ONLINE ISSN : 1880-1404
PRINT ISSN : 0916-717X

Biomedical Research on Trace Elements
Vol. 17 (2006) , No. 4 373-381

Organotin-Induced Toxicity and Nuclear Receptor Signaling

Tsuyoshi Nakanishi[1)]

1) Department of Toxicology, Graduate School of Pharmaceutical Sciences, Osaka University

(Received: September 7, 2006)
(Accepted: October 27, 2006)

Abstract:
Organotin compounds have been widely used as agricultural fungicides, rodent repellents, and molluscicides and in antifouling paints for ships and fishing nets. These widespread uses have resulted in the release of increasing amounts of organotins into the environment. In aquatic invertebrates, particularly marine gastropods, organotin compounds, such as tributyltin (TBT) and triphenyltin (TPT), induce irreversible sexual abnormality in females which is termed “imposex” at very low-concentrations. Although it has been theorized that these compounds act as potential competitive inhibitors for aromatase, which converts androgen to estrogen, and then increase levels of unconverted androgens in gastropods, their effective concentrations of aromatase inhibition are high. In addition to wildlife, organotins may have various undesirable effects on human health. In human ovarian granulosa cells, these compounds suppress aromatase activity at the nanomolar level. Contrary to this, in human choriocarcinoma cells, these compounds markedly enhance estrogen biosynthesis along with the increase of aromatase activity at the same low concentrations. Although there are many reports describing the potential toxicity of organotins, the critical target molecules for the toxicity of organotin compounds remain unclear. New data identify TBT and TPT as nanomolar agonist ligands for retinoid X receptor (RXR) and peroxisome proliferatoractivated receptor (PPAR) γ, which are members of the nuclear receptor superfamily. Here, we review the potential toxicity of organotin compounds via these nuclear receptors in mammals.

Key words: organotin, aromatase, endocrine disruptor, retinoid X receptor (RXR), peroxisome proliferator-activated receptor (PPAR) γ

To cite this article:

Tsuyoshi Nakanishi, “Organotin-Induced Toxicity and Nuclear Receptor Signaling”, Biomedical Research on Trace Elements, Vol. **17**, pp.373-381 (2006) .

JOI JST.JSTAGE/brte/17.373