Effect of Se selenium-deficient diet on Se pharmacokinetics after sodium selenite administration in rat

Minamoto Ozeki[*1], Haruko Ishii[*1], Masahiro Natsuhori[*1], Nobuhiko Ito[*1],
Koichiro Sera[*2], and Shoji Futatsugawa[*3]

[*1]Kitasato University School of Veterinary Medicine and Animal Sciences,
Higashi 23-35-1, Towada, Aomori 034-8628 Japan

[*2]Cyclotron Research Center, Iwate Medical University, 348-58 Tomegamori Takizawa 020-0173 Japan

[*3]Nishina Memorial Cyclotron Center, Japan Radioisotope Association,
348-58 Tomegamori Takizawa 020-0173 Japan

Abstract

Selenium (Se) concentration in biological samples from Wistar rats including plasma, brain, heart, lung, liver, kidney, spleen, uterus, testes, epididymis, seminal vesicle, and prostate were determined by using PIXE analysis. Moreover, Se concentration-time profiles in organs of Se deficient groups after Se administration were investigated. Rats were divided into 3 groups depending on the duration of the Se-deficient diet supplied; i.e., control (commercial regular diet), SD2W (Se-deficient diet for 2 weeks), and SD6W (Se-deficient diet for 6 weeks). The samples before and after single oral sodium selenite administration (dose ; equivalent to 2mg/kg bw of Se) were analyzed by PIXE.

Testes and epididymis had the highest Se concentration among the organ investigated. In SD group, pharmacokinetic parameters of Se changed by the Se deficient diet. The longer the Se-deficient diet was given, the higher Se concentration and AUC were achieved. This was due to increased absorption rate constant (Ka) and the highest concentration in the plasma (Cmax). On the other hand, the elimination rate constant (Kel) slightly decreased. It was indicated that in Se-deficient status induced the intestinal Se absorption and retention in the body.