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A review on epidermal growth factor receptor's role in breast and non-small cell lung cancer

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Abstract

Epithelial **growth factor receptor** (EGFR) is a cell surface transmembrane receptor that mediates the tyrosine signaling pathway to carry the extracellular messages inside the cell and thereby alter the function of nucleus. This leads to the generation of various protein products to up or downregulate the cellular function. It is encoded by cell **erythroblastosis virus oncogene B1**, so called C-erb B1/ERBB2/HER-2 gene that acts as a proto-oncogene. It belongs to the HER-2 receptor-family in breast cancer and responds best with anti-Herceptin therapy (anti-tyrosine kinase monoclonal antibody). HER-2 positive breast cancer patient exhibits worse prognosis without **Herceptin** therapy. Similar incidence and prognosis are reported in other epithelial neoplasms like EGFR+lung non-small cell **carcinoma** and **glioblastoma** (grade IV brain glial tumor). Present study highlights the role and connectivity of **EGF** with various cancers via signaling pathways, **cell surface receptors** mechanism, **macromolecules**, mitochondrial genes and neoplasm. Present study describes the EGFR associated gene expression profiling (in breast cancer and NSCLC), relation between mitochondrial genes and **carcinoma**, and several in vitro and in vivo models to screen the synergistic effect of various combination treatments. According to this study, although clinical studies including targeted treatments, **immunotherapies**, **radiotherapy**, TKI-EGFR combined targeted therapy have been carried out to investigate the synergism of combination therapy; however still there is a gap to apply the scenarios of experimental and clinical studies for further developments. This review will give an idea about the transition from experimental to most advanced clinical studies with different combination drug strategies to treat cancer.

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