

## Cancer Stem Cells: Current Challenge in Cancer Treatment and Important Prognosis Factor

Jussara Maria Gonçalves<sup>1\*</sup>

Federal University of Santa Catarina, Brazil.

**Corresponding Author:** Jussara Maria Gonçalves, Federal University of Santa Catarina, Brazil, **Email:** jussara.m@posgrad.ufsc.br

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### EDITORIAL

Prindull, Prindull and Muellen described stem cells (SC) in 1978 for the first time. The authors developed a pioneer study, which identified the existence of hematopoietic SC in cord blood. From this important finding, World Health Organization (2001) defined SC as: "cells able to generate a more specific cell or another identical SC". These cells were classified into three groups: totipotent (ability to generate an entire organism), pluripotent (ability to develop into all cell types of the embryo proper) and multipotent (able to generate most of the tissues of an organism). Furthermore, SC also may be divided according to the developmental stage from which they were obtained, as adult or embryonic.

These cells are undifferentiated and characterized for self-renewal potential. However, in a deregulated cell cycle, SC acquire indefinite proliferative potential and, consequently, are able to drive the formation and growth of tumors. In this condition, these cells are named Cancer Stem Cells (CSC) and, usually, compose the bulk of neoplastic cells within the tumor.

Although a malignant tumor has a heterogeneous cell content, are CSC that influence the tumor prognosis. These cells are the major cause of cancer therapy failure due to their considerable chemo and radio-resistance, resulting in tumor recurrence and metastasis. Acquired multidrug drug resistance (MDR), through gene amplification or rearrangement, may contribute to an aggressive phenotype and decrease chemotherapy effectiveness. For this reason, other possibilities of treatments have been constantly studied.

CSC amount may be measured within the tumor by specific protein biomarkers, according to the location and type of tumor. Usually, overexpression of CSC biomarkers as CD44, ALDH1, Sox2, Oct4, ABCB5, AGR2 and TAZ in human cancers

is related to clinical characteristics: tumor size, grading stages and lymph node metastasis. Based on this information, CSC biomarkers are possible determinants in order to facilitate the staging and prognosis. Moreover, several studies have assessed selective molecule inhibitors to act directly on CSC. Certainly, researchers around the world are converging towards a promising direction to provide a new treatment option for the cancer.