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# The effects of styrene on the expression of antioxidant and steroidogenic enzymes in murine germ cells

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Styrene is one of the most important chemical of wide industrial use, particularly in the manufacture of polymers and reinforced plastics. Its polymers and copolymers are used in an increasingly wide range of applications. A potential genotoxic effect exerted by styrene exposure in germ cells is the important causes of infertility, abortion and congenital diseases or death in offspring. In this study, we investigated to determine whether styrene and its metabolite such as styrene oxide increase the ROS production in F9 teratocarcinoma cells and C57BL/N/CrjBgi mice. Groups of mice were exposed to 0, 50, 100, 500 ppm styrene for 5 days. F9 teratocarcinoma cells were treated to 0, 10, 50, 100, 200 μM styrene for 24 h. The generation of ROS in mouse sperm cells was increased by styrene in a dose-dependent manner. The generation of ROS in F9 cells was particularly unchanged by styrene exposure, but increased by its metabolite, (R)-(+)-styrene oxide. The mRNA levels of SOD2 (Mn-SOD) and glutathione peroxidase (GPX1) were increased in mouse sperm cells and F9 cells while the SOD1 (Cu,Zn-SOD), catalase (CAT) mRNA were not changed in both cells. We also confirmed that styrene enhanced SOD2 protein expression by immunoblot. Moreover, the mRNA and protein levels of aromatase (CYP19) were down-regulated. To study the toxic effects of styrene in murine germ cells, styrene-treated cells were analyzed via two-dimensional gell electrophoresis. Taken together, the changes in ROS production, differential expression of mRNA and proteins by styrene treatment considered to reflect leading part of styrene as a endocrine disruptor.

**Keyword** : Styrene, SOD1, SOD2, GPX1, CYP19, germ cells