CXCR4: A Potential Biomarker for Targeted Cancer Therapy in the Future

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SUMMARY

Cancer is known as the most common cause of death in the world and metastasis is the essential step in this disease which is relate to patients death (1). The CXCR4/CXCL12 pathway plays a pivotal role in the metastasis and malignancy of cancer reasoning high invasive properties of cancer cells. CXCR4 is expressed in many cancer cells is responsible for to the migration of cancerous cells to the specific tissues secreting CXCL12 (e.g., liver, lymph nodes, bones and lung) (2, 3). At least 20 types of cancers can express CXCR4 which is a crucial factor in the development and metastasis of about 75% of all cancers including gastrointestinal, skin, head and neck, breast, ovarian, prostate, renal, hematological, neurological malignancies and etc (4).

Bonding of CXCL12 to CXCR4 in the surface of cancer cells triggers a series of essential processes such as movement of malignant cells, chemoattraction, angiogenesis and cell adhesion which are important for cancer progression (5). There is a great enthusiasm for the operation of CXCR4/CXCL12 as a target for cancer therapy. The role of CXCR4/CXCL12 axis in cancers is as follows: 1) affecting CXCR4 expression in primary tumor cells. 2) Reinforcing other cancer therapy. 3) Modulation the immune response (6).

References


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Xia et al. demonstrated that effector B cells killed tumor cells by CXCR4/CXCL12 pathway (7).

Moreover, it has been demonstrated that CXCR4 antagonists reduce intraperitoneal spread of tumor cells and increase necrosis and apoptosis of tumor cells. The CXCR4 antagonist, AMD3100 and Plerixa for are the most common among the agents which inhibiting CXCL12/CXCR4 axis and have a role in the inhibition of metastasis via targeting CXCR4-CXCL12 axis (6). Plerixa for is a FDA approved antagonist for non-Hodgkin lymphoma (NHL) and multiple myeloma (8).

Some studies have indicated the reduction of cancer cells migration by natural substances and drugs which attenuate the CXCR4 expression and it can be a promise strategy to decrease metastatic inhibition (9).

Dear editor, Cancer therapy has attracted the attention of many researchers around the world and a lot of works has been done in this regard. So far different therapeutic strategies such as treatment with CXCR4 inhibitory antagonists and drugs have been used to decrease the migration and metastasis of cancer cells toward specific tissues. Nevertheless, there are scarce clinical trials for treatment of patients with targeting CXCR4.

References