ABSTRACT

Charles University
Faculty of Pharmacy in Hradec Králové
Department of Pharmacology & Toxicology
Student: Barbora Macáková
Supervisor: PharmDr. Eduard Jirkovský, Ph.D.
Title of diploma thesis: Comparison of the effect of bisphenols on parental and differentiated H9c2 cells

Bisphenol is compound largely found in products and environment around us. Its toxicity and danger for human health is still being studied, meanwhile direct influence of environmentally relevant doses was not discovered. These endocrine disruptors are affecting various receptors in bodies and effect on cardiovascular system is not excluded either. The most extensively studied substance is BPA, which is gradually being replaced by its analogs, although these are not extensively researched to the same extent.

In this work we focused on influence of bisphenol BP, M and S on differentiation of H9c2 cells, serving as a model with potential negative effects on heart development and its regeneration after damage.

H9c2 cell line has an undifferentiated phenotype but can be easily directed towards differentiation under certain conditions

Research was focused on impact of bisphenol on differentiated cells and its changes in the expression of selected differentiation markers (GATA4, Hand2, Tnnt2, Myog) (transcription factors). Set protocols were observed and monitored for 9 days with addition of fetal bovine serum (1% to 10%), all-trans retionic acid (10mmol/L) and media changes.

From observed results, toxicity was found in parent cells, but only at high concentrations, and conversely, no toxicity was demonstrated for BPS. Out of the four bisphenols (BPBP, BPM, BPS, BPPH), only three substances were selected as non-toxic, exhibiting non-toxic properties even on differentiated cells. The impact of bisphenols on expression was not uniform and not statistically significant compared to control cells; however, due to variability of gathered data, their effect cannot be completely ruled out. The results will need to be subsequently confirmed at the protein level and in a dataset with less variability.