Targeting cancer stem cells by CD133 antigen

Behnam Rassouli Fatemeh¹, Matin M. Maryam¹,²*, & Bahrami Ahmad Reza¹,²

¹ Department of Biology, Faculty of Science, Ferdowsi University of Mashhad, Mashhad, Iran
² Cell and Molecular Research Group, Institute of Biotechnology, Ferdowsi University of Mashhad, Mashhad, Iran

*Corresponding author's E-mail: matin@um.ac.ir

BACKGROUND: Cancer stem cells (CSCs), also known as tumour initiating cells, are highly proliferating cancerous cells that have been found in several kinds of leukemia and solid tumours. CSCs are likely to share many of the properties of normal stem cells that provide them for a long lifespan, including overexpression of several drug transporters, active DNA-repair capacity and resistance to apoptosis. Due to their salient characteristics, it has been suggested that CSCs are responsible for tumour initiation, progression, metastasis and chemoradiotherapy resistance. Therefore, designing new therapeutic strategies by targeting CSCs seems to be an effective approach to overcome tumour drug resistance and metastasis.

CD133 (prominin-1) is a transmembrane protein that is coded by a single copy gene (PROM1) located on chromosome 4 (4p15.33), with conserved sequence throughout the animal kingdom. Although little is known about the biological functions of CD133, studies have shown that the expression of this antigen is limited to undifferentiated and neoplastic cells. Therefore, much attention has been recently focused on the utility of CD133 as a marker for CSCs to purify and enrich populations of these cells. Several reports indicated that CD133⁺ cells are present in a variety of malignancies including ovarian, lung, breast, endometrial, bladder, gastric, colon, prostatic and pancreatic tumours.

To prevent tumour progression and metastasis, using CD133 antibody conjugated drugs and/or stimulating and restricting body’s immune response to CD133⁺ cells might be considered as applicable and effective clinical strategies. These strategies will be discussed in here.

Key words: cancer stem cells, CD133, cancer therapy