

Dengue Virus Nonstructural-1 Protein And Its Structural Correlation To Human Integrin/Adhesin Proteins

V Wiwanitkit

Citation

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Abstract

Dengue infection is a major public health problem, yearly affecting thousands of children in the tropical countries. Although most infections present as fever, headache, chill and rash there is a severe form of dengue infection called dengue hemorrhagic fever. The mechanisms underlying severe bleeding in dengue DHF are not completely understood. Recently, it is noted that the dengue virus nonstructural-1 protein (NS1) generated antibodies to common epitopes on platelet integrin/adhesin proteins. Although the phylogenetic analysis revealed the closed phylogenetic relationship between dengue NS1 and integrin/adhesin proteins it does not mean the structural homology. Here, the author performs a structural analysis to answer the question how dengue virus NS1 protein the related to platelet integrin/adhesin relating proteins. Answering this question, the author performed a structural analysis of dengue virus NS1 and integrin/adhesin proteins. According to this study, no significant similarity in the structure of the studied protein can be detected. Therefore, the previous detected correlation between dengue virus NS1 and integrin/adhesin proteins is not supported.

INTRODUCTION

Dengue infection is a major public health problem, yearly affecting thousands of children in the Southeast Asia Region ¹. Although most infections present as fever, headache, chill and rash ^{2, 3, 4} there is a severe form of dengue infection called dengue hemorrhagic fever. In this case, the host immunological response host is the important factor in the course of disease ⁵. These responses are immune complex formation, complement activation, increase histamine release and a massive release of many cytokines into the circulation, leading to shock, vasculopathy, thrombopathy and disseminated intravascular coagulation (DIC) ⁵.

However, the mechanisms underlying severe bleeding in dengue DHF are not completely understood. Recently, Falconar proposed that the dengue virus nonstructural-1 protein (NS1) generated antibodies to common epitopes on human blood clotting and integrin/adhesin proteins on the platelet ⁶. In addition, several anti-NS1 monoclonal antibodies produced haemorrhage in mice, cross-reacted with integrin/adhesin proteins present on the platelets ⁶. Therefore, the role of NS1 as an important protein causing the unwanted immunological reaction bringing DHF is hypothesized. However, the proof on the correlation between dengue virus NS1 and platelet integrin/adhesin proteins is

needed. Here, the author performs a structural analysis to answer the question how dengue virus NS1 protein the related to platelet integrin/adhesin relating proteins. Answering this question, the author performed a structural analysis of dengue virus NS1 and integrin/adhesin proteins.

MATERIALS AND METHODS

The database Pubmed (<http://www.pubmed.com>) and ExPASY ⁷ was used for data mining of the protein sequences of dengue virus NS1 proteins (D-2VNS1) and platelet integrin/adhesin relating proteins (CD49B, CD41 and CD61). Secondary structure prediction was performed for each protein. Concerning modeling, the author performs protein secondary structure predictions of all studied proteins from its primary sequence using NNPREPDICT server⁸. The calculated secondary structures were presented and compared.

RESULTS

From searching of the databases, the sequences of D-2VNS1, CD49B, CD41 and CD61 were derived. These sequences were further predicted for secondary structure and the calculated structures were presented in Figure 1.

in causing hemorrhagic complication in dengue infection.
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Author Information

Viroj Wiwanitkit

Department of Laboratory Medicine, Faculty of Medicine, Chulalongkorn University