The role of radical processes in the toxicity mechanism of organomercurials and organotins

Elena R.Milaeva, Vladimir Yu.Tyurin, Dmitry B.Shpakovsky, Valery S.Petrosyan

Department of Chemistry, Moscow State Lomonosov University

The paper reviews recent results in the studies oriented towards the role of organomercury and organotin compounds $\mathbf{R_nMX_m}$ (M = Hg, Sn) in the xenobiotic-mediated enhancement of free radical production and hence in the promotion of cell damage. The conception of **C-M** bond homolytic cleavage that leads to the generation of reactive organic radicals $\mathbf{R^\bullet}$ is discussed as one of the mechanisms of mercury and tin organic derivatives toxicity. The study has been carried out as a multilevel *in vitro* and *in vivo* experiment by using the following targets:

- **co-enzymes** (NAD, NADP);
- **enzymes** (NAD-dependent malate, lactate and alcohol dehydrogenases; catalase, cytochrome *c* oxidase, *L*-aspartate and alanine aminotransferases);
- **lipids**; unsaturated fatty acids;
- **hormone** (epinephrine);
- **mitochondria**; fish and rat **organs** and **tissues**.

The application of antioxidants and new antioxidative scavengers (phenol containing porphyrins) as preventing additives for the detoxification of heavy metals organic derivatives is described. The data presented are fundamentally important to recognizing the difference between the role of metal center **M** and of organic fragments **R** in the biomolecular mode of organomercury and organotin compounds activity in the interaction with the biological targets when entering a living organism.

SELECTED REFERENCES

(1) E.R.Milaeva, V.S.Petrosyan, N.T.Berberova, Yu.T.Pimenov, L.Pellerito. *Bioinorg.Chem.Appl*. 2004, 2, 69-91. (2) E.Milaeva, D.Shpakovsky, V. Petrosyan. *Macromol.Symp*. 2003, 204, 191-204. (3) E.R.Milaeva, D.B.Shpakovsky, Yu.A.Gracheva, O.A.Gerasimova, V.Yu.Tyurin, V.S.Petrosyan. *J.Porphyrins & Phthalocyanines*. 2003, 8, 701-706. (4) V.Petrosyan, E.Milaeva, Yu.Gracheva, E.Grigor'ev, V.Tyurin, Yu.Pimenov, N.Berberova. *Appl.Organometal.Chem*. 2002, 16, 655-659.

This work was supported by Russian Foundation for Basic Research (grant N 03-03-32938).