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Human Networks
Environmental Estrogens and their Effect on Human's Health

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Estrogens in mammals have multiple effects ranging from control of reproductive, brain function and immune function. They have for long been considered to be promoters of breast and endometrial cancer. They exacerbate autoimmune diseases whereas the lack of estrogens, during menopause, has been correlated with increased risk of osteoporosis, coronary heart disease and neurode- generative disorders (Alzheimer's, depression).

The mediators of estrogen action are the estrogen receptor alpha (ERα) and estrogen receptor beta (ERβ) both detected in the above mentioned tissues/cells targets for the hormone. ERα and ERβ are members of the steroid receptor superfamily and their mechanism of action at the gene level has been largely elucidated.

Recently, though, there are data supporting estrogen's effect at a non-genomic level by activating MARK kinases.

The selective estrogen receptor modulators (SERMs) represent an exciting group of synthetic analogs of estrogens, which are currently used therapeutically for the prevention, and treatment of osteoporosis, cardiovascular disturbances, breast and endometrial cancer as well as Alzheimer's disease. They act by modulating ER conformation resulting in different tissue-specific biological responses.

Humans, however, are exposed to a variety of substances that have been detected in the environment and exhibit estrogenic activity.

Phytoestrogens for examples are plant compounds and their presence in diet is considered to have beneficial effects on human's health as they act as anticancer agents, prevent osteoporosis and lower the risk for myocardial infraction.

Xenoestrogens is another class of environmental estrogens which are chemical compounds industrially manufactured (pesticides, detergents, plastics) known as endocrine disruptors and are considered to be responsible for the increased incidence of breast, prostate, testicular cancer as well as infertility problems.

Many techniques have been developed for the isolation and identification of environmental estrogens (e.g. gas chromatography mass spectrometry, HPLC) as well as techniques in vitro and in vivo evaluating their biological activity and their mechanism of action at the cellular and molecular level (e.g. CAT assay, Scatchard plot, specific biological markers).

In this presentation we include new basic and clinical data concerning the major classes of environmental estrogens, their signal transduction mechanisms at the molecular level as well as their clinical effects on human's body.

Finally, some of the techniques used to analyze them and to assess their biological effects are thoroughly presented.

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