Triphenyl phosphate (TPHP) is one of the most commonly used organophosphorus flame retardants that may accumulate in the environment. However, its effects on human reproductive organs have not been well studied. We aimed to investigate the in vitro effects of TPHP in human Ishikawa endometrial cancer cells to elucidate how TPHP exposure disrupts intracellular signaling and cell proliferation in reproductive tissues.

Methods: Human Ishikawa endometrial cancer cells were exposed to TPHP.

Results: Exposure to TPHP elevated the levels of estrogen receptor (ER) α and progesterone receptor-B and reduced ER β in human Ishikawa endometrial cancer cells. TPHP stimulated phosphoinositide 3-kinase/protein kinase B and MAPK/ERK1/2 kinase signaling, which may contribute to the activation of ER function and induce nuclear translocation of nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB) in human Ishikawa endometrial cancer cells. Activated ER and NF-κB stimulate the expression of cyclin D1/cyclin-dependent kinase (CDK) 4/CDK6, indicating cell cycle progression and proliferation.

Conclusion: This report may provide new information on the molecular mechanisms underlying how TPHP exposure dysregulates the cellular physiology of the human endometrium [1)].

1)
Kwon HY, Park SB, Han M, Park JW, Lee Y, Han SJ, Kwon Y, Cho YJ. Triphenyl phosphate activates estrogen receptor α/NF-κB/cyclin D1 signaling to stimulate cell cycle progression in human Ishikawa endometrial cancer cells. Obstet Gynecol Sci. 2022 Oct 18. doi: 10.5468/ogs.22108. Epub ahead of print. PMID: 36254600.