

Chapter 17

MESENCHYMAL STEM CELL (MSC) TREATMENTS AND THE EFFECT OF PHYTOTHERAPY ON MESENCHYMAL STEM CELLS

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INTRODUCTION

Stem cells are defined as cells that have the capacity of self-renewal and can differentiate into organ- or tissue-specific mature cells (1). The term “stem cell” was used for the first time in 1909 by a Russian researcher named Alexander A. Maximow (2). Stem cells were initially named as “colony-forming cells” in 1960s, and after this, the term “stem cell” started to be used due to their self-renewal and differentiation properties (3). The telomerase enzyme activities of stem cells are very high. This way, by preventing the shortening of telomeres at the tip of linear chromosomes, these activities prevent stem cells from getting old and diminishing division capacity (4). During cell division, while stem cells conduct production of cells that will differentiate into precursor cells on the one hand, on the other hand, they create backups of themselves. This way, the pool of stem cells in the organism is kept stable on a certain level throughout life. Extracellular matrix components, neighbor cells and secretion proteins form the microenvironment (niche) outside stem cells. This microenvironment keeps the numbers of stem cells and their status under control (5). Stem cells are obtained from several different sources. In general, based on the source that are obtained from, stem cells are classified into two groups as embryonic and non-embryonic stem cells (6). The long lifespan of stem cells and their self-renewal and differentiation properties endow them with a unique and significant role in terms of usage in treatment in normal and pathological cases (7). For stem cell treatments to reach the desired success, they need to differentiate into cells that are specific to the tissue in the region of their application and reach a sufficient number

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stimulants could be preferred today in treatment of many diseases as they are less toxic and less costly.

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