

## STUDY ON HOMOCISTEINE LEVEL AND ITS RELATIONSHIP WITH LEVELS OF VITAMIN B12 AND B9 IN A GROUP OF ALBANIAN POPULATION

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### Abstract

Homocysteine (Hcy) is a non-protein amino acid, which is produced in the body by the chemical conversion of methionine, an essential amino acid. Homocysteine is converted to cysteine and methionine by a combination of B vitamins (B12, B6, and folate) and enzymes (MTHFR). High homocysteine levels in the body lead to a pathology called hyperhomocysteinemia. The aim of this research was to study on homocysteine level and its relationship with levels of vitamins B12 and B9 in a group of Albanian population, and its relationship with the level of Vitamins B6, B9 and B12.

In this study, the level of homocysteine on serum was determined in a group of 175 individuals of which 62 males and 113 females who lives in Albania. The range of patient ages taken varied from 20 to 85 years, so for the ease of study we divided them into 6 age groups: the first age group (20 - 30 years), the second age group (30 - 40 years), the third age group (40 - 50 years old), the fourth age group (50 - 60 years old), the fifth age group (60 - 80 years old) and the sixth age group (> 80 years old). The study was conducted at the Intermedica Medical Clinic from Tirana. Homocysteine was measured in the Cobas 6000 Roche apparatus. Gained results were analyzed by regression analysis and Pearson correlation test.

The results showed that the total average of the measured values is 11.87  $\mu\text{mol/L}$ . In female individuals it is 10.79  $\mu\text{mol/L}$  while in male individuals it is 13.85  $\mu\text{mol/L}$ . Concentration of homocysteine in human serum first decreases and then increases throughout life. It is lower around the age of 30, it grows slightly when they are 30 - 40 years old and it increases significantly after the age of 50 years. The difference between the sexes in the level of Hcy concentration in each age series is significant ( $P < 0.001$ ). Previous studies have shown that men have higher concentrations of homocysteine than women, but the difference decreases after menopause as at this time homocysteine levels in women increase significantly compared to the pre-menopausal period because the level of hormones such as estrogen decreases significantly. However, our study shows that gender-related changes persist throughout life, eliminating the beneficial effects of estrogen. Moreover, the homocysteine levels in adult males older than 60 years were higher than the upper limit of normal (16  $\mu\text{mol/L}$ ). According statistical analysis, it turns out that there is an inverse correlation between homocysteine and vitamin B12 values. Decreasing the values of vitamin B12 leads to increasing the values of homocysteine (hyperhomocysteinemia) and vice versa as we expected. There is an inverse correlation between homocysteine and folate values. Decreased folate values lead to increased homocysteine values (hyperhomocysteinemia) and *vice versa*.

This population-based study showed that Hcy concentrations in the Albanian population are lower when compared to central or northern European countries, but it corresponded to Mediterranean countries.

**Key words:** Homocysteine, Hyperhomocysteinemia, MTHFR, Methionine.