

Studying the effect of methylparaben and propylparaben on growth curve of human breast adenocarcinoma cell line.

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Background and Aims: Parabens are chemicals used as preservatives, widely available and cost little to manufacture and use. However, they mimic estrogen, which is known to play a role in the development of breast cancers. Methylparaben and propylparaben, as natural occurring fungicide/bactericides, are believed to be non-toxic in oral and intrapitoneal administrations. However, they are still required to be studied in cellular and molecular aspects.

Methods: Human-breast adenocarcinoma MCF-7 cell line, grown in phenol red-free RPMI 1640, supplemented with 10% neonatal calf serum, were exposed with 0-100 uM concentrations of estradiol or tamoxifen. After 5 days, number of live cells in each well was counted using trypan blue assay to obtain the EC50 or LC50 of estradiol and tamoxifen with regression fitness analysis on GraphPad Prism© software. The acquired EC50 for estradiol was used for methylparaben and propylparaben exposure, alone or in a co-treatment with LC50 of tamoxifen, to investigate their effects on MCF-7 growth curve.

Results: 6.08 ug/ml and 4.07 ug/ml are LC50 and EC50 of tamoxifen and estradiol, respectively. The final graphs demonstrate the strong estrogenic effect of both methylparaben and propylparaben, comparable to estradiol, yet, unlike the general belief indicating that the longer alkyl group, the stronger estrogenic activity, methylparaben seems to be a stronger xenostrogen, since it causes a longer exponential phase on MCF-7. In all cases, tamoxifen shows to be a good cell growth inhibitor for the first 9 days, when cells active resistance mechanisms together with the proliferative effect of estrogenic compound, leads to cell deviation.

Conclusions: Methylparaben and propylparaben seem to have strong estrogenic activity on MCF-7. Further studies are encouraged regarding their potency and molecular mechanisms.

Keywords: Growth Curve; MCF-7; Methylparaben; Propylparaben; Estradiol; Tamoxifen