Distribution of Tributyltin, Dibutyltin and Monobutyltin in the Liver, Brain and Fat of Rats: Two-Generation Toxicity Study of Tributyltin Chloride

Minoru Omura1,2,*, Youhei Shimasaki3, Yuji Oshima3, Kei Nakayama1, Kazuhiko Kubo4, Shuji Aou5, Rika Ogata1,2, Miyuki Hirata1 and Naohide Inoue1,2

1Department of Hygiene, Graduate School of Medical Sciences, Kyushu University, Fukuoka 812-8582, Japan
2“Research Area” CREST, Japan Science and Technology Corporation, Kawaguchi Center Building, 1-8, Honcho 4-Chome, Kawaguchi City, Saitama 332-0012, Japan
3Laboratory of Marine Environmental Science, Institute of Marine Biological Chemistry, Division of Bioresource and Bioenvironmental Sciences, Kyushu University Graduate School, Fukuoka 812-8581, Japan
4Department of Integrative Physiology, Graduate School of Medical Sciences, Kyushu University, Fukuoka 812-8582, Japan
5Department of Brain Science and Engineering, Graduate School of Life Science and Systems Engineering, Kyushu Institute of Technology, Kitakyushu 808-0196, Japan

(Received April 10, 2003; accepted August 4, 2003)

Key words: tributyltin metabolites, liver, brain, rats, two-generation toxicity study

The distribution of tributyltin (TBT) and its metabolites, dibutyltin (DBT) and monobutyltin (MBT), was examined in the liver, brain and fat tissues in a two-generation reproductive toxicity study of tributyltin chloride (TBTCl) in rats using dietary supplementation at concentrations of 5, 25 and 125 ppm. In the liver, irrespective of TBTCl dietary concentration, gender or generation, the highest concentration of metabolite was consistently MBT, followed by DBT, and then TBT. In contrast, TBT was consistently present at the highest concentration in the brain, nearly always followed by DBT and MBT. In fat tissues, the concentrations of the three butyltin compounds showed similar relationships to those observed in the brain, although the concentrations were much lower. In the liver, the concentration of TBT was higher in females, and those of DBT and MBT were higher in males. Factorial ANOVA also suggested the effect of gender on the concentrations of the three butyltin compounds in the liver. The results of this study suggest tissue-dependent distribution of TBT, DBT and MBT and gender-dependent distribution of the three metabolites in the liver of rats.

*E-mail: momura@eisei.med.kyushu-u.ac.jp