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**MATHEMATICAL MODELING FOR THE EFFECTS OF HER2
OVEREXPRESSION IN BREAST CANCER**

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Over-expression of the HER2 receptor due to the neu gene amplification contributes to the development of human breast cancers. We present a mathematical model to study the effects of HER2 over-expression on cell proliferation. This mathematical model comprises kinetic equations describing the cell surface binding of EGF growth factor to EGFR and HER2 receptors, coupled to a model for the dependence of cell proliferation rate on growth factor receptors binding. The cell proliferation models enable us to simulate the proliferative behavior of the HER2-overexpressing cells with various HER2 and EGFR expression levels at various ligand concentrations. This model predicts a growth advantage associated with excess in cell surface HER2 receptors.

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