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HLA B8 and BW15 antigens in diabetic children

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The simultaneous occurrence of HLA B8 and BW15 and B8 antigens is significantly more frequent in diabetic children than in the general population. BW15 alone shows no significant difference but may be considered as a potentiating factor. The relative risk of the manifestation of diabetes is the highest when HLA B8 and BW15 occur simultaneously. In the nearest diabetic relatives of diabetic children the occurrence of B8 and B8 and/or BW15 antigens is significantly more frequent than in the diabetic child population.

It has been observed [1] that HLA B8 antigen is significantly more frequent in diabetic children than in the general population, while HLA BW15 antigen shows no significant difference. A study was therefore made on the frequency of simultaneous occurrence of HLA B8 and BW15 antigens in insulin dependent diabetic children and in the different age groups. Further examinations were carried out to clarify the incidence of these antigens in diabetics and their nearest insulin dependent relatives (parents, brothers and sisters) as according to data in the literature a close relation might exist between the onset of diabetes and the appearance of the HLA B8 and BW15 antigens [2, 3, 5].

Material and Method

A total of 254 diabetic patients whose diabetes was diagnosed before 15 years of age and 14 diabetic children and their nearest relatives were examined. HLA antigens were typified in 8 siblings, further in 6 children and their insulin dependent diabetic parents. HLA antigen determination was carried out by the lymphocyte cytotoxicity microtest [7]. The findings were grouped according to the age at the manifestation of diabetes. Data obtained from the National Blood Service, Budapest, were used as controls. Statistical analysis was carried out according to Woolf [8].

Results

B8 antigen, and B8 + BW15 jointly differed highly significantly from those found in the healthy population (Table I). In accordance with our previous findings, in the case of BW15 antigen there was no significant difference. Compared with the controls, the frequency of B8 + BW15 antigens differed significantly in all age groups (Table II). In age groups under 5—10 years the

TABLE I

Occurrence of HLA B8 and BW15 antigens in diabetic and control children

HLA antigens	Diabetic children		P	Controls		Relative risk
	No.	per cent		No.	per cent	
B8+	78	30.70	< 0.001	57	16.19	1.89
BW15+	23	9.05	< 0.5	28	7.95	1.13
B8 + BW15	29	11.41	< 0.001	3	0.85	13.39
n	254			352		

+The number of the B8+BW15 cases has been subtracted from the number of B8 and BW15 cases

TABLE II

Presence of HLA B8 and BW15 antigens and the onset of diabetes in children

HLA antigens	Age, years						Controls	
	1—5		6—10		11—15			
	No.	per cent	No.	per cent	No.	per cent	No.	per cent
B8+	28	31.11*	31	28.9*	19	33.3*	57	16.19
BW15+	9	10.0	8	7.4	6	10.5	28	7.9
B8 + BW15	11	12.2**	14	13.0**	4	7.0**	3	0.8
n	90		107		57		352	

+The number of the B8+BW15 cases has been subtracted from the number of B8 and BW15 cases

* $P < 0.01$
** $P < 0.001$

simultaneous occurrence of B8 and BW15 antigens was higher than in the age groups over 10 years, but the difference failed to reach significance. Table III shows the data for HLA antigens in the nearest relatives in families with diabetes accumulation where the simultaneous occurrence of B8 and B8 + BW15 antigens was significantly more frequent than in the diabetic child population. (14 pairs of relatives were examined; the case number was 26, because in the case of a brother and a father the examination was unsuccessful).

TABLE III

Occurrence of HLA antigens among nearest diabetic relatives

HLA antigens	Nearest diabetic relatives	Diabetic child population	P
B8 + B8 and BW15	19	107	< 0.01
B8 and/or BW15	22	130	< 0.01
n	26	254	

DISCUSSION

The HLA antigens B8 and BW15 which are frequent in the Caucasian population, might play a role in the manifestation of juvenile diabetes by lowering the resistance of the organism. In their presence the susceptibility to viral infections increases and thus the beta-cells will be damaged with increased frequency. On the other hand, an inclination to autoimmune diseases may also induce the damage of beta-cells [6]. The significantly higher incidence of HLA B8 antigen in insulin dependent diabetes is well-known. BW15 antigen is also frequently present in juvenile diabetes but according to our own observations and those of Ludwigsson et al. [4] it shows no significant difference in diabetic children. The simultaneous presence of HLA B8 and BW15 is the greatest risk factor of the manifestation of diabetes. At the same time BW15 is also a potentiating factor. The importance of B8 antigen in the manifestation of diabetes has been supported by our finding, i.e. it is present with a statistically higher frequency in diabetic children and their insulin dependent nearest relatives even in comparison with our diabetic child population.

Diabetes mellitus being a multifactorial disease, HLA antigen positivity is only one of the factors which may influence the manifestation of diabetes. This however occurs in the majority of cases without the presence of these antigens. Their role is only to increase the risk of manifestation. This was clearly shown in our material by two cases of diabetic siblings. One each of these siblings was positive, while the other negative, for B8 antigen.

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