer spread and eventual death. "Most people die from the secondary cancers, as it's the health effects of the breast cancer *spreading* that kills them," explains Reed. "The prognosis for secondary cancer can vary from months to years, but it's not curable."

However, this research may only be in the early stages and it could be a long procedure before a potential drug is developed from it. Reed points out that some cancer research may never lead to a treatment: "There's a huge amount of breast cancer research coming out all the time. But often these studies aren't really anything that's going to impact on people with breast cancer."

But let's just say, for argument's sake, that there *is* a drug being developed that targets LPP. It would be worth looking into who would use it. People are now recognising strong family trends for breast cancer, so some may decide to be tested for LPP and PEA3 genes and see if they can take the drug preventatively.

"Having genetic testing tells you about your makeup and what you have inherited from your parents," explains Dr. Anneke Lucassen, a clinical geneticist from Princess Anne Hospital in Southampton who advises people on genetic testing. "You can't change the results of the test, as it will always be there. So that's something to think about," she cautions, "because once you've got the test results there's no going back."

Lucassen believes that genetic testing should be done after diagnosis rather than just as a precaution: “If there are clear treatments with benefits, then it might be worth having the test. There is very little to be offered if there’s nothing you can do about the test results, so people usually go for that option afterwards.”

Like Lucassen, Sharrocks also thinks that we wouldn’t need to give our hypothetical LPP-targeting drug to healthy people: “This approach is probably not relevant for people with a genetic family history who might take it only for preventative measures, but it would be more relevant for sporadic cancer cases. These patients would probably use the treatment immediately to stop spreading, and it will probably have to be taken indefinitely to contain any individual remaining cancer cells in the breast.”

But Lucassen is sympathetic towards people with very strong family histories of breast cancer. “The average person I’ve seen is a mid-30s woman whose mother died in her 40s from breast cancer, and her sister’s had it, and her grandmother had it,” she says. “They often have a stonking big family history, so they’ve already worked it out for themselves and aren’t shocked when I tell them they have the genes for breast cancer.” She often finds that people’s reactions are surprising when they get their results. “Some people feel guilt, some want to learn about it, others just want to sort it out, some people are upset and some are even pleased,” she recalls. “Many are just relieved by the certainty in knowing one way or another. It’s the uncertainties that most people find very difficult.”

Reed agrees that living with uncertainties is emotionally trying, particularly for those diagnosed with primary breast cancer: “Women often say that their fear of it coming back never really goes away. And when the cancer does come back, it’s usually a worse time for them than when they were first diagnosed, because their worst fears and uncertainties are realised.”

Reed also feels that the media doesn’t help in situations like these. “These women are very susceptible to the media talking about new ‘breakthrough’ drugs, and they think something’s going to come up and change their situation. Take Herceptin; it’s put across as a ‘wonder-drug’ that’s suitable for all women, but only around 25% actually over-express the HER2 gene [which the drug corrects]. A lot of women I spoke to thought that it could help them, but they didn’t have the gene.”

So it might be a good idea to be wary of the latest ‘miracle cure’ for breast cancer in the news. But although Sharrocks’ research might not give us a new treatment for breast cancer, it may at least help us to see breast cancer in a more positive light. Sharrocks believes that perhaps more research on breast cancer can help to eliminate the uncertainties that those with breast cancer face. “I hope that knowing about LPP’s role in cancer can help us all to feel more confident about dealing with breast cancer,” he concludes.