The Effects of BPF on RT4 Schwannoma Cancer Cells

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BACKGROUND

Bisphenol A is a toxic chemical used in everyday plastic products (1, 2). The FDA has banned its use in certain products such as in baby bottles in 2012 and in infant formula packaging in 2013 (3). Despite the ban, a modified version of this compound with a similar structure, BPF, is being used as a substitute with its danger being unknown (3). BPA can cross the blood-brain barrier and the placental barrier, causing neurotoxicity and deleterious effects for a fetus. Long term effects of BPA include anxiety, depression, autism, cognitive deficits, and increased rates of neurodegenerative disorders, and with such a similar structure, BPF can cause neurotoxicity that consumers are not aware of (4). In a study by Lei et. al (5), low concentrations of BPF induced proliferation in human breast cancer MCF-7 cells. Studying the role of BPF on RT4 Schwannoma cancer cells will contribute to the field as more will be known about the effects of BPF on the peripheral nerve system and cancer cells. In another previous research study, rat fetal neural stem cells (rNSCs) were exposed to doses of BPA or BPF at different ranges. The results indicated that both BPA and BPF enhance the directed-differentiation process of rNSC into astrocytes, oligodendrocytes, neurons, and interfere with the development of their characteristic morphology. Further, neurons treated with BPA or BPF showed an increase in cell proliferation (6). As BPF influenced neuron proliferation and differentiation, it stands to reason that it may also stimulate Schwann cell division. Therefore, this study will test the hypothesis *that addition of BPF in incremental doses to RT4 Schwannoma cancer cells will increase cell proliferation in comparison to cells without BPF.*

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RESULTS

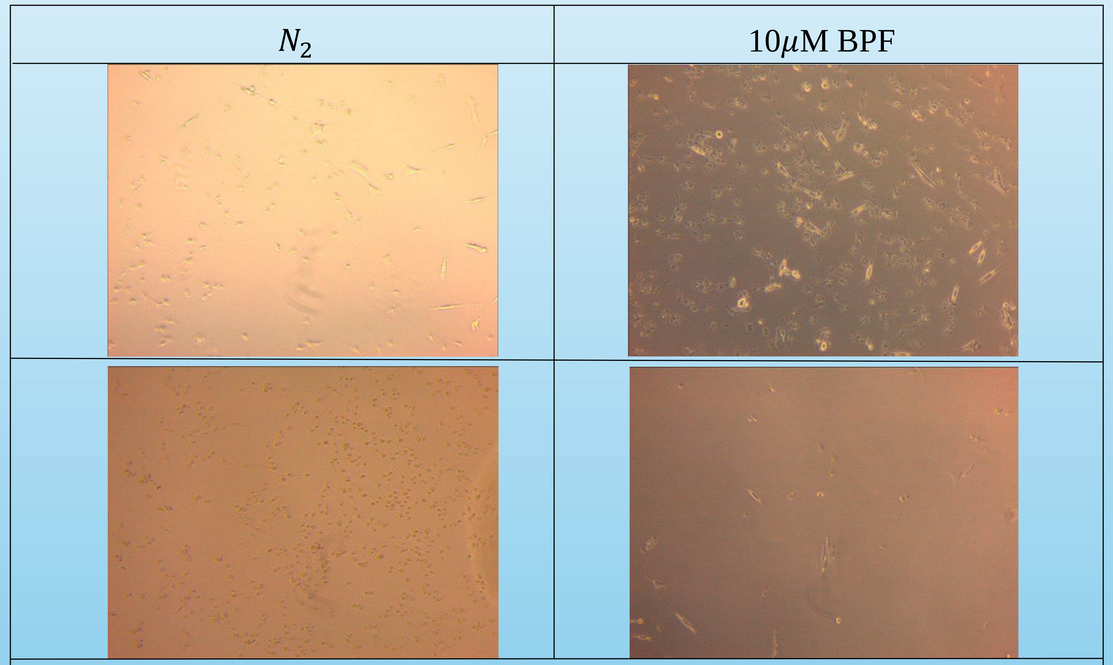

Fig. 1- N_2 control and 10μM BPF treatment before and after 24 hours. RT4 cells were plated at a density of 25,000 cells per well in DMEM media and incubated for 24 hours. Cells were then treated in N_2 media and incubated for 24 hours. They were then treated in BPF for 24 hours.

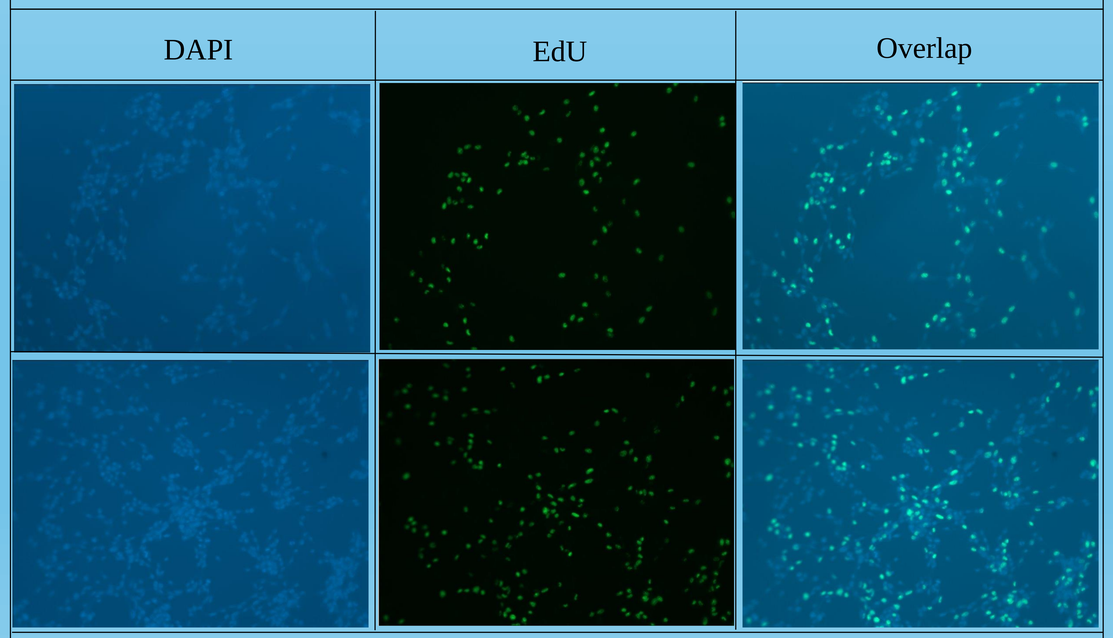

Fig. 2- N_2 control (top row) and 10μM BPF treatment (bottom row). Cells were assayed for growth using the Edu proliferation assay (2). The slides were processed for fluorescence microscopy using the Zeiss ZI Axio Observer. Cells were quantified using Zeiss Zen Cell Counting Software.

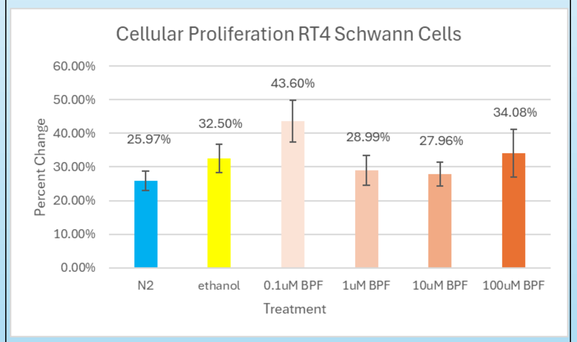

Fig. 3- Cellular Proliferation of RT4 Schwann Cells. Percent change was used to quantify proliferation and is calculated as the total number of EdU positive cells over the number of DAPI cells.

CONCLUSION

Higher dosages of BPF beyond 1x10-6M (28.99%+0.108) did not elicit an increase in proliferation, although a concentration of 1x10-4M (34.08%+0.123) slightly increased growth. The BPF treatment at a concentration of 10-7 M had the greatest percent change of (43.6% +0.107). Based on these results, it was concluded that that low concentrations (1x10-7M) of BPF were sufficient to increase cell proliferation which has implications in the health of the peripheral nervous system.

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