

Di(2-ethylhexyl) phthalate increases expression of several oxidative stress markers in the mouse ovary

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Di(2-ethylhexyl) phthalate (DEHP) is a plasticizer used in a wide range of consumer products including building materials, food and beverage containers, and children's toys. This is concerning because DEHP can leach out of products and enter the human body. Furthermore, DEHP has been shown to exhibit endocrine disrupting abilities after both short-term and long-term exposures. However, little is known about the effects of DEHP on the ovary. Thus, this study tested the hypothesis that DEHP alters gene expression in the mouse ovary. To test this hypothesis, female CD-1 mice aged 39-40 days were orally dosed with either vehicle control (corn oil) or DEHP (20 µg/kg/day - 200mg/kg/day) for 10 days. The ovaries from these mice were then collected immediately post-dosing and subjected to gene expression analysis for regulators of oxidative stress. The results show that DEHP exposure at both 200 µg/kg/day and 200 mg/kg/day significantly increased ovarian expression of superoxide dismutase 1 (*Sod1*), catalase (*Cat*), glutathione peroxidase 1 (*Gpx*), glutathione S-transferase kappa 1 (*Gstk1*), and glutathione S-transferase alpha 1 (*Gsta1*). DEHP exposure at all doses significantly increased ovarian expression of superoxide dismutase 2 (*Sod2*), glutathione S-transferase theta-1 (*Gstt1*), and glutathione S-transferase theta-2 (*Gstt2*). Additionally, DEHP exposure at 20 µg/kg/day significantly increased ovarian expression of glutathione peroxidase 2 (*Gpx2*). DEHP exposure at 200 µg/kg/day significantly increased ovarian expression of glutathione S-transferase pi 1 (*Gstp1*) and DEHP exposure at 200 mg/kg/day significantly increased ovarian expression of glutathione S-transferase zeta 1 (*Gstz1*). Finally, DEHP exposure at all doses significantly decreased ovarian expression of glutathione synthetase (*Gss*). All of the selected genes are related to the regulation of oxidative stress in the body. *Sod1* and *Sod2* are genes that encode the enzyme superoxide dismutase, an enzyme that breaks down superoxide radicals in the body. Similarly, *Cat* is a gene that encodes the enzyme catalase, an enzyme responsible for breaking down hydrogen peroxide in the body. *Gpx*, *Gpx2*, *Gss*, *Gsta1*, *Gstp1*, *Gstk1*, *Gstt1*, *Gstt2*, and *Gstz1* are all responsible for the production and transfer of glutathione, another prominent antioxidant in the body. Together, these data suggest that DEHP exposure for 10 days affects oxidative stress pathways in the mouse ovary. Supported by NIH RO1ES034112 and the Aarush M. Patel Foundation Fellowship.