Binding characteristics study for dengue virus non-structural protein 1 of antigen and its antibody by using circular dichroism technique

ABSTRACT

This paper presents the binding characteristics study of dengue non-structural protein 1 (NS1) antigen and its antibody using circular dichroism technique in far UV region. Circular dichroism (CD) is a spectroscopic technique which measures differences in the absorption of left-handed and right handed circularly polarized light. The CD spectrum can determine conformation of the NS1 antigen and its antibody, conformational changes of the antigen-antibody interaction and estimates the secondary structure of these proteins in far UV region. Firstly, CD spectrum of individual solutions of the antigen and the antibody were measured. Then, the solutions were mixed to produce a solution of complex dengue NS1 antigen and its antibody for measurement. The findings show that the antibody has the highest positive band of CD intensity follow by the complex antigen-antibody and antigen. The antibody is a chiral structure, has high helical conformation and more ordered epitope structure. Meanwhile, the NS1 antigen shows the negative and the lowest CD spectrum. The antigen is low chirality and has more random-like conformation. The complex (binding of the antigen and antibody) has the CD spectrum's shape similar to the antibody but in lower intensity. So, it has helical and beta conformations lower than the antibody. The binding characteristics of the complex solutions were also studied with increased in incubation time and with varied rotation applied. It is found that the immunoreactions between the antigen and its antibody are rapid processes which do not require too long incubation time. Besides, the applied rotation can increased the immunoreaction process.