

Abstract

In our environment there are many compounds which can negatively influence humans and wildlife. Every day, a vast number of environmental pollutants are released into our environment and there is no way to avoid their exposure. Some of these compounds can even mimic endogenous hormones and interfere with our endocrine system (so called endocrine disruptors), which is the key regulatory system controlling almost all physiological processes in human and animal bodies. Also the reproductive system is largely regulated by various hormones, and their proper function is crucial for gamete formation, fertilization and embryo development. Environmental pollutants are therefore considered as one of the possible causes of increased infertility in human population. This prompted us to study the effect of two endocrine disruptors (tetrabromobisphenol A – TBBPA, and zearalenone – ZEA) on the male mouse reproductive system *in vivo*.

According to our results, TBBPA is able to induce apoptosis as well as changes in the expression of selected testicular genes and sperm protamination. Our results also suggest that permanent exposure to TBBPA slightly enhances its effect in the next generation, depending on whether the parents have been affected or not. We hypothesized that differential protamination of the sperm DNA may be one of the possible mechanisms of trans-generational transmission of the pathological phenotypes induced by environmental pollutants.

Results from our next study have shown that ZEA is able to negatively influence the sperm quality, mainly sperm concentration and morphology. Based on our results from gene expression analysis we assumed that the most affected cells are spermatogonia and meiotic germ cells. Our results have also shown that the lower dose of ZEA had a greater effect on exposed animals.

Finally, in the third part of the presented work we analyzed expression of selected genes in specimens from testicular biopsies of azoospermic patients who underwent TESE. Our results showed that gene expression analysis can be an additional and useful tool for assessing the most suitable procedure for each patient.