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In breast cancer, overexpression of the human epidermal growth factor receptor (HER) 2 along with altered activity of several downstream signalling pathways, are associated with poor prognosis and shortened survival for the patient. The development of cancer is a complex mechanism involving aberrations of several important cellular functions. Altered mitochondrial function has become an emerging hallmark of cancer thereby connecting sustained uncontrolled cell proliferation with mitochondrial involvement in the pathogenesis of cancer.

The present thesis aimed at elucidating the possible role of the mitochondrial solute carrier gene SLC25A43, a relatively unknown protein, in both non-malignant and in cancer cells. Using immunohistochemistry the SLC25A43 protein expression was analysed in HER2-positive breast cancers, and siRNA mediated silencing was used to evaluate the effect of SLC25A43 in different breast epithelial cell lines. The data suggests that SLC25A43 is involved in regulation of cell proliferation and drug efficacy. Taken together, these data further strengthen the connection between mitochondrial function and the cell cycle, both in non-malignant and in cancer cells.