Susan G. Komen

Research Grants – Fiscal Year 2015

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ß1-integrin hyperactivation as a novel anti-breast cancer therapy

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Public Abstract:

One of the major problems in breast cancer is the regrowth of a tumor after a patient was thought to be cured. This can happen even years later. Traditionally, breast cancer is treated with chemotherapy. This therapy is very effective because it kills fast dividing cells, like cancer cells. However, a downside of chemotherapy is that some cancer cells are not dividing fast at all; they divide rather slowly and seem to sleep (or be dormant). Once the chemotherapy is stopped, these cells can “wake up” at any time, and regrow to form a new tumor (sometimes in another organ).

To prevent regrowth of the tumor, all cancer cells including the dormant cells must be killed. To do so, a combination of chemotherapy and a drug that kills dormant cells is needed. In this way, the chemotherapy can kill dividing cells, and the other drug can kill the non-dividing dormant cells.

To find such a drug that kills dormant cells we need to understand how dormant cells are created. By studying dormant cells, our lab has found a molecule called ß1-integrin that, when not active, causes the breast cancer cell to become dormant. We then designed a new drug (TS2/16) that activates ß1-integrin and awakens all of the sleeping cells. When we gave this new drug to mice after treatment with chemotherapy, all of the dormant cells disappeared, and regrowth of the tumors was greatly prevented.

However, we do not know exactly how TS2/16 is having its effect. In this grant we propose a set of experiments to further explore this. This is important, because this information will help improve our understanding of the new drug. This new understanding could provide new therapeutic option such as combining it with other drugs and forms of therapy to strengthen and improve treatment of breast cancer.