

3<sup>rd</sup> World Congress on  
Cardiology

&amp;

16<sup>th</sup> International Conference on  
Nutrition and Fitness

October 29-30, 2018 | London, UK

**Biological and immunological aspects of iron deficiency anemia in cancer development: A narrative review****Fatema Tuz Zohora, Katayoon Bidad, Mostafa Moin and Zahra Pourpak**

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Iron Deficiency Anemia (IDA) is a major and global public health problem in general population mainly affecting school-aged children and women with serious consequences on physical and mental health. It may be a risk factor for the development of cancer. IDA changes the microenvironment of the human body by affecting both biological and immunological systems. IDA is one of the leading causes of the imbalance between the pro-oxidant and antioxidant system (REDOX) in the body and generates excessive Reactive Oxygen Species (ROS) which are the crucial factors for oxidative damage of cellular structures like mitochondria, DNA leading to DNA damage and genomic instability, those are the hallmarks of cancer development. Moreover, IDA can severely affect the biogenesis/expression of microRNAs. IDA also interrupts the oxidative phosphorylation energy metabolism and intestinal Cytochrome-P450 systems. Additionally, IDA may diminish the cytoprotective role of Heme Oxygenase-1 (HO-1) against oxidative stress from external

environment. During IDA, the body greatly suffers from hypoxia which may activates multi-cellular signaling pathways for cell survival, tumor progression, angiogenesis and metastasis. Besides, immune system is also affected by hypoxia. IDA cause immunological dysfunctions against invading pathogens. It decreases the proliferation and cytotoxic as well as phagocytic activities of the immune cells against tumor cells through down regulation of different immunological pathways which might predispose iron deficient individuals to cancer development.

**Speaker Biography**

Fatema Tuz Zohora is a PhD student in Immunology, Asthma and Allergy Research Institute (IAARI), Tehran University of Medical Sciences (TUMS), Tehran, Iran. She holds her D.V.M and M.Sc. from Bangladesh Agricultural University. She is currently working with Next Generation Technique (NGS) in the field of Immunodeficiency at IAARI. She received Bangladesh Government Junior Scholarship and TUMS international Scholarship. Her research interest also includes molecular genetics and gene editing technologies.

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