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## **Phytoestrogens: What They Are and How They Work**

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Phytoestrogens are phytochemicals that have properties similar to estrogens. They are bioflavonoids in the isoflavone family. The isoflavones daidzein and genistein appear to be the most important phytoestrogens yet discovered. Other members of the isoflavone family with varying degrees of phytoestrogenic activities include glycitein, biochanin, phytosterols, saponins and ligands.

Epidemiological evidence indicates that humans who have diets rich in phytoestrogens have lower rates of breast and prostate cancer. These populations also have less heart disease, gallbladder disease, osteoporosis, menopausal difficulties, lung, stomach, colon, and uterine cancers.

The best food sources of daidzein and genistein are soybeans and clover. Daidzein and genistein are also present in black beans and alfalfa. As our research into these phytochemicals continues, it is likely that they will show up in other types of vegetables, fruits, and whole grains.

Phytoestrogens are adaptogens. This is their main mechanism of action. They can be beneficial when estrogen levels are either increased or decreased. When phytoestrogens are metabolized, they bind on the same cellular sites as do estrogens. Phytoestrogens are considered to be weak estrogenic compounds. When a phytoestrogen has attached itself to an estrogen receptor, this prevents estrogen from exerting its effects. On average, phytoestrogens have about two percent of the strength of estrogens. Therefore, when estrogen levels are high, substituting a phytoestrogen for an estrogen means that there will be much less estrogenic activity at a given binding site. Conversely, if estrogen levels are low and estrogen-binding sites are empty, filling them with phytoestrogens that contain two percent estrogen activity will result in a total increase in systemic estrogenic effect.

A second mechanism of action for phytoestrogens may be their ability to affect the endogenous production of estrogen. The pituitary gland releases gonadotrophins that stimulate estrogen synthesis in the ovaries. Phytoestrogens appear to lower gonadotrophin levels, which will lengthen the menstrual cycle. Women with

longer menstrual cycles have lower rates of breast cancer. Lower gonadotrophin levels also reduce menopausal symptoms, including hot flashes.

In men, phytoestrogens reduce the rate of prostate cancer, but do not appear to lower testosterone levels. Two glasses of soy milk a day reduced prostate cancer in a group of Seventh Day Adventists by 70 percent.

In conclusion, it is apparent that the study of phytochemicals and their effects on human health will become an ever-increasing topic in the 21st century. As our understanding of specific phytochemicals increases, there will undoubtedly be a multitude of applications that will benefit humans.

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