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**EPSTEIN-BARR VIRUS (EBV) AND HUMAN HERPES 6  
(HHV-6) SEROCONVERSION PROFILES IN MALAYSIAN  
CHILDREN AND YOUNG ADULTS**

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A dissertation submitted to the Institute of Postgraduate Studies and Research,  
University of Malaya, in partial fulfillment of the requirements  
for the Degree of Master of Biotechnology

June 1999

Perpustakaan Universiti Malaya



A509545237

Institute of Postgraduate Studies and Research  
University of Malaya  
Kuala Lumpur  
Malaysia

## ABSTRACT

Epstein-Barr virus (EBV) and human herpesvirus 6 (HHV-6) are related viruses which belong to the human herpesvirus group. Infection by these two viruses in human populations are known to be ubiquitous. Seroconversion of the viruses usually happen in early life. Early life infection by EBV usually causes mild symptoms in young children. However, if primary infection of EBV is delayed until adolescent or young adult age, infectious mononucleosis may be the clinical manifestation. In HHV-6 primary infection, some cases manifest in a childhood disease named exanthem subitum. This project is aimed at providing updated EBV and HHV-6 seroconversion profiles in Malaysia.

A total of 969 sera were collected from various locations in Malaysia. Indirect immunofluorescence assay (IFA) was used to detect IgG antibodies against EBV and HHV-6. The P3HR-1 EBV-positive cell line was used as the EBV viral capsid antigen (EBV-VCA) producer. HHV-6 infected human cord blood mononuclear cells were used to produce HHV-6 antigen for IFA. IgG-VCA screening by enzyme-linked immunosorbent assay (ELISA) using an ELISA kit was also carried out on 862 sera randomly selected from the 969 sera tested by IFA. IFA was found to be the more reliable and repeatable method.

The overall seroprevalence (IgG-VCA) for EBV in Malaysia is 91.3%. Overall seroprevalence of HHV-6 is slightly lower, at 90.6%. Infection by either virus is ubiquitous in Malaysia. Primary infection by these herpesviruses happens most

frequently in early life, at the age range of 1-3 years old. Compared to EBV, HHV-6 seroconversion is earlier, most of the children aged 2 years old have seroconverted.

Since EBV seroconversion is 100% by the time the children are 9 years old, infectious mononucleosis in young Malaysian adults is not of significant concern. The present study found that both EBV and HHV-6 infections are independent of sex, race and the regions in Malaysia from where the sera were collected.

## ACKNOWLEDGMENT

I would like to express my sincere gratitude to my supervisors, Associate Professor Dr. Sam Choon Kook and Associate Professor Dr. Cheng Hwee Ming for their guidance in this project.

My sincere thanks is also extended to Dr. S. Mangalam of Department of Virology, Institute for Medical Research, Kuala Lumpur; Tunku Marinah and all technical staff of Clinical Diagnosis Laboratory, University Hospital for providing the sera.

I want to thank Professor A. Kulenthran and staff nurses of Labour Wad, University Hospital for human cord blood collection.

I am also very grateful to Dr. Chua Kaw Bing of Department of Medical Microbiology, University of Malaya for supplying the HHV-6 stock for this project.

It is also my pleasure to extend my appreciation to IRPA (Intensified Research in Priority Areas) and University of Malaya for funding this project.

To all my lab-mates, Uncle Chong, Chandrika, Padmaja, Siew Choo, Vinder and Kathy in the Institute of Postgraduate Studies & Research, University of Malaya, I do like to thank them for their assistance and moral support.

Finally, my sincere gratitude to my parents for their immense support and understanding which has enabled me to complete this thesis.

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**LIST OF ABBREVIATIONS**

%	:	percentage
<	:	less than
>	:	more than
<sup>0</sup> C	:	degree Celsius
$\chi^2$	:	Chi square
$\mu\text{g}$	:	microgramme
$\mu\text{l}$	:	microlitre
$\mu\text{m}$	:	micrometre
AIDS	:	acquired immunodeficiency syndrome
BL	:	Burkitt's lymphoma
bp	:	basepair
C	:	cytosine
CD	:	cluster designation
CDL	:	Clinical Diagnosis Laboratory
CMV	:	cytomegalovirus
CPE	:	cytopathic effect
CR	:	complement receptor
DMSO	:	dimethyl sulfoxide
DNA	:	deoxyribonucleic acid
EA	:	early antigen
EBV	:	Epstein-Barr virus

ELISA	:	enzyme-linked immunosorbent assay
ES	:	exanthem subitum
FCS	:	fetal calf serum
FITC	:	fluorescein isothiocyanate
G	:	guanine
g	:	gramme
GMT	:	geometric mean titre
Gp	:	glycoprotein
HBLV	:	human B-lymphotropic virus
HCBMC	:	human cord blood mononuclear cell
HEPES	:	N-2-Hydroxyethyl-piperazine-N <sup>1</sup> -2-ethane-sulfonic acid
HHV	:	human herpesvirus
HLA	:	human leukocyte antigen
HRP	:	horseradish peroxidase
IFA	:	immunofluorescence assay
IFN	:	interferon
Ig	:	immunoglobulin
IL	:	interleukin
IM	:	infectious mononucleosis
IMR	:	Institute For Medical Research
IR	:	internal repeat
IU/ml	:	international unit / millilitre
Kbp	:	kilobasepair

L	:	litre
mg	:	milligramme
ml	:	millilitre
mM	:	millimolar
nm	:	nanometre
NBA	:	sodium butyrate
NPC	:	nasopharyngeal carcinoma
P	:	probability
PBS	:	phosphate buffered saline
PHA	:	phytohaemagglutinin
rpm	:	revolutions per minute
TMB	:	tetramethylbenzidine
TNF	:	tumor necrosis factor
TPA	:	12-0-tetradecanoyl phorbol 13-acetate
TR	:	terminal repeat
U/ml	:	unit / millilitre
UHKL	:	University Hospital Kuala Lumpur
VCA	:	viral capsid antigen
ZEBRA	:	Z Epstein-Barr virus replication activator

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