A new type of breast cancer drug

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At the recent annual meeting of the American Society of Clinical Oncology, Dr Angelo Bianco announced the results of clinical trials, demonstrating the effectiveness on a new type of anti-cancer drug, Herceptin, in fighting advanced breast cancer.

The study, involving 469 patients, showed that the addition of Herceptin to standard chemotherapy lengthened the time before the disease spreads by approximately three months, and increased the rate at which the tumour responded to treatment by between 23 and 32 percent.

Herceptin is an artificially produced anti-HER-2/neu antibody. An antibody is a special type of blood protein which attacks particular foreign substances, in this case HER-2/neu found on the surface of some breast cancer cells, and renders them harmless.

Herceptin functions by boosting the natural immunity of some patients to HER-2/neu. By interfering with the tumour cell's biological processes, Herceptin causes it to die. In this way, Herceptin is able to slow, or in some cases, stop the spread of breast cancer.

Herceptin is given intravenously and trials have shown that its side effects are minimal -- fevers and chills being the most common. The drug is produced through a complex procedure involving the fusing of cells taken from the spleen and tumours of mice. The hybrid cells are then genetically altered to make an antibody suitable for humans.

In the last 40 years, breast cancer has markedly increased in most industrialised countries. In the United States, it is the second leading cause of cancer deaths among women -- killing an estimated 44,000 women this year. In Britain, more women die of breast cancer than any other type. In Australia, 2,600 women die of breast cancer each year.

The Herceptin results are some of the first to prove the potential of immunotherapy in combatting cancer. Immunotherapy, sometimes referred to as biotherapy, is an experimental form of treatment using agents that modify the body's immune defence mechanisms.

Conventional treatment for breast cancer patients, using chemotherapy and radiation, is based on killing all fast growing cells. But these methods also kill cells that form hair and line the mouth and gut. Many patients experience hair loss and mouth ulcers.

More significantly, chemotherapy and radiation destroy newly forming blood cells. This can result in dangerously low levels of white blood cells necessary for fighting infections, and also platelets needed for blood to clot. The impact can be life threatening.

The advantage of using a cloned or artificially produced antibody like Herceptin is that it specifically targets the cancer cells, without damaging the patients' healthy cells. It is an entirely new way of treating cancer and represents a major scientific development.

The Herceptin trials are the outcome of research that began some 10 years ago into the protein HER-2/neu. Investigations revealed that between 20 and 25 percent of patients with malignant breast tumors showed high levels of HER-2/neu. The protein was also associated with those patients who responded poorly to conventional therapy and faced the greatest danger of dying from the disease.

Dr Lori Goldstein, Director of the Breast Cancer Research Program at Fox Chase Cancer Center, Philadelphia, said the Herceptin results could have broad implications for research into breast cancers.

"We are at a very exciting point where what we have learned in the laboratory about the molecular basis for cancer can be translated into clinical trials, and eventually used in patients. These studies, especially the approach utilising HER-2/neu, show that molecular targeting can effectively fight advanced breast cancer, and that biotherapy can be used to augment current therapy. These approaches are showing clinical significance not just in the treatment of breast cancer,

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but also, perhaps, in early detection and prevention," Goldstein said.

Another conference research paper reported that the widely used chemotherapy agent Taxol, when used after surgery in combination with other drugs, increases a woman's chance of survival from breast cancer. Taxol was originally developed from compounds found in the bark of the yew tree.

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