

Molecular mechanism on estrogenic activity that appears only in extremely low doses of estrogens such as 17 beta-estradiol, bisphenol-A, or diethylstilbesterol

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Previously we reported when bisphenol-A(BPA) or diethylstilbesterol(DES) were given a single intravenous injection at extremely low dose to SD female rat, peroxidized uterus and ovary by fluorescent staining by 2',7'-dichlorofluorescein(DCF) after three hours exposure of estrogens were observed.

The findings will be very important, because it was suggested that estrogens will induce the reactive oxygens(ROS) such as super oxidized, hydroxyl radical.

It was consider the peroxidation of uterus or ovary were carried out by ROS. Then we considered the reason why did the estrogenic activity of estrogens appear only in extremely low concentration?

The estrogen molecule has mon- phenolic structure and hydrophobic moiety consisted by carbon skelton C₈~C₁₄.

ROS will act as the oxidant for the lipid layer of uterus or ovary as well as mono-phenolic moiety. The hydrogen atom of phenolic hydroxyl group will be abstracted by hydroxyl radical, then the phenoxyl radical species will appear simultaneously. The phenoxyl radical species should couple with each other by thermal motion ,to form the dimer(bis-phenoxyl of estrogen). Number of radical species will be more numerous the more bis-phenoxyl will form with its collision. It was consider the dimer of phenoxyl estrogen will be inactive, bis-phenoxyl should be possible to considered as pro-estrogens. If the phenoxyl species were separated together each other(extremely diluted solution), the chance of collision of phenoxyl radical will decrease. In such condition the inverted-U dose relationship will appear only in extremely low concentration of estrogens.