IgG Immune Deposits in Glomerular Lesions of Young New Zealand Black Mice

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ISHIDA, S., SASAKI, T., ONODERA, S. and YOSHINAGA, K. IgG Immune Deposits in Glomerular Lesions of Young New Zealand Black Mice. Tohoku J. exp. Med., 1980, 130 (2), 205-206 — IgG immune deposits in glomerular lesions were found in 62% of 4-week-old mice born from anti-DNA antibody positive mothers but not in the mice born from anti-DNA antibody negative ones. In the former mice anti-DNA antibody producing cells could not be detected in spite of the presence of antibody. These results indicate that maternal anti-DNA antibody might be responsible for the development of glomerular lesions in the offsprings. Renal lesions, however, was not observed in the 2- to 3-month-old mice indicating that permanent lesions were not induced by this transient maternal antibody. —— NZB mice; initial immune deposits; anti-DNA antibody

New Zealand Black (NZB) mice are well known to develop an autoimmune disease and lupus nephritis. As for the initial renal changes in NZB mice, only few reports have been published (McGiven and Lynraven 1968). Some young NZB mice were observed to have IgG, but rarely IgM, immune deposits in their glomeruli in contrast to adult NZB mice which have both IgG and IgM deposits. In order to investigate the relation of the renal deposits to the maternally transferred anti-DNA antibody, anti-DNA plaque forming cells (PFC) or histological, electron microscopic and immunofluorescent (IF) findings in the glomeruli of the offsprings born from anti-DNA antibody producing mothers were compared with those of controls (Table 1). At 1 month of age, no anti-7s-DNA-PFC was

| Table 1. Anti-DNA per spleen and immune deposits in kidney of young NZB mice |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Age (Months) | Anti-DNA-19s PFC/spleen | Anti-DNA-7s PFC/spleen | IP+ IgG IgM | Anti-DNA-19s PFC/spleen | Anti-DNA-7s PFC/spleen | IF |
| 1 | 1000 | n.d. | 5/6 | 1/8 | 1760 | n.d. | 0/5 | 0/5 |
| 2 | 1350 | n.d. | 1/6 | 0/6 | 2150 | 1050 | 1/3 | 1/3 |
| 3 | 600 | n.d. | 0/3 | 0/3 | n.d. | n.d. | 1/1 | 0/1 |
| 4 | 4925 | n.d. | 1/2 | 1/2 | 3900 | n.d. | 2/2 | 2/2 |

* The mice born from anti-DNA antibody-positive mothers. 
† The mice born from anti-DNA antibody-negative mothers. 
‡ Immunofluorescent findings in the glomeruli. 
§ Not detectable. †† Positive cases among cases examined.

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observed in either group. Anti-DNA antibody, however, was demonstrated in sera from the mice exposed to the maternal antibody early in life and IF methods revealed IgG immune deposits in the glomeruli in 62% of these mice. On the other hand, neither IgG nor IgM deposits were found in controls. Electron microscopic studies showed thickening of the glomerular basement membrane of the 4-week-old mice exposed to the maternal antibody (Fig. 1).

Fig. 1. An electron micrograph of a 4 week old mouse kidney with IgG immune deposits. Note the irregular contour of the basement membrane thickening and splitting.

IgG immune deposits were also detected in the glomeruli of C₃H/He mice whose mothers were hyperimmunized with DNA (Sasaki et al. 1977). The antibodies transferred from mother to fetus have been demonstrated to be IgG (Dray 1972). These findings suggest that maternally transferred anti-DNA antibodies might have formed the immune complex in the kidney of the offsprings. However, C-type viruses (Mellors et al. 1971), for example, may also be responsible for these lesions since one case showing IgG and IgM deposits and having no anti-DNA antibody was observed (Table 1). The deposits were rarely found in 2–3-month-old NZB mice exposed to anti-DNA antibody prenatally. These results indicate that these transient antibodies do not induce the permanent lesion (Kuriyama 1973).

References