Mechanisms of tumor cell resistance to the current targeted-therapy agents.

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Abstract

Resistance to chemotherapy agents is a major challenge infront of cancer patient treatment and researchers. It is known that several factors, such as multidrug resistance proteins and ATP-binding cassette families, are cell membrane transporters that can efflux several substrates such as chemotherapy agents from the cell cytoplasm. To reduce the adverse effects of chemotherapy agents, various targeted-based cancer therapy (TBCT) agents have been developed. TBCT has revolutionized cancer treatment, and several agents have shown more specific effects on tumor cells than chemotherapies. Small molecule inhibitors and monoclonal antibodies are specific agents that mostly target tumor cells but have low side effects on normal cells. Although these agents have been very useful for cancer treatment, however, the presence of natural and acquired resistance has blunted the advantages of targeted therapies. Therefore, development of new options might be necessary. A better understanding of tumor cell resistance mechanisms to current treatment agents may provide an appropriate platform for developing and improving new treatment modalities. Therefore, in this review, different mechanisms of tumor cell resistance to chemotherapy drugs and current targeted therapies have been described.

KEYWORDS:

Chemotherapy; Drug resistance; Monoclonal antibodies; Small molecule inhibitors; Targeted-based cancer therapy; Tyrosine kinase inhibitors