Down Regulation of PTEN is Observed in CXCR4 Expressing Prostate Cancer Cells

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The progression of human prostate cancer is a result of metastasis from the primary tumor to vital organs. Metastasis is a complex process that involves invasion, intravasation, extravasation, and metastatic colonization. To date, the biology underlying the various mechanisms of metastasis has not been elucidated. Chemokines are pro-inflammatory molecules that bind to chemokine receptors, which are members of the G-protein coupled receptor (GPCR) family. The interaction between chemokines and their receptors results in a diverse array of biological and biochemical functions, such as chemotaxis, hematopoiesis and angiogenesis. Likewise, neoplastic cells employ chemokines and their receptors to promote metastasis and encourage cell survival. In prostate cancer, the CXCR4 chemokine receptor is overexpressed on the cell surface, which directs metastatic cells to tissues where its ligand is overexpressed, such as the bones and lungs. In addition to chemokine receptor, loss of tumor suppressors correlates with increased cancer malignancy. The Phosphate and Tensin homolog deleted on chromosome 10 (PTEN) is the second most mutated tumor suppressor in human cancer. Functional PTEN has been shown to disrupt the chemotactic movement of cells in *Dictyostelium discoideum* (slime mold) towards a chemoattractant. It has also been shown that PTEN is inactivated in metastatic prostate cancer cells. Furthermore, Gao *et al* showed that reconstituted PTEN in Jurkat T-cells down-regulated CXCR4-mediated chemotaxis. Therefore, we hypothesize that the absence of PTEN expression correlates with an upregulation of CXCR4-mediated functions in prostate cancer cells. We analyzed the expression of CXCR4 by flow cytometry and observed that CXCR4 was highly expressed in human metastatic prostate cancer cell lines, PC3 and LnCaP. PTEN expression was analyzed by western blot and RT-PCR. We did not observe expression of PTEN in PC-3 and LnCaP cells at the protein level. However, expression at the mRNA level was observed in LnCaP cells. In summary, our results showed that CXCR4 is over expressed in PTEN-null prostate cancer cell lines. In future studies, we will investigate if the decrease expression of functional PTEN promotes CXCR4-mediated metastasis in prostate cancer cells. I would like to thank the RISE program at Clark Atlanta University and RCIM grant number 2G12RR003062-22.

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