Lapatinib and Neratinib: Using combination drug therapy to advance the effect of the treatment of HER2 Positive Breast Cancer

Kendra Hearn
*El Centro de Investigacion del Cancer- Campus Miguel de Unamuno, Salamanca, Spain*

Atanasio Pandiella
*El Centro de Investigacion del Cancer- Campus Miguel de Unamuno, Salamanca, Spain*

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INTRODUCTION

There are four receptor tyrosine kinases (RTKs) in the ‘HER’ or ErbB receptor family: EGFR, HER2, HER3, and HER4. This family of receptors is involved in many cellular functions including growth, division and apoptosis. The regulation of ErbB can occur in subregions of the membrane and are vital to the continued health of the cell. These RTKs are known for their involvement in many forms of cancer. The study of HER2 positive breast cancer accounts for approximately 20% of breast cancers, and has been noted as one of the most aggressive forms of the disease. In this study, three different pharmaceutical agents, trastuzumab (monoclonal antibody), and intracellular kinase inhibitors, lapatinib and neratinib are used in various concentrations and combinations to determine optimal efficacy in two HER2 positive cell lines.

RESULTS

Binding Activity

In SKBR3, the sample containing the combination therapy of lapatinib and Herceptin had a cell death percentage of 16.23% neratinib and Herceptin had the highest cell death percentage at 34.94%.

In line BT474, both combination 24.95% cell death rate in the combination of neratinib and Herceptin and a 38.83% cell death rate of lapatinib and Herceptin.

Neratinib

For both SKBR3 and BT474, it was determined that the most effective form of treatment was the combination of neratinib and Herceptin. Even though in SKBR3, the combination of lapatinib and Herceptin had a lower percentage of live cells in line BT474, the neratinib-Herceptin combination has proved to be overall superior when compared in trials.

This combination of drugs should be further studied to determine a concentration effective and safe for the use of treatment of HER2 positive breast cancer. From these results another conclusive finding could be that the use of tyrosine kinase inhibitors are not as effective as monoclonal antibodies when they are not used in combination.

FUTURE WORK

If possible, the repetition of this method would further confirm the results shown. Also the ability to work with a bigger data set would give more accurate results.

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