UNIVERSITI TEKNOLOGI MARA

AMPLIFICATION OF TIM-1 GENE OF ZIKA VIRUS ENTRY RECEPTOR

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TABLE OF CONTENT

ACKNOWLEDGEMENT ..... **II**

TABLE OF CONTENT ..... **III**

LIST OF TABLES ..... **V**

LIST OF FIGURES ..... **VI**

LIST OF ABBREVIATION ..... **VIII**

ABSTRACT ..... **IX**

CHAPTER 1 ..... **1**

1.0 INTRODUCTION **1**

1.1 INTRODUCTION 1

1.2 PROBLEM STATEMENT 3

1.3 OBJECTIVES 4

1.4 HYPOTHESIS 4

CHAPTER 2 ..... **5**

2.0 LITERATURE REVIEW **5**

2.1 ZIKA VIRUS 5

2.1.1 Structure of Zika virus 5
2.1.2 History 7
2.1.3.Epidemiology 8
2.1.4.Transmission and Clinical symptoms of Zika Virus Infection 8
2.1.5 Pathogenesis of Zika virus 11
2.1.6 Diagnosis of Zika virus 12
2.2 TIM-1 GENE 14

2.2.1 Structure of TIM-1 14
2.2.2 Function of TIM-1 15
2.2.3 Relation of the Zika virus and TIM-1 15
2.3 GENE KNOCKOUT TECHNOLOGY 16

2.4 RECOMBINANT ADENO-ASSOCIATED VIRUS (RAAV) 18

2.5 POLYMERASE CHAIN REACTION 19

ABSTRACT

In 2014, the incidence of Zika virus infection increased tremendously in French Polynesia and Brazil. The cases of microcephaly in newborn child are related to Zika virus infection. It is crucial to understand the mechanism of entry of Zika virus through a receptor. There are few receptors that have been reported to be responsible in allowing the entry of Zika virus. One of it is TIM-1 gene. The purpose of this study is to amplify the homology arms of TIM-1 gene of Zika virus entry receptor. The homology arms produced can be used by future researchers to further study the gene knockout for TIM-1. By generating knockout of TIM-1 receptor, it can help to further understand the mechanism of entry of Zika virus and it may also lead to the discovery of anti-viral drugs and vaccines for Zika virus. In order to design specific primers, we used ENSEMBL software, Repeat Masker software and Primer Blast sofware. We amplified the homology arms by using Polymerase Chain Reaction. The amplicon size is 1000 base pair. We used 1.5% agarose gel electrophoresis to analyze the product. Based on the result, we successfully amplified the homology arms of TIM-1 gene. The products can be used for gene knockout study and can give better understanding on the mechanism of entry of Zika virus.

CHAPTER 1

1.0 INTRODUCTION

1.1 Introduction

Zika virus (ZIKV) is an emerging flavivirus that was first identified in Uganda in 1947. It is then later found in humans with many outbreak in Uganda, Yap Island and French Polynesia in 1952, 2007, 2013 respectively and also found in New Caledonia, Easter Island and Cook Island in 2014 (Reviewed by Gebre, Forbes, & Gebre, 2016). ZIKV is a single stranded positive ribonucleic acid (RNA) virus that has 10,974 nt genome (Fellner, 2016). It is a mosquito-borne flavivirus and the virus is transmitted to human by the bite of an infected Aedes species mosquito (*Ae. aegypti and Ae. albopictus*). Usually, these mosquitoes bite during the day and night. The virus also can be transferred by sexual intercourse with the infected person. Normally, ZIKV infection causes a mild and self-limited illness.

The symptoms are quite alike other arbovirus infections such as dengue that include fever, skin rashes, conjunctivitis, muscle and joint pain, malaise, and headache. There are many complications that arise from infection by ZIKV. An infected pregnant woman may give birth to a baby with microcephaly. ZIKV also may trigger Guillain-Barré syndrome. The outbreak in French Polynesia in 2013-2014 exposed that the cases of microcephaly in newborn child and the Guillain-Barré syndrome cases were related to ZIKV infection (Kay, Allen, Frank, Santhana, & Dye, 2016). In Malaysia, the first case of Zika virus infection reported was in Klang, where a 58-year old woman, was