Short Communication

Study on the Frequent Expression of Rodgers and Chido, Red Blood Cell Antigens, in Iranian Healthy Population


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Abstract

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Rodgers (Rg) and Chido (Ch) are blood-group antigens and they determine the fourth-component of human complement C4. Rodgers and Chido are associated with two C4 isotypes (C4A and C4B). In addition to genotype determination, study on expression of Rg and Chido could be useful in disease studies.

DNA was extracted from the whole blood of 60 normal individuals. Then, PCR amplification of C4d gene fragment was followed by restriction digestion. This study demonstrated that the frequency of Ch and Rg in Iranian healthy population was 98.3 and 93.4 percent, respectively. Additionally, 6.6 percent of the studied population showed Chido-positive, Rodger-negative and 1.7 percent showed Rodger-positive, Chido-negative genotype. It may be concluded that upon receiving blood transfusion, 6.6 and 1.7 percent of individuals could produce anti-Rg and anti-Ch antibodies, respectively.

Keywords: Blood Group Antigens, DNA Restriction Enzyme, Compliment C4

Following PCR steps were taken: initial temperature for denaturation started at 94°C for 2min, followed by 10 cycles at 94°C for 15sec, 65.4°C for 30sec, and 68°C for 1min and another 29 cycles at 94°C for 15sec, 54.7°C for 30sec, and 68°C for 1min. The program was followed by a final extension step at 72°C for 8 min. The restriction fragment length polymorphism was carried out by overnight digestion with 1U of BspL-1 enzyme (Fermentas). The restriction-digested section was analyzed by using electrophoresis on a 2% agarose gel and stained with ethidium bromide.

This study showed that the frequencies of Chido and Rodger blood group antigens were 98.3 and 93.4 percent, respectively. Approximately, 6.6 percent of the studied population showed Chido-positive, Rodger-negative genotype whereas 1.7 percent of the studied population showed Chido-negative, Rodger-positive genotype (Fig 1, Table 1).

Table 1: The frequency of Chido and Rodger blood group antigens in a healthy Iranian population

<table>
<thead>
<tr>
<th>Ch/Rg antigens</th>
<th>Ch+</th>
<th>Rg-</th>
<th>Ch+ Rg+</th>
<th>Rg- Ch+</th>
<th>Ch- Rg-</th>
<th>Ch- Rg+</th>
<th>Ch+ Rg+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>98.3</td>
<td>93.4</td>
<td>93.4</td>
<td>1.7</td>
<td>6.6</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Middleton and Crookston used inhibition techniques and found that about 97% of white donors are Ch+ (10). Longster and Giles found that anti-Rg antibody reacted with red cells of about 97% of white people, strength of red cell Rg expression was variable and the reaction with Rg+ red cells was specifically inhibited by Rg+ plasma (11). The results were obtained in this study for the frequent expression of Ch and Rg in the Iranian healthy subjects were in accordance with the mentioned studies. Regarding to the existence of ≥41 allotypes in the two classes of C4, we can use the results of this research as a preliminary study for further elucidation of Ch/Rg genetic variation in Iranian people.

In summary, the frequent expression of Rodger and Chido antigens in the studied subjects of Iran could suggest that 6.6 and 1.7 percent of the population could produce anti-Rg and -Ch antibodies respectively upon receiving blood transfusion.

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References