Correlation between Cancer Stem Cells and Circulating Tumor Cells and Their Value

Maria Toloudi    Panagiotis Apostolou    Marina Chatziioannou    Ioannis Papasotiriou
Research Genetic Cancer Center (R.G.C.C. Ltd.), Filotas, Greece

Key Words
Breast cancer · Cancer stem cell-like cells · Circulating tumor cells

Abstract
Background: The scientific community has proven the value of circulating tumor cells (CTCs) as a prognostic factor in the development of cancer and progress to metastases [1–4]. Simultaneously, a new type of cancer stem cell-like (CSC-like) cells has also been established as a progenitor of metastases and relapses in cancer patients [5, 6]. The present research attempts to support the hypothesis that CTCs have all the cellular hallmarks of CSC-like cells which play a crucial role in cancer spreading.

Materials and Methods: Two methods have been chosen: a cellular-based and a molecular-based method. The first method is based on the fact that CSCs form microspheres in culture. In the second method, microspheres develop in the presence of specific markers that define the CSC phenotype [6].

Results: In cellular-based assays, it has been shown that microspheres form in semi-suspension in a culture flask. In the second panel of the test, Nanog was chosen as a marker and the tested sample was positive when grown under specific conditions.

Conclusion: Our analysis has demonstrated that in this particular case, CSCs-like cells are included in the vast majority of CTCs.

Introduction

It is well known that circulating tumor cells (CTCs) are a distinct population of cancer cells that have detached from the primary tumor and flow into the blood circulation, creating a secondary tumor. Their role in the metastatic pathway has proven to be essential [4, 9–12].

Initiation of metastasis involves CTCs creation which includes cell-to-cell adhesion mechanisms and cell mobility. Several growth factors act in order to stimulate the epithelial-to-mesenchymal transition (EMT). The primary epithelial cancer cells interact