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COX2 Plays an Important Role in Maintenance of Mammary Cancer Stem Cell Population in Human Breast Cancer Cell Lines

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ABSTRACT

Breast cancer is a malignant growth in the adipose-rich mammary gland. Initiation and progression of breast tumors involve multiple cell types, among which mammary cancer stem cells play an important role. There are two main types of adipocytes; white adipocytes have previously been found to influence the disease while brown adipocytes, which uniquely express uncoupling protein 1 (UCP1), were recently detected in breast tumors.

We have detected Myf5, a transcription factor, which is expressed in the progenitor population of brown adipocytes, in breast cancer cell lines. We also found an association between expression of Myf5 and COX2 (or Ptg2), which induces inflammation. We hypothesize that inflammatory conditions induced by COX2 could be contributing to the maintenance as well as expansion of Myf5 progenitor population.

Breast cancer cell lines (HCC1806, HCC 70 and MDA-MB-468) were treated with various concentrations of Cox2-inhibitor (SC 236) and Cox1-inhibitor (SC 560) for 24 hours. They were analyzed for the expression of Myf5 and mammary cancer stem cell markers (ALDH1, CD44, Oct 3/4), by Western blot and quantitative Polymerase Chain Reaction (qPCR). We also examined the levels of inflammatory markers (Cox1 and Cox2) and various inducers of COX2 by Western blot analysis and qPCR. Our preliminary results suggest that breast cancer cells treated specifically COX2 inhibitor exhibit a decline in Myf5, ALDH1, and CD44 and an increase in protein levels of COX2. This suggests that COX2 might play a role in maintenance of mammary cancer stem cells, including Myf5 progenitor population in human breast cancer cell lines.

Keywords: Breast Cancer, Mammary Cancer Stem Cells, COX2

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