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Expression of P450, VEGF and VEGFRs in the placenta of rat by exposure to 3,3',4,4',5-pentachlorobiphenyl PCB126

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A recent report (Ishimura, et al. 2002) revealed that exposure to 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) altered the glucose kinetics in the placenta of Holzman rats. In the report, glycogen contents and glucose transporter 3 mRNA level increased in the placentas of TCDD-exposed rats, and also the property of the glycogen cells in the junctional zone of the placentas were affected in these exposed rats.

We have revealed that vertically transferred 3,3',4,4',5-pentachlorobiphenyl (PCB126) altered the reproductive development and puberty of the female Sprague-Dawley (SD) rats. However, the effects of PCB126 on the rat placenta remained to be clarified.

In this study, we investigated protein and mRNA expression of cytochrome P450 1A1 (CYP1A1), a target molecule of PCB126, vascular endothelial growth factor (VEGF) and its receptors (VEGFR-1/flt-1 and VEGFR-2/flk-1) in the rat placenta exposed by PCB126 using immunohistochemistry and semi-quantitative RT-PCR.

The pregnant SD rats were given a single oral dose of 100, μ g/kg PCB126 (n=4) or 2ml/kg (n=4) corn oil on the gestational day (GD) 15. The placentas were collected on GDs 16 and 18 and examined.

The number and weight of placentas of the PCB-exposed rats did not significantly differ from those of controls. There are no differences of the morphology of the glycogen cells in the placentas between exposed and control rats. By immunohistochemistry, CYP1A1 was detected in the fetal vascular endothelial cells in the labyrinth zone of placenta of exposed rats. Also, mRNA of CYP1A1 was detected in the placenta of PCB-exposed rats, but not in controls. Semi-quantitative RT-PCR study revealed no differences in mRNA expression of VEGF, flt-1 and flk-1 in the placenta between exposed and control rats.

These findings suggest that maternal exposure to PCB126 affects the fatal vascular endothelial cells in the placenta because of CYP1A1 induction. Therefore, further studies on the effects of PCB126 on endothelial or vascular function in the placenta must be required.