The Therapeutic Potential of Estrogen Receptor Beta Agonists in Lung Cancer

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Lung cancer is a global health problem with 71% of its patients terminally diagnosed (American Cancer Society). The therapeutic potential of two estrogen receptor (ER) beta agonists (s-Equol and LY) was examined in lung cancer cells. S-Equol is a soy isoflavone and LY is a small molecule receptor agonist. The objective of the study was to determine the anti-proliferative effect of s-Equol and LY and to determine the mechanisms of action of these agents. The hypothesis was that s-Equol and LY treatment will result in inhibition of proliferation and viability of lung cancer cells. A549 lung cancer cells were treated with s-Equol (1 to 200 μM) and LY (1 to 10 μM) for 24 to 48 hours. Cell viability was determined using MTT assay. Expression of ER beta (tumor suppressor gene), Cyclin D1 (promotes cell proliferation), p53 (promotes growth arrest and apoptosis), and p21 (promotes growth arrest) was examined using Western blotting. Cell migration (using membrane inserts and scratch test) and cell invasion (using matrigel) was examined. Data was analyzed using t-test and one-way ANOVA test. Drug treatment of lung cancer cells resulted in an increase in ER beta expression, an increase in p53 expression, an increase in p21 expression, a decrease in Cyclin D1 expression, resulting in significant decrease in cell viability and proliferation, and significant decrease in cell migration and invasion. In conclusion, the data suggests that s-Equol and LY inhibit cell viability, migration, and invasion, and could be used as potential agents to treat lung cancer.

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