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## Abstract

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

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#### **Abstract**

**Background and aim:** Breast cancer continues to pose a significant global health concern, requiring the exploration of novel therapeutic agents. It is essential to conduct a comprehensive analysis of the mechanisms of action of bioactive nitro-derivatives of pyrimidine compounds in the context of human breast cancer. Additionally, studying the mechanisms underlying resistance to these compounds is crucial, shedding light on potential strategies to overcome this resistance.

**Materials and methods:** The literature search was guided by key terms such as breast cancer, nitro-derivatives of pyrimidine, mechanism of action, resistance, bioactive compounds, and human, utilizing reputable databases including Google Scholar and PubMed. Inclusion criteria included articles that focused on the specified mechanisms in the context of human breast cancer, were published in English, and peer-reviewed within the last 10 years. Exclusion criteria involved studies that were unrelated to the topic, non-English articles, and those lacking sufficient information on mechanisms.

**Results:** The multifaceted mechanisms of action of bioactive nitro-derivatives of pyrimidine compounds in human breast cancer, including their effects on cell proliferation, apoptosis, angiogenesis, and metastasis, are highlighted. Furthermore, the molecular pathways associated with resistance to these compounds, encompassing changes in drug efflux, mutations in drug targets, and alterations in cellular signalling cascades, are elucidated. By examining the intricate interplay between these compounds and breast cancer cells, insights into strategies for enhancing their efficacy and overcoming resistance are offered.

**Conclusion:** Considerable promise exists for nitro-derivatives of pyrimidine compounds as potential therapeutic agents in managing human breast cancer. Understanding their mechanisms of action and the underlying causes of resistance is crucial to optimizing their clinical utility. Future research endeavors should concentrate on refining these compounds, exploring combinations with other therapies, and innovating approaches to address resistance mechanisms. Such efforts are essential for advancing our ability to effectively combat breast cancer.

**Keywords:** *Breast cancer, Nitro-derivatives, Pyrimidine compounds, Mechanisms of action, Resistance*

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