SEROLOGICAL COMPARISON OF AVIAN PARAMYXOVIRUSES AND ANALYSIS OF ANTIGENIC DETERMINANTS OF HN GLYCOPROTEIN OF NEWCASTLE DISEASE VIRUS BY USING MONOCLONAL ANTIBODIES

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The antigenicity of avian paramyxoviruses, including Newcastle disease virus (NDV) and NDV-like strains, as well as the relationship between antigenic determinants and biological activities were examined by using five monoclonal antibodies against the hemagglutinin-neuraminidase (HN) molecule of Taka virus, which is a variant of NDV. Furthermore, the topography of the antigenic determinants reacting with the five monoclonal antibodies was also examined by using the competitive binding assay.

In cross hemagglutination inhibition (HI) test, 32 strains of NDV isolated from wild birds were classified into 5 groups. Biological activities of the five monoclonal antibodies were compared by HI, serum neutralization (SN) and hemolysis inhibition (HLI) tests, and enzyme-linked immunosorbent assay (ELISA) against Taka virus. Clones 1, 2 and 3 antibodies had the same HI titer of as high as 1 : 1024 but showed different titer values in SN, HLI and binding tests, with the highest titer in the order of clones 1, 3 and 2. Clone 4 antibody showed on SN activity and low titer values in the other tests. Clone 5 antibody showed low HI and SN titers but high HLI titer values and binding activity. However, clone 5 antibody showed high SN titer with an agar overlay medium containing the antibody. These results suggested that the five antibodies can be divided into 3 types : clones 1, 2 and 3 in the first, clone 4 in the second, and clone 5 in the third type.

In addition, an attempt to elucidate the topography of the antigenic determinants by competitve binding assay was not successful because of the differences in the binding activity of each of the clones. However, from the results of competitive binding assay and of the biological activities, it was deduced that clones 1, 2 and 3 might have recognized a similar antigenic determinant on the HN molecule, and that the antigenic determinant of clone 5 antibody showed a structural overlap with that of clone 1 antibody. Furthermore, clone 4 antibody reacted with a similar antigenic determinant of clone 5 antibody.