

Interference of environmental factors in serum bilirubin levels - A preliminary study

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Bilirubin is a toxic metabolite produced by the normal catabolism of hemoglobin and other proteins. It is also a key marker of liver and hematological disorders. In absence of disease, there are considerable variations of bilirubin levels within subjects that have been reported to be associated with genetic background, but some reports suggest the involvement of environmental factors.

The aim of this work was to evaluate the effect of environmental factors that could contribute for the changes of bilirubin levels in a normal Portuguese population.

This study was performed in 80 volunteer healthy young adults. Venous blood samples were collected and processed to determine the bilirubin serum levels. A questionnaire was performed which included several parameters, namely: smoking habits, oral contraceptive therapy, caloric intake, fasting status and physical activity.

Results showed that: in a population of 17 males and 66 females (average age: 20.3 ± 1.9 years) the mean (\pm SD) serum bilirubin levels was 10.60 ± 4.46 $\mu\text{mol/L}$; a trend to higher bilirubin levels was found in males than in females (12.83 ± 5.98 $\mu\text{mol/L}$ vs. 10.77 ± 6.33 $\mu\text{mol/L}$); higher serum bilirubin levels were found in non-smoking subjects (11.63 ± 6.84 vs. 9.58 ± 2.56 $\mu\text{mol/L}$, $p=0.044$), and in female subjects that were under oral contraceptive therapy (15.57 ± 9.06 vs. 9.75 ± 4.45 $\mu\text{mol/L}$, $p=0.003$). Statistically significant correlations were found between bilirubin serum levels and fasting time ($r=0.365$, $p=0.001$), as well as, between bilirubin serum levels and caloric intake ($r=-0.254$; $p=0.021$). Multiple regression analysis identified oral contraceptive therapy ($\beta=0.36$; $p=0.01$), smoking status ($\beta=-0.25$; $p=0.04$) and caloric intake ($\beta=0.052$; $p=0.018$) as independent variables significantly associated with total serum bilirubin levels ($R^2=0.264$).

Our preliminary data show that bilirubin levels are dependent and influenced by smoking status, caloric intake, fasting time, and oral contraceptive use. Further studies are required to better understand the impact of the environmental factors, besides the genetic background, in the bilirubin serum levels.

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Abstracts

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