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DREAM Program Report

DREAM Program is shorted for the “Dedicated Research Exchange and Mentorship” Program, which provides students with the opportunity to do scientific research in famous universities in the world.

I feel grateful to be chosen as one member of the program this year and have had a great research experience in the laboratory of Lombardi Cancer center in Georgetown University, Washington D.C.

My research project mainly focus on the effect of two factors on breast cancer progression ; the first factor is the tumor suppressor gene “Tob”, while the second factor is EGFR vIII variant. Breast cancer is one of the top killers in the world that threatens lives of millions of people, so research on effective treatment methods will be of great importance. The disadvantage of traditional treatment methods is the lack of tumor cell specificity, which may cause damage to normal cells. To reduce normal cells cytotoxicity and increase oncogene response rate, target therapy is the prospecting method in the future.

In this research project, two different research methods are used to achieve the objectives. As to the analysis of the effect of tumor suppressor gene “Tob”, western-blotting is used to compare the different expression levels of different antibodies. Three cell lines：BT549, 361 and MCF7, which have different features, are used ; for each of the cell lines, both the wild-type cells and the Tob-transfect ones are used for research. The expression levels of different phosphate-EGFR with different receptor sites are studied. As can be seen from the results, some of the cells show no expression of certain types of receptors ; while as to the cells with receptor expression, there is an decrease in the expression level of phosphate-EGFR in the cell lines with Tob transfection. Other antibodies in the down-signaling pathway are then analyzed using the same method, which also shows decrease in expression level in the Tob-transfect cell lines, giving evidence to the tumor-suppressor effect of Tob gene.

As to study of the effect of EGFR vIII, FACS (Fluorescence-activated cell sorting) analysis, which is a more quantitative method, is used. In this study, three groups of cells：BT549 VS. BT/Tob, u87 VS. u87/vIII and H4 VS. H4/vIII cells are used for analysis of the activity of ALDH and CD133. According to the result, BT cells with Tob-transfect show decreased percentage of gated cells, further proving the tumor suppress effect of Tob. On the other hand, u87 and H4 cells with EGFR vIII variant shows higher portion of gated cells, which means that the vIII variant may be able to help with tumor cells progration.

Due to time limitation, no further research can be conducted to look into the issue in depth. However, in summary, the above result shows the effect of Tob as a tumor suppressor gene and the critical role of EGFR vIII for tumor growth. Such findings give an insight for the research in the treatment of breast cancer and the design of new and target drugs for breast cancer.