

## Immunoexpression of estrogen receptor $\alpha$ in the ovary of mice after chronic exposure to arsenic(III)-oxide

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### Background

Arsenic (As) is a naturally occurring metalloid found in soil and groundwater. As it can enter the food chain, As poses a serious environmental and health risk. In humans, the severity of symptoms of As poisoning depends on the dose and duration of exposure. Chronic exposure to low concentrations of As leads to dysfunction in virtually all body systems, including the impairment of the normal function of endocrine organs. Ovarian estrogens are the most important regulators of female fertility. Acting through specific receptors, estrogens regulate the growth and development of follicles, oocytes and granulosa cells in the ovaries as well as the function of ovulation. The aim of this study was therefore to determine the distribution of estrogen receptor  $\alpha$  (ER $\alpha$ ) in the ovaries of mice after administration of As(III)-oxide, which is considered to be the most toxic form of inorganic As.

### Methods

Female mice from the Naval Medical Research Institute (NMRI, Bethesda, USA) aged approx. 6 months at the end of the experiment were used. Since birth, animals from the experimental group (n=6) drank water in which As(III)-oxide was dissolved at 10.6 mg/l, while the mice in the control group (n=6) drank tap water. For immunohistochemical localization of ER $\alpha$  in the ovaries of the mice, the sections were incubated with rabbit monoclonal anti-human ER $\alpha$  primary antibody (IR084, Dako, Agilent Technologies, Denmark), 1 h at room temperature and then visualized using EnVision FLEX, High pH (Link) system (K8000, Dako, Agilent Technologies, Denmark) for 30 min at room temperature. For negative control, primary anti-ER $\alpha$  antibody was omitted. After hematoxylin counterstaining, slides were analyzed with a Leica DMLB microscope (Leica Microsystems, Wetzlar, Germany).

### Results

The control group is characterized by the preserved structure of the ovarian surface epithelium, under which there were numerous follicles in various stages of development as well as numerous corpora lutea and stromal cells. The results showed that the expression of the estrogen receptor was more pronounced in the experimental group than in the control group. A particularly positive response was observed in the corpora lutea, the secondary follicles, and the granulosa cells of the antral follicles, while immunostaining was absent in the stromal cells.

### Conclusion

The present results show that chronic arsenic exposure affects the pattern and intensity of ER $\alpha$ -immunoexpression, suggesting involvement in the impairment of estrogen signaling with possible disruption of reproductive function.

### Keywords:

Mice, arsenic(III)-oxide, ovaries, immunohistochemistry

### Reference:

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