



REVIEW ARTICLE

BIOMARKERS: A COMPREHENSIVE REVIEW

Veena Gupta¹, Ekta Singh² and Swapnil Sharma^{1*}

¹Department of Pharmacy, Banasthali University, Banasthali-304 022, Rajasthan, India

²Department of Food Science and Nutrition, Banasthali University, Banasthali-304 022, Rajasthan, India

*E-mail: swapnilsharma1978@gmail.com

Tel.: +91 9214661099.

Received: August 14, 2013 / Revised: March 28, 2014 / Accepted: March 29, 2014

Biomarker is a parameter which is used to measure the progress of disease or the effects of treatment and evaluated as an indicator of normal biologic processes, pathogenic processes or pharmacologic responses to a therapeutic intervention. Different types of biomarkers are used in diagnosis as well as prognosis of diseases of cancer. This review focuses on various types of biomarkers and their significance with special reference to cancer diagnosis and prognosis.

Key words: Biomarker, Diagnosis, Lymphocyte, Methylation, Susceptibility.

INTRODUCTION

Cancer cells lump together and form a mass of extra tissue known as a tumor, which continues to grow. As it grows, it may damage and invade nearby tissue. If a cancerous tumor outgrows its birthplace (called the primary cancer site) and moves on to another place (called the secondary cancer site), it's referred to as metastasizing (Silverman, 2014). There are several types of cancer. Carcinoma is a cancer that begins in the skin or in tissues that line or cover internal organs. Sarcoma is a cancer that occurs in bone, cartilage, fat, muscle, blood vessels, or other connective or supportive tissues. Leukemia is a cancer that starts in blood-forming tissue such as the bone marrow, and causes large numbers of abnormal blood cells to be produced and enter the blood. Lymphoma and multiple myeloma are cancers that begin in the cells of the immune system. Central nervous system cancers are cancers that begin in the tissues of brain and spinal cord. Biomarker is used to refer measurable characteristics that reflect or presence of some disease state which is used as the severity an indicator of a particular disease state or some other physiological state. It can be a substance that is introduced into an organism to examine organ function or other aspects of health (Wagner, 2002; Naylor, 2003). For example, rubidium chloride used as a

radioactive isotope to evaluate perfusion of heart muscle. It indicates a change in expression or state of a protein that correlates with the risk or progression of a disease with the susceptibility of the disease to a given treatment. These are characteristic biological properties that can be detected and measured in parts of the body or tissue. They may indicate either normal or diseased processes in the body. Complex organ functions or general characteristic changes in biological structures can also serve as biomarkers. It has been used in pre-clinical research and clinical diagnosis for a considerable time. A biomarker is a parameter that can be used to measure the progress of disease or the effects of treatment (Sahu *et al* 2011). The parameter can be chemical, physical or biological. In molecular terms biomarker is "the subset of markers that might be discovered using genomics, proteomics technologies or imaging technologies. Biomarkers play major roles in medicinal biology. It helps in early diagnosis, disease prevention, drug target identification, drug response etc (Loukopoulos *et al* 2003).

Types of biomarker

Biomarkers are an objective measure or evaluation of normal biological processes, pathogenic processes, or pharmacological