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## Abstract

### **Mechanisms Action and Resistance of Bioactive Nitro Derivatives of Pyrimidine on Human Breast Cancer**

Faezeh Hajhosseinjavaheri\*

Department of Biology, Faculty of Basic Sciences, Central Tehran Branch, Islamic Azad University, Tehran, Iran

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#### **Abstract**

**Background and aim:** Cancer's global impact persists, driven by its molecular diversity. It is essential to delve into the molecular signatures of cancer and their significance in diagnosis, prognosis, and therapy. A comprehensive understanding of these intricate mechanisms is pivotal for the progress of precision medicine in cancer care.

**Methods:** An extensive literature search was conducted, encompassing research articles, clinical studies, and genomic databases, to compile a comprehensive collection of molecular signatures associated with different cancer types. Emphasis was placed on genetic mutations, epigenetic alterations, gene expression profiles, and proteomic changes contributing to the initiation and progression of cancer. Furthermore, cutting-edge technologies and computational approaches employed for the identification and characterization of these molecular signatures were explored.

**Results:** The key molecular signatures associated with various cancer types, including but not limited to breast, lung, colorectal, prostate, and pancreatic cancer, were summarized. The clinical relevance of these signatures for early diagnosis, accurate prognosis, and the development of targeted therapies was highlighted. Moreover, emerging trends in cancer research, such as liquid biopsies and single-cell sequencing, which hold great promise for enhancing our understanding of cancer molecular signatures and their clinical applications, were emphasized.

**Conclusion:** Molecular signatures play a pivotal role in unraveling the complex nature of cancer, holding immense potential for enhancing cancer diagnosis, prognostication, and treatment outcomes. The integration of multi-omics data and advanced analytical techniques can refine our understanding of these signatures, paving the way for more precise and personalized cancer management strategies. This underscores the importance of ongoing research efforts in this field and emphasizes the potential for molecular signatures to revolutionize the way we approach cancer diagnosis and therapeutics.

**Keywords:** *Molecular signatures, Cancer, Diagnosis, Prognosis, Therapeutics, Precision medicine*

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\***Corresponding author:** Faezeh Hajhosseinjavaheri, Department of Biology, Faculty of Basic Sciences, Central Tehran Branch, Islamic Azad University, Tehran, Iran.

**E-mail address:** [fa.javaheri2019@gmail.com](mailto:fa.javaheri2019@gmail.com)