Examining Mechanisms of Resistance in Palbociclib-Resistant Estrogen Receptor-Positive Breast Cancer Cells

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Breast cancer is characterized by an aggressive, malignant tumor that can metastasize to distant places of the body. Research stems from treatment with palbociclib, an innovative drug, against three cancer cell lines and relies on the inherent quality of cancer cells to acquire resistance. To identify how different characteristics of cancer cells changed through resistance, estrogen receptor-positive (ER+) palbociclib resistant (pR), ER+ palbociclib sensitive (pS), estrogen receptor-negative (ER-) pR, and ER- pS type cells from the T-47D cell line were grown. Previous research established the effect palbociclib caused in ER+ MCF-7 cells and in ER- MDA-MB-231 cells and additionally, measured antiviral response. The purpose of this project is to identify the concentrations and functions of the proteins Rb (S780), CDK4, Rb, Cyclin D1, Cyclin E, ERa, which play a role in the cyclin D1-CDK4/6-Rb axis, and determine the efficacy of an oncolytic adenovirus (OAd). Furthermore, these experiments aim to understand how the individual characteristics of each cell line affect the cell line's reaction to all treatments. Detailed in the results are the figures for western blot and flow cytometry cell cycle analysis procedures as well as preliminary graphs portraying the growth of the cancer cells against varying concentrations of palbociclib. This innovative project focuses on a relatively unknown, promising field known as combination therapies to manipulate the innate quality of cancer cells to develop resistance. These studies provide a base for a novel anti-cancer treatment combining palbociclib and an OAd to effectively treat ER+ metastatic breast cancer.

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