Subtypes of Hepatitis B Antigen (HBAg) in Peru

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Subtypes of hepatitis B antigen (HBAg, Australia antigen) were investigated in 29
HBAg positive sera of asymptomatic carriers and hepatitis patients, living in
different areas of Peru. Ethnically, 10 of them were from Indians and 19 from
Mestizos. All of these HBAg sera were found to be subtype adw. ——— AuAg;
HBAg; subtype; hepatitis

Australia antigen [Au (1), HAA, HBAg] is considered by several investigators
to be the surface antigen of the hepatitis B virus on which several kinds of deter-
minants are expressed. Known determinants are d/y (Le Bouvier 1971) and w/r
(Bancroft et al. 1972) once thought to be mutually exclusive, in addition to a
common determinant a (Levene and Blumberg 1969), yielding four subtypes adw,
ayw, adr and ayr. Evidence is now appearing (Mazzur et al. 1974b) that deter-
minants d, y and w can be found on the same particle. Different geographical
distributions of these subtypes in various areas of the world were also established
(Feinman et al. 1973; Ishida et al. 1973; Mazzur et al. 1974a).

Mazzur et al. (1974a) reported a predominance of subtype adw in the Cash-
inhaua Indian tribe of Peru. A cooperative survey team from Japan and Peru
reported an incidence of HBAg of 1.4% among Peruvian people (Madalengoitia et
al. 1974). Further subtyping of the antigen is the purpose of this communication.

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MATERIALS AND METHODS

Serum specimens: Twenty-nine HBAg positive sera were collected from various areas of Peru. Twenty-one out of 29 were from Indians and Mestizos inhabiting the northern and middle parts of jungle and lowland areas, 3 from Mestizos in the southern highland, and 5 from Mestizos living in the city of Lima.

Subtyping: Subtyping was performed in the Clinical Research Laboratory of The Institute for Cancer Research, Philadelphia, using a micro-ouchterlony technique (Mazzur et al. 1974a). Briefly, 16 seven-hole patterns were punched into each plate forming wells 3 mm in diameter and 6 mm from center to center. Plates were filled with test materials (the center well for antibody, the 6 peripheral wells with antigen) and were incubated in a moist chamber at room temperature. Formation of precipitin bands was recorded from the wet plates in 24 and 48 hours. The plates were then washed and stained with azocarmine, and precipitin bands were again recorded. Three reference human sera were used and designated Hil, Wep and 151427. They were known to contain adw, ayw and ayw−, respectively. A chimpanzee anti-serum was used as anti-ayw. Anti-aw serum was from a hemophiliac patient (kindly supplied by Dr. Goldfield). The chimpanzee anti-ayw, as well as anti-adw, was absorbed so as to produce monospecific anti-d and anti-y reference sera.

For subtyping d and y, Hil was placed obliquely in wells 1 and 4, Wep in wells 2 and 5, and unknown samples in wells 3 and 6. Chimpanzee anti-ayw serum was placed in the center well.

For subtyping w, Hil was placed obliquely in wells 1 and 4, 151427 in wells 2 and 5, and unknown samples in wells 3 and 6. Human anti-aw serum was placed in the center well. Because we did not have anti-r serum, the absence of w implied the presence of r. The presence or absence of a spur between test serum and reference antigens dictated the subtype of the antigen in the test serum (Le Bouvier 1971; Mazzur et al. 1974a).

RESULTS AND DISCUSSION

All HBAg positive sera collected from Indians and Mestizos in various areas of Peru were subtyped with respect to their antigenic determinants, d/y and w/r. All of the 29 specimens tested were found to be subtype adw (Table 1).

Subtype adw is known to be common throughout the American Continent, including North, Central and South America (Mazzur et al. 1974a; Dodd et al. 1973). In Peru the subtype adw was found in 33 out of 35 HBAg positive sera of the Cashinahua tribe. Our results (Table 1) with HBAg collected from Peru, which included the highland and lowland areas and Lima city, are compatible with

<table>
<thead>
<tr>
<th>Race</th>
<th>Area</th>
<th>Number tested</th>
<th>Number of HBAg with following subtypes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>adw</td>
</tr>
<tr>
<td>Indians</td>
<td>Lowland</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Mestizos</td>
<td>Lowland</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Highland</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Lima City</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>29</td>
<td>29</td>
</tr>
</tbody>
</table>
what was reported within the Cashinahua tribe by Mazzur et al. (1974a). In Central America, all of the 69 HBAg sera obtained from Panama Indians were subtype adw (Peters, personal communication). Similar adw predominance was also found in Mexico (our own unpublished data). Thus, it is very likely that the distribution of subtype adw is more predominant in Central and South America.

Mazzur and his co-workers (Mazzur and Blumberg 1974; Mazzur et al. 1974a) hypothesized that the HBAg subtypes among asymptomatic carriers might be maintained mainly by maternal transmission, mothers to their children, so that the marked geographical separation of subtypes was defined. The maintenance of these subtypes may be reflected in migration history as suggested by Feinman et al. (1973). HBAg of Spaniards in Spain is known to be composed of an almost equal mixture of subtypes ad (w) and ay (w) (Pedreida et al. 1974). However, in Peru subtype adw is predominant not only among Indians but also among Mestizos, genetical hybrids of the Spanish and Indian inhabitants (Table 1). However, Mestizos are more closely related to Indians than to Spaniards because Spaniards who migrated during the 16th century make up less than 10% of the population of Peru as compared with Indians occupying 50%. Therefore, the exclusion of subtype ayw among Mestizos might have occurred in Peru since the 16th century.

On such a basis, one might ascribe the predominance of subtype adw in South and Central America to Indians, the descendants of the Protomongoloids who migrated from Asia in 20000 B.C. This is also suggested by the fact that the subtype adw is common among inhabitants of the Philippines (Mazzur et al. 1974a), who are believed to be descendants of the Protomongoloids.

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