Effect of naturally occurring dietary compounds against gastrointestinal cancer stem cells

Fatemehsadat Amiri[1]

[1] Assistant Professor, Department of Nutrition, Iran University of Medical Sciences, Tehran, Iran

Abstract

A great deal of research has demonstrated the existence of cancer stem cells (CSCs) in several human cancers in recent years. CSCs are minor population of tumorigenic cells that are capable of continuous self-renewal and differentiation which may be regulated by some signaling pathways including Wnt/β-catenin, Hedgehog, and Notch. In addition, recent studies indicate that CSCs may be responsible for tumor relapse and resistance to therapy.

Currently available therapeutic approaches, including chemotherapy and radiotherapy, are often used as a main regimen in the treatment of most cancers, but represents a major obstacle in cancer therapy and lack the ability to effectively kill these CSCs. Therefore, this CSC population has become a target for cancer prevention and therapy.

Natural products have been discovered to be more effective than cancer drugs because of their multi-targeting property, low cost, low toxicity and immediate availability. Since a large number of epidemiological studies have demonstrated an association between consumption of fruits and vegetables and the reduced risk of various cancers, naturally occurring dietary compounds have received increasing attention for their efficacy in cancer chemoprevention. It has been suggested that some dietary constituents including vitamins A and D, curcumin, sulforaphane, soy isoflavone, epigallocatechin-3-gallate, resveratrol, lycopene, piperine and genistein can directly or indirectly affect CSC self-renewal pathways.

Investigating the efficacy of the dietary compounds against CSCs will provide rationale for preclinical and clinical evaluation of these compounds or their native food extracts

for chemoprevention of CSCs. These studies will eventually enable us to discover more effective strategies for cancer treatment to reduce cancer resistance and recurrence and to improve patient survival.

The current knowledge about the potential impact of natural dietary compounds on gastrointestinal CSC will be discussed in this review.

Key words: gastrointestinal, cancer stem cells, dietary compounds