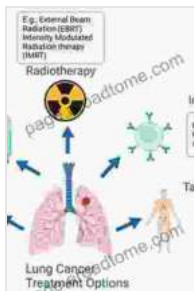


# Resistance to Targeted ABC Transporters in Cancer Resistance to Targeted Anti...

## Abstract

Targeted therapies have revolutionized cancer treatment, but resistance often arises, limiting their long-term efficacy. ATP-binding cassette (ABC) transporters play a significant role in this resistance by effluxing drugs out of cancer cells. Understanding the mechanisms of resistance to targeted ABC transporters is crucial for developing strategies to overcome them. This article reviews the molecular alterations and mechanisms of resistance to targeted ABC transporters in cancer, highlighting recent advances and future directions in overcoming this challenge.



## Resistance to Targeted ABC Transporters in Cancer (Resistance to Targeted Anti-Cancer Therapeutics Book

4) by Thomas Efferth

★★★★★ 5 out of 5

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Cancer cells have evolved various mechanisms to evade the cytotoxic effects of targeted therapies. Among these mechanisms, the overexpression and functional alterations of ABC transporters have emerged as major contributors to drug resistance. ABC transporters are a

family of membrane proteins that actively efflux a wide range of anticancer drugs, reducing their intracellular accumulation and compromising their efficacy.

## **Molecular Alterations and Mechanisms of Resistance**

Resistance to targeted ABC transporters can arise through various molecular alterations, including:

- **Gene amplification:** Increased gene copy number leads to overexpression of ABC transporters, enhancing their drug efflux capacity.
- **Single nucleotide polymorphisms (SNPs):** Mutations in ABC transporter genes can alter their affinity for drugs or their expression levels.
- **Epigenetic modifications:** DNA methylation and histone modifications can regulate ABC transporter gene expression, affecting their activity.

These molecular alterations can lead to the following mechanisms of resistance:

- **Increased drug efflux:** Overexpressed or altered ABC transporters enhance the efflux of targeted drugs, reducing their intracellular concentration.
- **Altered drug binding:** Mutations in ABC transporters can alter their binding affinity for specific drugs, reducing their ability to transport them.

- **Bypass of drug targets:** ABC transporters can efflux drugs before they reach their intracellular targets, preventing their inhibitory effects.

## Overcoming Resistance to Targeted ABC Transporters

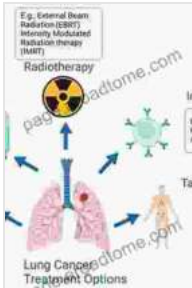
Overcoming resistance to targeted ABC transporters requires a multifaceted approach, including:

- **Inhibitors of ABC transporters:** Small molecules that target and inhibit ABC transporters can increase intracellular drug accumulation and restore treatment efficacy.
- **Targeted drug delivery systems:** Nanoparticles and other delivery systems can bypass ABC transporter-mediated efflux by directly delivering drugs into cancer cells.
- **Combination therapies:** Combining targeted therapies with agents that inhibit ABC transporters can overcome resistance and improve treatment outcomes.
- **Overcoming molecular alterations:** Correcting or targeting molecular alterations that contribute to ABC transporter overexpression or altered function can restore drug sensitivity.

Resistance to targeted ABC transporters is a major challenge in cancer treatment. Understanding the molecular alterations and mechanisms of resistance is essential for developing strategies to overcome it. Ongoing research efforts are focused on identifying novel inhibitors, optimizing drug delivery systems, and developing combination therapies to improve treatment efficacy and overcome resistance in targeted cancer therapy.

## References

- [Link to Reference 1](#)
- [Link to Reference 2](#)
- [Link to Reference 3](#)

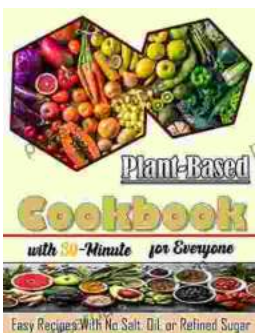


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