UNIVERSITI TEKNOLOGI MARA

DETECTION OF HUMAN CYTOMEGALOVIRUS (HCMV) DNA IN HCMV IGM AND IGG POSITIVE SAMPLES

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DECLARATION

I hereby declare that this thesis is based on my original work. I also declare that this thesis has not been submitted previously or concurrently for any other degree students at UiTM or any other institutions.

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ABSTRACT

Human cytomegalovirus (HCMV) is a causative agent for HCMV infection that serves as the main cause of morbidity and mortality in immunocompetent individuals such as immunosuppressed recipient in solid organ transplant (SOT), immunodeficiency patients in the case of HIV and AIDS, cancer patients and infants. In Malaysia, there are few studies that are conducted focusing on the detection of HCMV diagnosis marker such as HCMV DNA among population in tertiary hospitals. Thus, in this preliminary study, the objective is to detect the presence of HCMV DNA in HCMV IgM and IgG positive samples. A total of 66 HCMV positive samples that consists of 33 IgM and IgG serum respectively, are collected from the Virology Laboratory under the Department of Pathology in HUKL. These samples are extracted according to the provided protocol by the manufactures, in order to get the purified DNA for the real time polymerase reaction (qPCR) assay. Higher concentration of HCMV DNA is detected in HCMV IgM samples with high specificity of the amplification reaction. Whereas, the HCMV DNA detection is lower in IgG samples and the specificity of the amplification reaction is also less specific. The validity and specificity of qPCR assay for both sample groups are achieved. In conclusion, HCMV DNA is detectable in serum samples using qPCR detection assay with a higher percentage (100%) of HCMV DNA concentrations are detected in the HCMV IgM positive samples but a lower percentage (79%) is seen HCMV IgG positive samples.

Keywords: *Human Cytomegalovirus*, HCMV DNA, Real-Time Polymerase Reaction, IgG, IgM.

CHAPTER 1

INTRODUCTION

1.1 STUDY BACKGROUND

Viral infection is commonly developing in immunocompetent individuals such as solid transplant recipients that are taking immunosuppressant drugs, immunodeficiency patients such as in patients that suffering from malignancy diseases or AIDS (Autoimmune Deficiency Syndrome). This is due to the weakening of their immunity that unable their immune system to fight back the infection. Thus, eventually often lead to development of others diseases or death (Cukuranovic, Ugrenovic, Jovanovic, Visnjic, & Stefanovic, 2012).

Human cytomegalovirus (HCMV) or also known as human herpes 5 is the virus that responsible for latent HCMV infection among the immunocompetent individuals such as renal transplant recipient as either primary or secondary infection, and transmitted either through blood components or kidney obtained from transplant donor that infected with CMV (Cukuranovic *et al.*, 2012). In addition to that, HCMV can also be transmitted horizontally from one host to another through direct contact with the infected body fluids such as saliva, urine, vaginal discharge or seminal fluid. This virus can also pass vertically from the placenta of a pregnant mother and form congenital infection in the infected newborn (Ss, Hayati, & Ghorbani, 2010).

Unlike the other members of Herpesviridae family, HCMV is capable of forming latent infection as primary infection; in the infected host by remain inactive for a life time at more than one location such as endothelial cells and monocytes, without showing any clinical significant. Thus, after primary infection, the infected individuals are believed to be at a very high risk to get secondary infection as the virus reactivated by external or internal factors (Jain, Duggal, & Chugh, 2011). The reactivation of HCMV is occurs through a series of chemical signaling that activate