

Piwi2: an IMPORTANT Regulator of Cancer Stem Cells in Breast Cancer Cell Line, MCF7-Piwi2

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DOI: 10.21859/mci-sup-62

Keywords:

Piwi2
Cancer Stem Cells
Breast Cancer

Abstract

Introduction: Piwi2 belongs to Piwi protein subfamily, which functions in PIWI/piRNA pathway and plays crucial roles in gametogenesis in different organisms. Recent studies have demonstrated that PIWIL2 is ectopically expressed in tumor cell lines and various stages of different cancers, remarkably in cancer stem cell (CSCs). However, it is not clear whether Piwi2 has a causing role(s) in development of CSC populations or it is as a consequence of cancer. Thus, to further investigate the biological roles of Piwi2 in the process of tumorigenesis especially in cancer stem cells development, we established the MCF7-Piwi2 cell line stably expressing Piwi2.

Materials and Methods: MCF-7 cell line was transfected with a construct containing Piwi2 cDNA. Stable transfectants were selected and the effect of Piwi2 on its molecular behavior was investigated by semi-quantitative RT-PCR and qRT-PCR.

Results: The MCF7-Piwi2 cells demonstrated higher and lower expression of CSC biomarkers of CD44 and CD24, respectively, compared to MCF-7. We also examined CD133 expression and observed an increase in MCF7-Piwi2 cells. Totally, our molecular data were consistent with piwi2 reprogramming role in the emergence or prevalence of cancer stem cell population.

Conclusions: These observations may implicate piwi2 as an important regulator of cancer stem cells population in breast cancer. However, further complementary data such as the results of tumorigenic in vitro and in vivo assays of MCF-Piwi2 and its comparison with MCF-7 cells should be collected to fully confirm the role of piwi2 in the process of tumorigenesis.