

EDITORIAL

Could the Difference Between Normal and Malignant Stem Cells Eradicate Cancer?

Normal stem cells provide a reserve for the renewal of tissues. This system, recognized a half of century ago, explained the hierarchy of descending cell populations (“generation-age hypothesis”¹ and initiated a revolution in biomedical sciences. However, all aspects of stem cell “nature” are not yet revealed; even the hierarchy concept has been questioned, and no one has yet adequately defined this elusive “stem cell.” One concept (the “chiaroscuro” model) supposes that a stem cell is a metastable functional entity that varies between a committed progenitor and a stem cell form.²

Regardless of how we define these fundamental phenomena, stem cell research has prompted, in the second decade of 21st century, a real medical revolution: cellular therapy. Five decades after the paradigm of hematopoietic stem cells was established, the stem cell concept emerged in oncology, where the observed primitive cells were called “cancer initiating cells” or “cancer stem cells.” Although the stem cell concept identifies these “cancer-initiating cells” as the main target of anti-cancer therapies, there is still debate about the process.³

At the same time, stem cell research indicates that both normal and cancer stem cells have much in common. Both have the anaerobic metabolism of a “primitive” cell phenotype⁴ that was, so far, typically associated with cancer cells. In addition, normal and cancer stem cells exhibit many common features related to this primitive cell phenotype, including membrane antigens or markers, expression of transcription factors and activation of signals for cell quiescence/self-renewal.

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The main challenge now is to identify differences between normal and cancer cells that will allow selective eradication of cancer stem cells without compromising normal tissue stem cell potential.⁵ Some recent studies point to dissimilarities that could be of capital importance, such as a difference in the PI-3 kinase pathway.⁶

In line with the practice of following particular hot topics, this issue of *Scripta Medica* contains a short segment in the Questions & Answers.⁷ From a review paper entitled “Complexity of cancer stem cells,” the characterization of cancer stem cells is presented.⁸

References

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