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> [Mol Biol Rep.](#) 2024 Feb 1;51(1):271. doi: 10.1007/s11033-023-09080-2.

Bombesin-like receptor 3 expression induced by bisphenol A is likely associated with reduced cell proliferation by inhibiting DNA synthesis and inducing inflammation in liver cells

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PMID: 38302795 DOI: [10.1007/s11033-023-09080-2](https://doi.org/10.1007/s11033-023-09080-2)

Abstract

Background: Bisphenol A (BPA) is an exogenous endocrine disruptor mimicking hormones closely associated with health complications, such as cancer progression. BPA is also related to an increase in the prevalence of obesity-related diseases due to its obesogenic action. Bombesin-like receptor 3 (BRS3) is an important factor that should be considered in the adipogenic gene network, as depletion of this gene alters adiposity.

Methods: Therefore, the present study aimed to investigate the messenger ribonucleic acid (mRNA) expression of BRS3 in human liver THLE-2 cells post-BPA treatment by real-time polymerase chain reaction. The effects of BPA on the levels of pro-inflammatory proteins, interleukin 6 (IL6) and CC motif chemokine ligand 2 (CCL2), in conditioned media of BPA-treated THLE-2 cells and deoxyribonucleic acid (DNA) synthesis in replicating BPA-treated THLE-2 cells during the cell cycle were also examined by enzyme-linked immunosorbent assay (ELISA) and flow cytometry, respectively.

Results: The study found that the mRNA expression of BRS3 was increased in THLE-2 cells treated with BPA. The study also showed that the expression levels of IL6 and CCL2 reached an optimum level in the conditioned media of BPA-treated THLE-2 cells after 48 h of treatment. Subsequently, the DNA synthesis analysis showed that bromodeoxyuridine/propidium iodide (BrdU/PI) stained positive cells were decreased in BPA-treated THLE-2 cells at 72 h of treatment.

Conclusion: The study demonstrates that BRS3 expression induced by BPA is likely associated with reduced cell proliferation by inhibiting DNA synthesis and inducing cellular inflammation in liver cells.

Keywords: BPA; BRS3; DNA synthesis; Human liver cells; Inflammation; mRNA expression.