Inadequate responses to hepatitis B vaccine occur in approximately 5–15% of neonates. Factors that influence the response to vaccination include the immunogenetic state of the vaccine recipient: carriers of the human leucocyte antigen (HLA)-B8, DR3 do not develop adequate responses to hepatitis B vaccine. To determine the importance of the immunogenetic factor for the outcome of hepatitis B vaccination in neonates, we investigated the HLA type of infants with an inadequate response to hepatitis B vaccination and analysed the subgroups non-infected low responders and infected non-responders for differences in the specific HLA type.

Between 1982 and 1991, 705 healthy newborns from HBsAg-positive mothers received HBlg at birth and were vaccinated within the first year with plasma or recombinant-DNA vaccine according to a three- or four-dose vaccination schedule. During the first year blood was assayed for HBsAg and anti-HBs titres <10 IU/l were identified; eight infants with an anti-HBs level below 10 IU/l and negative tests for HBsAg (non-infected low responders) and another eight infants who became anti-HBs negative but HBsAg-positive (infected non-responders) were identified; eight infants with an inadequate response to hepatitis B vaccination.

Table 1 shows the HLA phenotypes of the eight non-infected low responders and the eight infected non-responders to hepatitis B vaccine. HLA-DR3 was present in four of the eight (50%; 95% CI: 15–85%) non-infected low responders and in none of the eight (0%) infected non-responders. Two non-infected low responders were probably homozygous for HLA-DR3.

This study confirms that the HLA-DR3 haplotype plays a role in the low responsiveness to hepatitis B vaccination in non-infected neonates. In our study with only a small number of ethnically heterozygous individuals, all four DR3-positive children were non-infected low responders and two of them were probably homozygous for DR3. These low responders were not absolute non-responders, since all of them developed protective anti-HBs levels after hepatitis B revaccination in their second year of life. The two children homozygous for HLA-DR3 produced anti-HBs in the lowest range (45 and 55 IU/l, respectively) after revaccination in comparison to the other six revaccinated low responders (median 171, range 49–3497 IU/l). The observation that none of the eight non-responders, who became infected with hepatitis B virus, was DR3-positive suggests that HLA-associated low responsiveness is not causally related to this type of failure of hepatitis B vaccination.

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