

Evaluation on Estrogenic Effects of Diisononyl Adipate (DiNA) on MCF-7 Human Breast Cancer Cell Lines

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Abstract : Background: Plasticizers, such as phthalates and adipates, were substances added to a material that provided flexibility and durability to plastics such as polyvinyl chloride (PVC). Phthalates were generally recognized as an endocrine disrupter due to their estrogenic and anti-androgenic activities. Phthalates had the capacity to bind to estrogen receptors, and hence they might prolong menstrual cycles and increase the proportion of premature menopause. Recently, adipates such as di-2-ethylhexyl adipate (DEHA) and di-isononyl adipate (DiNA) had replaced phthalates and were now used for food packaging. Methods: MCF-7 cell lines were treated with di-2-ethylhexyl phthalate (DEHP), di-2-ethylhexyl adipate (DEHA), or di-isononyl adipate (DiNA) (10^{-6} , 10^{-5} , and 10^{-4} mol/l), using 17β -estradiol (10^{-8} mol/l) as a positive control. After incubations of 24, 48, 72, and 96 hours, the cells were tested using the alamarBlue assay. Results: The alamarBlue assay revealed that cell proliferation significantly increased after treatments of DEHP and DEHA for 24 hours at a concentration of 10^{-6} , 10^{-5} , and 10^{-4} mol/l. After more than 48 hours, cell proliferations in DEHP at 10^{-6} , 10^{-5} , and 10^{-4} mol/l significantly decreased compared to the control group. Conclusions: The present study demonstrates that adipates, as well as phthalates, were capable of inducing cell proliferation. We further used MDA-MB-231 cell lines to confirm that the proliferation effect was generated through binding to estrogen receptors.

Keywords : MCF-7, phthalate, adipate, endocrine disrupter

Conference Title : ICBCM 2016 : International Conference on Biomarkers and Clinical Medicine

Conference Location : Paris, France

Conference Dates : May 16-17, 2016