Iron and Carcinogenesis

Iron is an important element for all living beings. It is incorporated in some protein structures which are involved in numerous biological activities. Iron ability to switch between two different oxidation states, Fe²⁺ and Fe³⁺, is a key factor for its critical role in different organisms. Despite its importance in the transport of oxygen in living organisms; the potential damage results from the interaction between its two molecular forms is also of great importance. The production of reactive oxygen species (ROS) and especially OH∙ by iron is attributed to DNA, proteins and lipids reactions leading to cell damage and mutations. As a result, high levels of iron have been determined as a risk factor for cancer. Iron can lead to carcinogenesis by the involvement in several different pathways. Oxidative stress induced by iron may lead to lipid peroxidation and direct damage to DNA and proteins. It is believed that excess iron may also block certain mechanisms that are activated by cells to limit the harmful effects of oxidative stress. Furthermore, iron is an essential nutrient for cancer cells and it may facilitate tumor growth. On the other hand, epidemiological studies have shown a positive correlation between high levels of iron stores and the risk of a wide range of cancers indifferent populations. As a conclusion, iron reduction can have several anti-cancer effects, including depriving cancerous cells of an essential nutrient, influencing on different stages of cell cycle.

Keywords: Iron, Cancer, Carcinogenesis, Free Radical, Oxidative Stress

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