ANTIBODY DEPENDENT ENHANCEMENT IN DENGUE DISEASE: A MATHEMATICAL APPROACH

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A primary dengue infection provides protection for life against reinfection with the same serotype, but only partial protection against other serotypes. A person previously infected with dengue virus (DENV) has antibodies against this serotype for life. However, for the remaining three serotypes, immunity is lost after a short period of time and the person becomes susceptible. Generally, these antibodies remain in the body to react quickly to pathogens that already have infected. However, it seems that these antibodies are not effective against another DENV serotype. By contrast, the infection is worse. This phenomenon is called as *antibody dependent enhancement* (ADE). We propose a mathematical model of ADE in dengue infection, considering the target cells, infected cells, dengue virus and the B memory cells. We found that high proliferation parameter levels of cross-reactive antibodies increase the viral load, and even if the basic reproductive number is less than one, there exists a higher chance of a huge increase in the initially innoculated viral load.