Frequency of Australia Antigen in Volunteer Blood-donors in Miyagi Prefecture

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The discovery of Australia (Au) antigen (Blumberg et al. 1965) and the establishment
of its association with serum hepatitis (Blumberg et al. 1970) may contribute to the epide
miological studies on the spread of hepatitis among the population (Hawkes 1970).

The antigen is quite rare in American and European populations but occurs with
intermediate frequencies in Japanese and Mediterranean population (i.e. 1~2%) and
with higher frequencies in the tropics and Southeast Asia (Blumberg et al. 1970, Okochi
et al. 1970). The present report deals with the screening result of Au antigen by means
of immunoelectrosyneresis with serum specimens obtained from blood-donors in Miyagi
Prefecture, a northern part of the Honshu Island. Sera were collected from 8,571
individuals who were living in Miyagi Prefecture and donated blood during 1970-1971,
through Japan Red Cross Blood Center of Sendai. No hepatitis outbreak was reported in
the Prefecture during this period. All sera were tested qualitatively for the presence of
Au antigen by the immunoelectrosyneresis (IES). The test revealed almost the same
detection rate as that of the complement fixation test and gave almost 2 times the
detection rate of Ouchterlony double diffusion test. For the detection of Au antigen, a
human serum from a healthy high school student (Chubachi) was used as a provisional
reference serum. So far tested, this serum has been known to react with all of the panels of
the heterogenous Au antigens which had been detected in Japan, showing the reaction of
identity with a reference antiseraum that had kindly been sent from Dr. K. Okochi. The
IES test of serum (5µl) was performed on slides layered with 1.0% agar solution in veronal
buffer of pH 8.6, with an electric strength of 15 V/cm for 30 min at room temperature
(Prince and Burke 1970).

The results obtained are summarized in Table 1, indicating the higher positive incidence
among male (1.9%) than in female (1.4%). The higher incidence was obtained with all of
the 5 age groups listed in the table. In both sexes, the highest incidence was found
among the age group of 16-20.

As the number of serum specimens examined in this study was almost 1/200 of the
number of the population in Miyagi Prefecture, geographic distribution of the Au

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TABLE 1. Sex and age distribution of Au antigen in Miyagi Prefecture

<table>
<thead>
<tr>
<th>Age</th>
<th>Number</th>
<th>Au(+)</th>
<th>%</th>
<th>Age</th>
<th>Number</th>
<th>Au(+)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16-20</td>
<td>528</td>
<td>14</td>
<td>2.6</td>
</tr>
<tr>
<td>16-20</td>
<td>1,184</td>
<td>35</td>
<td>3.0</td>
<td>21-30</td>
<td>754</td>
<td>11</td>
<td>1.5</td>
</tr>
<tr>
<td>21-30</td>
<td>2,552</td>
<td>55</td>
<td>2.2</td>
<td>31-40</td>
<td>506</td>
<td>4</td>
<td>0.8</td>
</tr>
<tr>
<td>31-40</td>
<td>1,316</td>
<td>16</td>
<td>1.2</td>
<td>Female</td>
<td>355</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>41-50</td>
<td>950</td>
<td>11</td>
<td>1.1</td>
<td>51-</td>
<td>147</td>
<td>1</td>
<td>0.7</td>
</tr>
<tr>
<td>51-</td>
<td>309</td>
<td>3</td>
<td>1.0</td>
<td>Total</td>
<td>2,290</td>
<td>35</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Fig. 1. Distribution of Au antigen in different counties of Miyagi Prefecture.

antigen positive personnel was attempted as shown in Fig. 1. Although the population size in a county is different one another, when the number of specimens collected from one county was more than 200, the positive rate was judged to be a representative value of each county. These counties illustrated as dark area (K, C and O) in Fig. 1 revealed the positive incidence higher than 3%. The difference of the Au antigen positive frequency among the populations of three districts (K: 3.0%, C: 4.6% and O: 5.4%) and general population (1.7%) were statistically significant. For the explanation of such sex difference and the difference among counties as noted in this study, serum specimens from all age groups including those of infants and children should be examined. Although such examination is under way, a preliminary result reveals higher incidence in a certain age group of a county of high incidence (K). This result together with the distribution of anti-Au among the populations in the Prefecture will be reported in the next paper.

References