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Trace elements in blood serum from healthy elderly population living in São Paulo city. An attempt to establish reference interval values

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The availability of reliable reference intervals or normal values for trace elements in blood serum is of great importance for its use in the assessment of the health status of patients and for successful treatment. Nevertheless reference intervals for trace elements are difficult to obtain due to the influence of several factors such as definition of the reference group, sampling procedure and the quality of the analytical results. This study aimed to assess trace element concentrations in the blood serum of a healthy elderly population in order to obtain representative ranges or baseline values as an attempt to obtain reference intervals. Presently serum reference values for an elderly population are very scarce. Thus this study may provide useful information in interpreting laboratory results and for prevention of age-associated diseases. Blood samples were collected from 165 elderly subjects (mean age 77 ± 11 ; range 60-101 years) considered healthy participating in a "Successful Ageing Program" and also attended for clinical checkups at the Hospital das Clínicas of the Faculdade de Medicina, Universidade de São Paulo. They were from both genders and selected based on the SENEUR protocol. Blood samples collected in heparin-free tubes without additives for trace element determinations were centrifuged and then the obtained serum was freeze dried for the analysis. Instrumental Neutron Activation Analysis was applied in the determination of the elements Br, Ca, Cl, Fe, Na, Rb, Se and Zn. The mean values and ranges of concentrations (mean \pm sd; range) obtained were for Br (3.4 ± 1.1 ; 1.58-8.14) mg L⁻¹, Ca (9.5 ± 1.1 ; 5.1-15.0) mg dL⁻¹; Cl (90.2 ± 9.1 ; 67.3-118.3) Meq L⁻¹, Fe (124.0 ± 98.5 ; 38.9-1202.9) μ g dL⁻¹, Na (131.2 ± 14.6 ; 91.5-181.4) mmol L⁻¹, Rb (319.4 ± 57.9 ; 194.1-520.3) μ g L⁻¹, Se (70.5 ± 25.7 ; 22.5-185.6) μ g L⁻¹ and Zn (93.3 ± 15.1 ; 56.8-141.1) μ g dL⁻¹. The mean concentrations obtained for Ca, Fe, Rb, Se and Zn were within the reference intervals used in clinical laboratories. This means that the effect of age on these element concentrations in serum of healthy elderly population living in São Paulo city was negligible. For Br and Cl our results were somewhat lower than these reference intervals. The precision and accuracy of the results were evaluated by analyzing certified reference materials NIST 1566b Oyster tissue and IAEA-A-13 Animal Blood.