Protein Expression Analysis of Cell Lines Derived from Drug Resistant Tumors

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There are a number of effective treatments for breast cancer, including chemotherapy and targeted strategies such as the use of the Her-2 targeting drugs lapatinib and trastuzumab. However, in a number of cases, tumors that initially respond to therapy eventually develop drug resistance, leading to the relapse of the disease. By studying protein levels in different drug resistant variants, we have observed two mechanisms by which drug resistance may develop. Thus, some Her-2 human breast cancer cells (e.g., MDA-MB-231H2N) treated with the clinically used trastuzumab agent, can escape therapy by shedding, or losing, the target Her-2 protein. Similarly, EMT-6 mouse mammary cancer models that are resistant to alkylating agents (such as cisplatin, thiotepa, or cyclophosphamide) lose or reduce (i.e., between 3- to 5-fold) the expression of proteins such as MLH1 and PMS2, both of which are important for the sensitivity of cancer cells to alkylating agents. Thus, taken together our results suggest that tumors can escape therapy by losing those proteins that are either the target of the therapy or that modulate sensitivity to a given treatment. We will report our findings, and describe our ongoing efforts to optimize the analysis of protein levels in tumor cells that show resistance to currently available anti-cancer strategies.