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UPDATING AND STUDY OF NORMAL LEVELS OF COPPER, ZINC AND SELENIUM IN SERUM OF PREGNANT WOMEN

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Objective: Establish some updated biological reference intervals for copper, zinc and selenium levels in serum in pregnant women.

Methods:

-The study group consisted of 166 pregnant women, who did not suffer from pathologies.

-Zinc and copper determinations in serum were made using Flame Atomic Absorption Spectroscopy (AAS) through Perkin Elmer 1100B equipment and selenium in serum was determined by Electrothermal Atomic Absorption Spectrometry (ETAAS) method with Zeeman's background correction and graphite furnace through Perkin Elmer's 4110 ZL equipment. All samples were analysed in duplicate.

-The SPSS program, version 13.0 for windows was used to process the statistics data. The Pearson Correlation was applied.

Results and discussion:

- The concentrations of copper, zinc and selenium averaged 73.61 ± 43.67 microg/dL, 65.37 ± 12.87 microg/dL and 99.59 ± 21.74 microg/L, respectively, in pregnant women.

- There was no significant correlation between zinc and selenium levels. A significant correlation was found between serum levels of copper and selenium serum levels ($p < 0.05$) and between copper and zinc ($p < 0.001$).

- Varying differences were noted in these oligoelements according to week of gestation. Copper serum levels were higher than zinc levels in all pregnant women. In pregnancies at term were observed levelness.

Conclusions:

- There are diversity of values according age of gestation.

- The need to study more advanced considered the clinic history of pregnancies and different treatments and supplements during pregnancy.

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IODINE AND SELENIUM DEFICIENCY IN PREGNANT WOMEN OF AMUR-RIVER REGION

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Increased content of Fe, Mn, deficiency of iodine and selenium and other essential elements misbalance in the environment are the peculiarities of the Amur-river region, and other regions of Russia also. Technogenic pollution resulted in increased levels of marginally permitted concentrations of some trace elements (Zn, Cu, Cd, Pb, Hg, Ni, Li and etc.).

Specific features of environment complex factors may be one of the reasons for anemic state formation in pregnant women. This is one of the most common extra genital pathology. During past 15 years, the frequency of such pathology in pregnant women of Khabarovsk territory increased 2,1 times, anemia dependent confinement complications – 4 times.

Trace elements misbalance, influencing eritron system function, appears under some environment factors action. 509 pregnant women from industrial center (Khabarovsk city) were examined. 80,3% of women in group with normal blood analyses and Ferro dynamic status iodine deficiency in the whole blood revealed. In anemia group iodine deficiency revealed in 91,6%. Severe iodine deficiency revealed in 59,8% in comparative group, 74,7% in Fe-deficiency anemia group, and 83,1% in Fe-saturated anemia group. Blood serum Selenium deficiency in 67,5% of comparative group pregnant women accompanied with blood cells Selenium deficiency in 30% of cases.

In the anemia group, Selenium deficiency in serum revealed in 58%, in blood cells in 76% of pregnant women, independently of Fe content.

Represented investigations illustrated the environment influence at the trace elements status in pregnant women, resulting in Iodine and Selenium deficiency.

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EVOLUTION OF THE HABITUAL VALUES OF PB LEVELS IN BLOOD IN THE PROVINCE OF ZARAGOZA (SPAIN)

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Objectives:

1) Establish some updated biological reference intervals for Pb levels in total blood in the province of Zaragoza to help diagnose possible intoxications by Pb correctly.
2) Carry out a differentiation by genders, in order to demonstrate the existence of significant differences.

Methods: The samples of people referred to the "metal" reference unit of the Biochemistry Service, who did not suffer from important pathologies and with normal values of the ALA-dehydratase enzyme (inhibited due to the presence of high Pb levels), were analysed. In all, between the months of January and July 2006, 156 samples of total blood were processed, of which 83 were men and 73 women. The concentration of Pb in total blood expressed in microg/dL was determined for these samples by ETAAS (Electrothermal Atomic Absorption Spectrometry) method with Zeeman corrector and graphite chamber in the Perkin Elmer equipment 4110-ZL. The samples were analysed in duplicate. The SPSS program, version 13.0 for Windows was used to process the statistics data. Student's t-test was applied to assess the possible influence of the gender on Pb levels in blood, that is, comparison of means and variances in two independent groups of individuals. Results: The following habitual interval was obtained for the total of 156 total blood samples analysed: 2.94 ± 2.02 microg/dL of Pb where the typical error of the mean was 0.16; and a value of the median of 2.43 microg/dL of Pb. Distinguishing between genders some habitual values of: 2.29 ± 1.64 microg/dL of Pb were found for women (73) with a standard error of the mean of 0.19, whilst for men (83) there was a habitual range of: 3.51 ± 2.16 microg/dL Pb, with a standard error of the mean of 0.24. A significance of $p < 0.001$ was verified by means of the t-test for independent samples, so there were statistically significant differences between both genders. Conclusions: An incipient decrease of the Pb levels in blood is observed, confirming our initial suspicions. The habitual values are: 2.94 ± 2.02 microg/dL of Pb at the present time, compared with 13.27 ± 3.47 microg/dL of Pb in 1989. The need to differentiate the habitual values by gender is made clear as women always have lower levels of Pb than men, i.e., the average plumbemia of males differs in a statistically significant manner from the average plumbemia of women.

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TRACE ELEMENT DETERMINATION IN BLOOD SERUM FROM AN ELDERLY POPULATION OF SÃO PAULO METROPOLITAN REGION, BRAZIL BY USING INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS

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Trace element determinations in serum samples are increasing and becoming an important research in medicine, due to the fact that levels of certain elements are related to various pathological conditions in human beings. The objective of this study was to investigate the trace element levels of a healthy elderly population residing in the So Paulo Metropolitan region, So Paulo, Brazil. Blood samples were collected from 47 healthy subjects, aged 60 to 91 years, included in a program "Successful Ageing" from the Hospital das Clínicas, So Paulo University Medical School. All participants signed an informed consent approved by the Ethics Committees. The whole blood collected in heparin free tube without additive was centrifuged and the obtained serum was freeze-dried prior the analysis. Haemolyzed samples were excluded for the analyses. The serum samples were analyzed by instrumental neutron activation analysis method. Samples and element standards were irradiated at the IEA-R1 nuclear research reactor for short and long irradiations under a thermal neutron flux of $5 \times 10^{12} \text{ n cm}^{-2} \text{ s}^{-1}$. After adequate decay times the gamma activities were measured using an HGe detector coupled to a gamma-ray spectrometer. Element concentrations were calculated by comparative method. Ca, Cl, Na, Rb, Se and Zn concentrations were found within the range values established by clinical laboratories or published data for blood serum, indicating that the selected population did not present deficiency or excess of these elements. A comparative study based on two different age groups of healthy elderly indicated that the Br, Ca, Fe, Na, Rb and Zn concentrations in sera from group aged 60 to 70 years did not present significant difference from those found for the group of 75 to 91 years ($p = 0.05$). Only for Se, the group aged 75 to 91 years presented lower concentrations than those of the group of 60 to 74 years. Concentrations of elements in serum of males and females indicated significant difference only for Br and Fe ($p = 0.05$). In males, Br and concentrations were lower but Fe concentrations were higher than those found for females. To validate the analytical methodology the certified reference materials (CRMs) NIST 1566b Oyster Tissue and NIST 1577b Bovine Liver were analyzed. Results obtained for CRMs analyses showed good precision and accuracy. Acknowledgments: To FAPESP and CNPq for financial support.