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Oncogenic protein kinase D regulating networks in invasive breast cancer

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Invasive breast cancer is the leading cause of women mortality. Protein kinase D2 (PRKD2) and PRKD3 but not PRKD1, were implicated to positively contribute to invasive breast cancer growth and progression. In current study, we found that PRKD2 and PRKD3 function as important oncogenic drivers in invasive breast cancer with evidences showing that PRKD2 and PRKD3 were preferentially expressed in invasive breast cancer cells and tissues to promote breast cancer growth in vitro and in vivo. To uncover the molecular mechanisms of PRKD2 and PRKD3 in invasive breast cancer, phosphoproteome, interactome and transcriptome of PRKD2 and PRKD3 were systematically investigated. Besides identification of PRKD2 and PRKD3 regulated phosphoproteins, interacting proteins and target genes expression, 36 hub nodes including known breast cancer drivers, such as TP53, MYC and BRCA1, were identified in PRKD2 and PRKD3 regulating networks. ELAVL1 and UBC were recognized as the most common hub nodes across PRKDs networks. The enriched pathway analysis reveals that PRKD2 and PRKD3 regulated pathways contribute to multiple cancer related events, including cell cycle, apoptosis, migration, angiogenesis, cancer energy metabolism and cancer immunity. Enrichment of cell cycle and cell mobility related pathways across PRKDs networks, explained the observations that depletion of PRKD2 or PRKD3 or both or inhibition of PRKDs activity led to alternation of cancer cell cycle and decrease of cancer cell migration ability. Besides common features, notable variations were also observed from phosphoproteome, interactome to transcriptome between PRKD2 and PRKD3, indicating that PRKD2 and PRKD3 have shared specific functions and mechanisms. Finally, our studies raised promising invasive breast cancer therapeutic drug targets, such as ELAVL1, Ubiquitin system, HDACs and so on. Taken together, the important roles as well as the molecular mechanisms of PRKD2 and PRKD3 in invasive breast cancer were uncovered to provide clues for further combating invasive breast cancer.

Biography

Liu Yan was born in Shandong province, China in 1989. He obtained B.S in Bioscience from Northeast Agriculture University in 2012. Now he is studying PhD degree in southeast University major in oncobiology.

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