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## **Phytoestrogen and Estrogen Regulation of Antioxidative Potential, and Cell Cycle Regulatory Protein and Constitutive Cyclooxygenase-2 Expression**

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Antioxidative potentials of estrogen and genistein were compared by measuring the degree of protection against plasmid DNA strand breakage induced by peroxyl free radicals using the DNA strand scission assay with pBR322 DNA. Genistein decreased DNA strand breakage by AAPH radical treatment at the all of three concentrations tested (0.5, 1.0, 1.5  $\mu\text{g}$  /ml) with the range of 89.5% to 99.6%. Compared to genistein, estrogen was not as effective as genistein showing 46.9% to 29.6% protection, and this protective effect was decreased as estrogen concentrations increased from 0.1 to 0.3  $\mu\text{g}$  /ml. DNA ladder experiments showed that genistein induced apoptosis in cultured cell lines, whereas estrogen did not induce any apoptosis. The effects of cell signal transduction protein expression patterns were compared between estrogen and genistein in MCF-7 cells. At the low concentrations genistein showed estrogen agonistic action in p21 and p53 expressions. But at the higher concentrations genistein had antiestrogenic activities. The increased expression of cyclin B1 by estrogen was tampered by genistein at the highest concentration. Genistein increased the expression of bax at the three concentrations tested. COX-2, pERK1/2 and pJNK of low concentrations of phytoestrogen and estrogen had the similar expression patterns in animal model system.

**Keyword** : phytoestrogen, estrogen, antioxidative potential, COX-2