Archives of Pharmacy Practice
Abstract Conference Proceedings
2nd Asia Pacific Pharmacy Education (PharmED) Workshop
ISSN 2045-080X Vol. 3, Issue 1, 2012

DP-018

IN VIVO TECHNIQUES FOR THE EVALUATION OF PASSAGES FROM MATARNAL AND FETAL SIDES ACROSS THE PLACENTAL BARRIER

Takashi Asada, Tatsuya Takanohashi, Tomohiro Nishimura, Masatoshi Tomi and Emi Nakashima
Division of Pharmaceutics, Faculty of Pharmacy, Keio University, 1-5-30 Shibakoen, Minato-ku, Tokyo 105-8512, Japan
E-mail: saczv621.xogntutf_w6o2o-chsgue@z6.keio.jp

ABSTRACT

Placental syncytiotrophoblasts play a role as a selective permeability barrier, which governs the passage of biomolecules and xenobiotics between the mother and the fetus. Quantifying the transplacental transfer of drugs *in vivo* is of clinical importance in administrating drugs to the pregnant. The purpose of the present study is to evaluate the passage of compounds from both maternal and fetal sides of the placenta in pregnant rats. To evaluate the fetomaternal transfer clearance, radiolabeled test compounds were perfused from umbilical artery, and then the perfusate was collected from umbilical vein. Fetomaternal transfer clearance was calculated by steady-state disappearance of radioactivities in the perfusate. To evaluate the maternofetal transfer of test compounds, radioactivities in the fetus were measured after administrating radiolabeled test compounds into the abdominal aorta together with antipyrine as a reference compound. In most of tested compounds, fetomaternal transfer clearances correlated with their lipophilicity. However, in the case of [^{3}H]digoxin, a substrate for P-glycoprotein, the fetomaternal transfer clearance was 1.5-fold higher than that of [^{14}C]antipyrine and was significantly decreased by 100 μM verapamil and 100 μM digoxin. On the other hand, the maternofetal transfer of [^{3}H]digoxin was much lower than that of [^{14}C]antipyrine. These data suggests that P-glycoprotein-mediated efflux transport of digoxin took place at the apical membrane of the placental barrier. The *in vivo* techniques used in the present study have the potential to clarify the presence of some drug transporters at the placental barrier.