ABSTRACTS OF THE PAPERS PRESENTED AT

THE 17TH INTERNATIONAL SYMPOSIUM ON CAROTENOIDs

17th International Symposium on Carotenoids 2014
International Carotenoid Society

Park City, Utah USA, 29th June—4th July, 2014

JAPANESE SOCIETY FOR CAROTENOID RESEARCH
http://www.carotenoid.jp/
THE ASSOCIATION OF SERUM CAROTENOID CONCENTRATION WITH SINGLE NUCLEOTIDE POLYMORPHISMS IN APOE, BCMO1, HL AND FABP GENES

Asta Mažeikienė, a Audronė Jakaitienė, a Justas Arasiūnas, b Ingrīda Domarkienė, b Ingrida Uktvertytė, a Laima Ambrozaitytė, a Zita A. Kučinskienė, a Vaidutis Kučinskas

aDepartment of Physiology, Biochemistry, Microbiology and Laboratory Medicine, Faculty of Medicine, Vilnius University, Lithuania (e-mail: asta.mazeikieniene@mf.vu.lt); bDepartment of Human and Medical Genetics, Faculty of Medicine, Vilnius University, Lithuania

Background and objectives. Results of recent studies indicate the influence of genetic factors on human serum carotenoid concentrations. We aimed to analyze the association of carotenoid status with four single nucleotide polymorphisms (SNPs) in four genes (apolipoprotein E (APOE), β-carotene-15,15′-monooxygenase (BCMO1), hepatic lipase (HL) and fatty acid-binding protein (FABP)) related to carotenoid metabolism.

Participants. 221 (49.8% male, 50.2% female) ethnic Lithuanians (34–85y) from 6 Lithuanian ethnolinguistic regions.

Methods. All individuals were genotyped for SNPs in the candidate genes: APOE (R176C, rs7412), BCMO1 (A379V, rs7501331), HL (C-480T, rs1800588), FABP (T55A, rs1799883). Genotyping was performed using Illumina HumanOmniExpress-12 v1.0 or v1.1 array of ~770K SNPs on Illumina hiScanSQ platform. Fasting serum carotenoid (lutein, zeaxanthin, α- and β-carotene, β-cryptoxanthin and lycopene) concentrations were measured using UHPLC method. Associations between SNPs and plasma carotenoid concentrations were assessed by linear regression method. ANOVA was used to determine the mean differences between carotenoid concentrations of individuals of different SNPs genotypes. Statistical analysis was performed using IBM/SPSS v20.0.

Results. Mean concentrations (μg/ml) were calculated for the following serum carotenoids with respect to the analyzed SNP:

<table>
<thead>
<tr>
<th>Carotenoid</th>
<th>rs7501331 C/C</th>
<th>rs7501331 C/T</th>
<th>rs7501331 T/T</th>
<th>rs1800588 C/C</th>
<th>rs1800588 C/T</th>
<th>rs1800588 T/T</th>
<th>rs7412 C/C</th>
<th>rs7412 C/T</th>
<th>rs7412 T/T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lutein</td>
<td>0.295±0.150</td>
<td>0.295±0.122</td>
<td>0.295±0.152</td>
<td>0.288±0.137</td>
<td>0.288±0.143</td>
<td>0.288±0.140</td>
<td>0.157±0.120</td>
<td>0.157±0.146</td>
<td>0.157±0.165</td>
</tr>
<tr>
<td>Zeaxanthin</td>
<td>0.295±0.150</td>
<td>0.295±0.122</td>
<td>0.295±0.152</td>
<td>0.288±0.137</td>
<td>0.288±0.143</td>
<td>0.288±0.140</td>
<td>0.157±0.120</td>
<td>0.157±0.146</td>
<td>0.157±0.165</td>
</tr>
<tr>
<td>β-Carotene</td>
<td>0.295±0.150</td>
<td>0.295±0.122</td>
<td>0.295±0.152</td>
<td>0.288±0.137</td>
<td>0.288±0.143</td>
<td>0.288±0.140</td>
<td>0.157±0.120</td>
<td>0.157±0.146</td>
<td>0.157±0.165</td>
</tr>
<tr>
<td>β-Cryptoxanthin</td>
<td>0.295±0.150</td>
<td>0.295±0.122</td>
<td>0.295±0.152</td>
<td>0.288±0.137</td>
<td>0.288±0.143</td>
<td>0.288±0.140</td>
<td>0.157±0.120</td>
<td>0.157±0.146</td>
<td>0.157±0.165</td>
</tr>
<tr>
<td>Lycopene</td>
<td>0.295±0.150</td>
<td>0.295±0.122</td>
<td>0.295±0.152</td>
<td>0.288±0.137</td>
<td>0.288±0.143</td>
<td>0.288±0.140</td>
<td>0.157±0.120</td>
<td>0.157±0.146</td>
<td>0.157±0.165</td>
</tr>
</tbody>
</table>

The linear regression results have shown that the T/C genotype of rs7501331 was significantly associated with higher α-carotene serum levels. The associations remain significant after the serum carotenoids were adjusted for total cholesterol. Also α-carotene concentration was statistically significantly different between genders with higher values in women. None of the other tested polymorphisms was significantly related to the serum carotenoid concentrations.

Conclusions. These results suggest that BCMO1 is implicated in serum concentrations of α-carotene and that genetic variants in this gene can affect blood concentrations of the above-mentioned carotenoid.

Acknowledgements. The study was supported by LITGEN Project (VP1-3.1-SMM-07-K-01-013).