Drug Repositioning approaches for breast cancer stem cells.

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Breast cancer are known to originate from a minor population of cancer cells termed cancer stem cells (CSCs), which has drug resistance. However, novel therapeutic drugs for the eradication of CSC has not been established yet. Drug repositioning (DR), which finds new medical uses for existing drugs, is expected to facilitate drug discovery. In the present study, we tried to explore DR candidates by omics analyses. We performed the ribosome profile that comprehensively analyzes translation using the deep sequencing. Breast CSCs was isolated by a CSC marker aldehyde dehydrogenase (ALDH) from breast cancer cell line MCF-7. We found that sphingosine kinase, which produces bioactive lipid sphingosine-1-phosphate (S1P), is translationally upregulated in ALDH-positive cells, compared to ALDH-negative cells. Since S1P regulates many biological processes through S1P receptors, we next focused on the immunosuppressive agent fingolimod, a S1P receptor modulator, as a candidate. The Fingolimod blocked proliferation of ALDH-positive cells and expression of stem cell markers Oct4, Nanog and Sox2. These results suggest that fingolimod is a potential target for breast cancer stem cells.