Markers of cancer stem cells, novel biological targets for cancer treatment

Minoo Molavi[1], Fatemeh B. Rassouli[1,2*]
[1]*Department of Biology, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran*
[2]*Cell and Molecular Biotechnology Research Group, Institute of Biotechnology, Ferdowsi University of Mashhad, Mashhad, Iran*
Corresponding author's e-mail: ***behnam3260@um.ac.ir***

Abstract

Advances in multidisciplinary care, including chemo and radiotherapy regimes in adjuvant and metastatic settings, as well as discovery of novel biological agents, such as cancer stem cell (CSC) specific markers, havesignificantly improved the survival rate of cancers worldwide.Nevertheless, a considerable group of cancer patients still continue to experience recurrence and metastasis after conventionaltherapy. This is mainly due to the existence of CSCs that are a subpopulation of malignant cells responsible for cancer initiation,progression, invasion, and therapy resistance. In this regard, detection, isolation, and characterization of CSCs in hematological malignancies and solid tumors have been considered as key points for designation of novel cancer-targeted therapies.
During the last decade, a number of cell surface antigens, with various biological activities, were introduced as CSC markers in a wide range of human malignancies. For instance, CD44 is a transmembrane glycoprotein that modulates tumor growth, migration, invasion, and angiogenesis; EpCAM is a crucial factor for the maintenance of proliferation and pluripotent phenotype of cancer cells; and LGR5 is involved in formation, progression and invasion of malignancies.Accordingly, targeting CSCs through their specific antigens, by administration of antibody-drug conjugates, is a new and promising therapeutic modality for elimination of therapeutic-resistance and/or metastatic cancer cells. In addition, immunotherapy of CSCs, in forms of dendritic cell (DC)-based therapy and adoptive T-cell transfer, could be used in conjunction with current treatment regimes to target CSCs via their specific markers.

Key words: *cancer stem cell markers, antibody-drug conjugates, immunotherapy*.