

## THE CHALLENGE OF TREATMENT RESISTANCE

Diversity, or heterogeneity, among cancer cells within and between tumors is a major cause of treatment resistance. Some examples of heterogeneity are as follows:

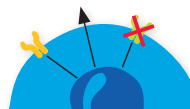
Not all cells in a tumor may be rapidly dividing; those that are not are insensitive to treatments targeting rapidly dividing cells such as cytotoxic chemotherapeutics.



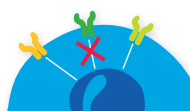
Some cancer cells in a tumor may have or may acquire mutations in the target of a given treatment that render the treatment ineffective.



Some cancer cells in a tumor may have or may acquire molecular or cellular differences other than changes in the treatment target that render the treatment ineffective.



Redundancies among signaling networks fueling proliferation can enable cancer cells to become resistant to a treatment.



Differences in tumor microenvironment components can render a treatment ineffective.

