UNIVERSITI TEKNOLOGI MARA

IDENTIFICATION OF CHIKUNGUNYA VIRUS ENVELOPE PROTEIN THROUGH BIOINFORMATICS ANALYSIS

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ABSTRACT

Chikungunya (CHIK) is a viral disease transmitted to humans by mosquitoes bite. Symptoms of CHIK infection are very similar to dengue, but hemorrhagic or shock syndromes rarely take place with CHIK. The hallmark feature of CHIK disease is peripheral small joints pain typically persists for weeks or months. Currently no vaccine is available for this disease. Chikungunya virus envelope protein belongs to Alpha E1 glycoprotein superfamily. The protein sequence contains 440 amino acids. It is classified as hydrophobic protein and stable. Chikungunya envelope protein is found mostly on the outside of the cell. E1 glycoprotein has a hydrophobic domain that has been proposed to represent the fusion peptide of the virus to host cell membrane enabling delivery of the nucleocapsid into the cytoplasm. Highest percentage of amino acids components within chikungunya virus envelope protein are valine and alanine belong to non-polar side chains group which contain a hydrocarbon side chain. They play a role in hydrophobic interactions to determine the structure of the protein. Chikungunya virus envelope protein share high degree of similarity with other type of viruses particularly with ONN virus which belong to Alpha virus genus. In silico identification and characterization of Chikungunya virus envelope protein provide preliminary information on the structure and function of the protein. In addition, comparative modeling is becoming a useful technique in the field of bioinformatics because the knowledge of the three-dimensional structure of protein would be an invaluable aid to understand the details of a particular protein. The predicted three-dimensional model may be further used in characterizing the interest protein in wet laboratory. The methods in this study can be used to get more information about biosystem by identifying and characterization of other proteins and biomolecules.

CHAPTER 1

INTRODUCTION

1.1 Overview

Chikungunya (CHIK) is a viral disease transmitted to humans by mosquitoes bite. It was first reported from Tanzania in 1953 and spread subsequently to Africa, Asia and recently in some parts in Europe. CHIK virus is endemic (always happen) in most of sub-sahara Africa countries, India and South East Asia (Gilles Pialoux *et al.*, 2007). Cases are reported in Europe, Hong Kong, Canada, Taiwan, Sri Lanka and the USA, which are directly associated with the return of tourists from India and islands of the Indian Ocean. Moreover, a laboratory-confirmed outbreak of CHIK in North Eastern Italy was reported with more than 200 cases in September 2007 (Pardigon, 2008). Recently CHIK virus was detected in Malaysia. Until 22 November 2008 there is 3,452 cases were reported. The infection is transmitted to human through the bite of infected *Aedes* mosquitoes mainly *Aedes albopictus* and *Aedes aegypti* (Kementerian Kesihatan Malaysia, 2009).

According to Kementerian Kesihatan Malaysia (2009), symptoms of CHIK infection are very similar to dengue, but hemorrhagic or shock syndromes rarely take place with