Investigation of the Inhibitory Effect of Small Molecules on PLK1 Function in Triple Negative Breast Cancer

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The overexpression of PLK1 occurs in many types of cancer. Consequently, the misexpression of PLK1 is used as a diagnosis for specific cancers. Small molecule inhibitors can prevent cancerous growth and encourage cell death. This study aimed to discover inhibitory molecules and analyze their effect on PLK1 function. A prior study determined eight compounds to be strong binders of PLK1. These compounds were chemically modified versions of the mitotic inhibitor Rigosertib. GI50, Phase Contrast microscopy, and FACS analysis were used to analyze the effect of these potential inhibitory molecules. The compounds 150210 and 150130 are selective mitotic inhibitors of PLK1. These drugs minimally harmed normal cultured breast cells, but significantly decreased the growth of cultured cancer cells at low concentrations. Many of these cells were abnormal and mitotic suggesting that the drugs encouraged a mitotic arrest and cellular instability to decrease cancer cell growth. These compounds can limit tumor growth and potentially create a novel, more effective treatment option for those suffering from triple negative breast cancer.