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## CHEMOPREVENTIVE EFFECT OF GINKGO BILOBA EXTRACT: ESTROGENIC AND ANTIESTROGENIC POTENTIALS IN HUMAN BREAST CANCER CELL LINES

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Phytoestrogens produced naturally by either plants or their seeds are three main classes of phytoestrogens: isoflavone, lignan and coumestan. Phytoestrogens can have both agonist and antagonist action of estrogenic activity. It is believed that phytoestrogens with agonist and antagonist action of estrogenic activity may reduce the risk of breast cancer, in addition to may reduce the risk of osteoporosis by therapeutic agent of breast cancer. Therefore, phytoestrogens, a part of Selective estrogen receptor modulators (SERMs) may be ideal preventative agents of menopausal women, who are also at increased risk of developing breast cancer and ideal estrogenic agents at menopausal women. Ginkgo biloba extract (GBE) contains a complex mixture of approximately 300 chemicals. The major therapeutic indications of the standard GBE are widely used to treat peripheral or cerebral circulatory disorders and Alzheimers disease. The standard GBE contain in 24% flavonoid glycosides (Ginkgo-flavone glycosides) and 6% terpene lactones (ginkgolides, bilobalide). Therefore, GBE may act on SERMs. However, little is known about the estrogenic activity of GBE.

In this study, GBE showed the weak agonistic and strong antagonistic activity in E-screen assay, pS2 and progesterone receptor (PR) mRNA level (RT-PCR), and Focus assay. GBE displaced [<sup>3</sup>H]17 $\beta$ -estradiol from estrogen receptor and competed stronger with E2 for binding to ER- $\beta$  than to ER- $\alpha$  indicated that GBE has biphasic action via estrogen receptor mediation. The induction of E2 metabolism and reduction of aromatase activity were observed by GBE treatments in MCF7-BUS and T47D cells. Also, EROD activity and CYP1A1 mRNA were increased by GBE. These results indicated that GBE has cross-talk activity mediated estrogen receptor and arylhydrocarbon receptor. In conclusion, we suggest that Ginkgo Biloba Extract could have chemopreventive activities on the estrogenicity.