

4-TERT-OCTYLPHENOL-INDUCED ALTERATIONS IN TRANSCRIPTIONAL PROFILING OF NEONATAL PORCINE OVARIES

Slomczynska, Maria¹; Knapczyk-Stwora, Katarzyna²; Nynca, Anna³; Ciereszko, Renata E⁴; Paukszt, Lukasz⁵; Jastrzebski, Jan P⁵; Czaja, Elzbieta²; Witek, Patrycja²; Kozirowski, Marek⁶

¹Department of Endocrinology, Institute of Zoology and Biomedical Research, Jagiellonian University in Krakow, ²Department of Endocrinology, Institute of Zoology and Biomedical Research, Jagiellonian University in Krakow, Poland, ³Laboratory of Molecular Diagnostic, Faculty of Biology and Biotechnology, University of Warmia and Mazury in Olsztyn, Poland, ⁴Laboratory of Molecular Diagnostic and Department of Animal Anatomy and Physiology, Faculty of Biology and Biotechnology, University of Warmia and Mazury in Olsztyn, Poland, ⁵Department of Plant Physiology, Genetics and Biotechnology, Faculty of Biology and Biotechnology, University of Warmia and Mazury in Olsztyn, Poland, ⁶Department of Physiology and Reproduction of Animals, University of Rzeszow, Rzeszow, Poland

Abstract Body

Folliculogenesis in pigs begins during fetal life and the reserve of primordial follicles is established during the neonatal period. In mammals, the formation of the primordial follicles is a complex process involving the breakdown of egg nests, oocyte separation and subsequent recruitment of somatic cells. The precise coordination of the expression of genes essential for follicular development is affected by many factors including endocrine active compounds (EACs). We have already demonstrated that the availability of androgens and estrogens is important for both the assembly and the development of follicles in neonatal porcine ovaries. The present study was undertaken to identify transcriptomic changes induced in these ovaries by environmental estrogen – 4-tert-octylphenol (OP). Piglets were subcutaneously injected with OP (100 mg/kg bw) on days 1 to 10 post partum (n = 4 per group). Control animals were treated with corn oil. Ovaries were excised from the 11-day-old piglets, total cellular RNA was isolated and submitted to RNA-sequencing (RNA-Seq). The expression of several selected up- and down-regulated DEGs was confirmed by qRT-PCR. 253 differentially expressed genes (DEGs, $p_{\text{adjusted}} < 0.05$; fold change [FC] ≥ 1.0) were identified in OP-treated piglet ovaries. The DEGs were assigned to Gene Ontology (GO) terms covering “biological processes”, “molecular function” and “cellular components” categories. The DEGs classified to “biological processes” were mainly annotated to “movement of cell or subcellular component”, the “molecular function” GO category encompassed DEGs annotated to “endopeptidase regulator activity”, and the “cellular component” category included “signaling receptor binding”. Our results suggest that neonatal exposure of pigs to 4-tert-octylphenol alters the expression of genes involved in ovarian cell proliferation, ion transport and ovarian steroidogenesis which, in turn, may affect female reproduction in adult life.

Supported by the National Science Centre, Poland (Grant No. 2015/17/B/NZ9/01457)