



## Cancer Treatment; New Strategies/New Hopes

Ebrahim Salehifar<sup>1\*</sup>, Maria Tavakkoli Ardakani<sup>2</sup>

<sup>1</sup>Department of Clinical Pharmacy, Faculty of Pharmacy, Mazandaran University of Medical Sciences, Sari, Iran.

<sup>2</sup>Department of Clinical Pharmacy, School of Pharmacy, Shahid Beheshti University of Medical Sciences, Tehran, Iran.

Received: 2020-02-27, Revised: 2020-02-29, Accept: 2020-02-29, Published: 2020-03-30

### ARTICLE INFO

Article type:

Editorial

J Pharm Care 2020; 8(1): 1-2.

► Please cite this paper as:

Salehifar E, Tavakkoli Ardakani M. Cancer Treatment; New Strategies/New Hopes. J Pharm Care 2020; 8(1): 1-2.

Beginning in the early 2000s and based on the better understanding of the biology of cancer, new drugs have been developed that target specific molecular pathway in malignant cells. There has been a significant shift from the development of classic cytotoxic agents toward targeted therapies. Dose limiting toxicities of target therapies are often different. These agents have unique mechanism of action and are very specific for one or several key cellular biologic pathways. Introduction of these agents was associated with a significant progress in the management of some cancers. A good example is use of tyrosine kinase inhibitor (TKIs) for the treatment of chronic myeloid leukemia. Imatinib was the first one and several other TKIs such as dasatinib, nilotinib, bosutinib and ponatinib have been developed.

Advances in genotyping led to the personalized treatment of cancer. In the field of Hemato-oncology, as other areas of medicine, “Genotype-Directed Therapy” has been proposed to tailor the pharmacotherapy based on the specific genotype of each patient. Driver mutations are initiative of evolution of noncancerous cells to malignant cells. Screening and considering the driver mutations has improved the efficacy and was associated with a decreased toxicity. Now, evaluating driver mutations is a standard part of diagnosis and also helps predicting the tumor response to targeted therapies in several tumors including non-small cell lung cancer (NSCLC) and Colorectal Cancers.

New guidelines recommend analysis of EGFR mutation by polymerase chain reaction; ALK by immunohistochemistry (IHC) or fluorescence in-situ testing (FISH) and ROS1 (by FISH) for newly diagnosed

non-squamous NSCLC. For patients progressed on erlotinib or gefitinib who have T790M mutation, newer drugs such as osimertinib may be effective. In fact, selection of the treatment depends on the specific genotype of the patients. In colorectal cancer, KRAS and NRAS mutations were associated with the worse prognosis and patients with these mutations do not response to anti-EGFR therapy such as Cetuximab.

Beside incorporation of genotyping in the treatment of patients with cancer, other pathophysiological aspects of cancer such as dysregulation of the immune system and changes in the level of microRNA (miRNA) have been studied. Immunotherapy provides a major advance in cancer treatment. Checkpoint inhibitor therapy targets the T-cells to reactivate the silenced T cell cytotoxicity. Especially approaches based on inhibiting programmed death-1 (PD-1)/PD-L1 and cytotoxic T-lymphocyte-associated protein 4 (CTLA4) are the most rapidly growing drug class. Now 8 checkpoint inhibitors (such as pembrolizumab, nivolumab, Ipilimumab) have been approved for 15 cancer indications including colorectal cancer, lung cancer, lymphoma, melanoma, hepatocellular carcinoma and squamous cell carcinoma of the head and neck.

MicroRNAs (miRNAs) are small noncoding RNAs that modulate many processes important in tumor initiation, progression, and metastasis. Many miRNAs are involved in the control of target gene expression and show exhibiting tumor suppressive or promotive activities. Dysregulation of miRNAs was introduced as a pathophysiology of several cancers. Generally, there is a decrease of tumor suppressive miRNAs (e.g., miR-34a-5p and miR-124-3p)

\*Corresponding Author: Dr Ebrahim Salehifar

Address: Km 18 Khazar-abad Road, Mazandaran University of Medical Sciences, Faculty of Pharmacy, Khazar Square, Sari, Mazandaran 48471-16548, Iran. Tel: +981513543081, Fax: +981513543084.  
Email: esalehifar52@gmail.com

and increase of tumor promotive miRNAs (e.g., miR-21-5p and miR-183-5p) in many human cancers including Non-Small Cell Lung Cancer (NSCLC).

Although this is a very tough competition with malignant cells and we are in the first steps of the long way of finding more curative treatments, we are very hopeful for exploring more effective and advanced therapies in the future.