DRUGS EXPTL. CLIN. RES. XXIII(1) 7-11 (1997)

PHARMACOKINETICS OF SELOL, A NEW AGENT CONTAINING SELENIUM, IN RATS

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Summary: *The pharmacokinetic properties of selol, a new organoselenium compound, were evaluated in rats. Each animal was given a single oral or subcutaneous dose of selol 12 mg/kg. The selenium concentration was determined in whole blood and tissues by non flame carbon furnace atomic-absorption spectrometry. The pharmacokinetic parameters C_{max} and t_{max} differed statistically between oral (p.o.) and subcutaneous (s.c.) treatment. The selenium average peak concentrations in the blood were 494 ± 8 ng/ml after oral and 322 ± 5 ng/ml after subcutaneous administration. They were reached after 1.9 ± 0.1 h and 2.4 ± 0.1 h, respectively. For the AUC_0 mean values of 1373 ± 56 ng · h/ml (p.o.) and 1273 ± 137 ng · h/ml (s.c.) were found. The mean residence time (MRT) was significantly longer after subcutaneous administration. Selenium distributes quickly to the main organs with prevalence to the adrenal gland. Moreover, its concentrations in the examined organ were evidently higher after subcutaneous treatment as compared to the oral route. Our data suggest that Selol may be used as a possible source of selenium for the treatment of selenium-deficient patients, particularly via the subcutaneous route.*

Introduction

Selenium deficiency may lead to diseases in certain human populations. Some authors (1-3) report that low blood levels of selenium correlate with a higher prevalence and incidence of cancer. However, it is not known whether supplementation is beneficial as a prophylaxis against cancer. Recent studies indicated that the low blood selenium concentrations were also associated with an increased risk of asthma and atopic dermatitis (4, 5).

Orally ingested selenium is well absorbed from food mainly as the amino acids selenomethionine and selenocysteine and derivatives (6). It has been proved that bioavailability of selenium compounds from plants is in general higher than from animals (7). Regarding this, a new organoselenium compound named selol was synthesized in the Department of Drug Analysis of Warsaw Medical University. In preliminary studies using ^{1}H- and ^{13}C-NMR, Selol showed a polymeric structure composed of seleno-glycerides. Detailed results on its structure will be published at a later date pending patent registration.

Our previous studies indicated that the toxic action of selol was closely related to the route of administration (8). After parenteral application it appeared to be practically non toxic, while given orally Selol exhibited high toxicity (LD_{50} - 100 mg · kg^{-1}). The

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0378-6501/97/1/0007 + 5 $02.50/0