Changes of Plasma Cystine Aminopeptidase Activities in Pregnant Horses

Hidenori IKENAGA¹, Terumasa SHIMADA², Kenichiro ONO², Shigeyoshi TAKAGI³, Naoyoshi SUZUKI², and Isamu TOMODA¹

¹Department of Veterinary Clinical Pathology, School of Veterinary Medicine, Nippon Veterinary and Animal Science University, 1-7-1 Kyonan-cho, Musashino, Tokyo 180, Japan, ²Department of Veterinary Clinical Pathobiology, Faculty of Agriculture, The University of Tokyo, 1-1-1 Yayoi, Bunkyo-ku, Tokyo 113, Japan, and ³Equine Research Institute, Japan Racing Association, 5-27-7 Tsurumaki, Setagaya-ku, Tokyo 154, Japan

(Received 7 June 1993/Accepted 14 July 1993)

Plasma cystine aminopeptidase (CAP) activities were examined in 40 pregnant and 10 non-pregnant Thoroughbred horses by spectrophotometric analysis using S-benzyl-L-cystine-p-dimethylaminoanilide as a substrate. Plasma CAP activities were remarkably low and no difference was observed between pregnant and non-pregnant horses. No changes of plasma CAP activities related with pregnant conditions, such as placental growth, functions and fetal growth, were observed. These results suggested that the plasma CAP activities seemed to be unavailable for the marker of maternal gestational conditions in horses.

Key words: cystine aminopeptidase, horse, pregnancy

Fig. 1 shows changes of plasma CAP activities in pregnant and non-pregnant horses. No difference was observed in the mean plasma CAP activities between pregnant and non-pregnant horses; however, those levels showed 3 peaks from May to July, from December to February, and April in both pregnant and non-pregnant horses. Babuna and Yenen [1] demonstrated that the plasma CAP activity increased significantly after the 14th week of gestation and retained at high levels during pregnancy in women. These values were altered in certain pathologic pregnancies, decreased rapidly in intruterine fetal death and also increased in the presence of multiple pregnancy. However, Hrabak et al. [5] reported that plasma CAP activities in pregnant cows were very low and did not change with length of gestation, nor did it change when placentation was disrupted by infection with *Aspergillus fumigatus*. The same results were also reported in pregnant rabbits, rats, and sheep [1, 13]. On the other hand, Hrabak et al. [6] demonstrated that plasma CAP activities in pregnant guinea pigs showed remarkably high and decreased with length of gestation, whereas increased significantly in women. In pregnant horses, plasma CAP showed same inhibitory effects by ethylene diamine tetra-acetic acid (EDTA), L-methionine, and heat treatment as those of placental CAP [7] like as those in women [8, 10, 11]. However, no changes was observed during pregnancy in this study. Changes of plasma CAP activity in horses did not seem to result from the pregnant conditions. Grosser et al. [12] reported that the structure of placenta was classified into 4 types, hemochorial, endotheriochorial, syndesmochorial, and epitheliochorial placenta. The type of placental structure in the horse was classified into epitheliochorial placenta and was different from those of women classified to hemochorial one. Changes of plasma CAP activities related with gestational conditions were considered to be different in maternal fetal blood barrier systems associated with the type of placental structure. Further studies were necessary for estimating of plasma CAP activity in pregnant horses from the point of view on the type of placental structure. No changes of arylamidase (AA) [EC 3.4.11.2] activity related with gestational conditions was also observed in pregnant horses (data not shown). Since AA activity was detected in various tissues such as kidney, brain, liver, and also placenta [4], many investigators reported that plasma AA activities showed no specificity to placental AA activities and also no relation with maternal pregnant conditions [4].

(Sankyo Co., Ltd.) using S-benzyl-L-cystine-p-dimethylaminoanilide as a substrate.
In conclusion, the plasma CAP activities seemed to be unavailable for the marker of maternal gestational conditions in pregnant horses, like as plasma AA activities.

References