EVALUATION OF IMMUNOGLOBULIN M ANTIBODY CAPTURE ELISA KITS FOR DIAGNOSIS OF JAPANESE ENCEPHALITIS

A

Dissertation

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Master of Science in Medical Microbiology

By

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EVALUATION OF IMMUNOGLOBULIN M ANTIBODY CAPTURE ELISA KITS FOR DIAGNOSIS OF JAPANESE ENCEPHALITIS Manoj Bhandari 2011

RECOMMENDATION

This is to certify that **Mr. Manoj Bhandari** has completed this dissertation work entitled **"Evaluation of immunoglobulin M antibody capture ELISA kits for diagnosis of Japanese encephalitis''** as a partial fulfillment of Master of Science degree in Microbiology under our supervision. This dissertation work done by Mr.Manoj Bhandari is an original research and has not been submitted to any other institute/Universities to earn any other degree.

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ABSTRACT

Japanese encephalitis (JE) is the most common cause of viral encephalitis. It is caused by the JE virus (JEV), belonging to the family flaviviridae. It is endemic in many parts of Asia, including Nepal.This study conducted at the National Public Health Laboratory, in 2010 is concerned with the evaluation of two commercially available MAC ELISA assays; the Panbio JE-Dengue IgM Combo ELISA and the XCyton ELISA developed and available for the diagnosis of the JE against the well established in house AFRIMS (Armed Forces Research Institute of Medical Sciences) ELISA. The sensivity, specificity, predictive value positive, predictive value negative and efficiency of the kits were evaluated along with percentage cross reactivity of the kits to dengue positive serum samples**.**

Two hundred fifty one serums and three hundred twenty nine CSF samples were tested using the Panbio IgM Combo ELISA and XCyton ELISA respectively. Besides a panel of samples containing 30 positive and 30 negative CSF sample was tested using the Panbio ELISA and a panel of samples containing 30 positive and 33 negative samples was tested using the XCyton ELISAThe Panbio kit had sensitivity ranging from 59-76% and the specificity ranging from 84-90 %. The XCyton kit had sensitivity ranging from 83-85% and specificity ranging from 95-100%. The efficiency of the XCyton kit was greater than the Panbio kit for any type of sample tested. The percentages cross reactivity against the dengue positive serum samples using both the kits was 4% and 32% respectively. The p values obtained were statistically significant at 5% level of significance for chi-square test. The overall sensitivity and specificity of the XCyton kit was higher than that of the Panbio kit. The Panbio kit includes antigen for both JE and Dengue and has additional advantage where both JE and dengue co-circulate.

Key words: JE, MAC ELISA, sensitivity, specificity, PVP, PVN

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LIST OF ABBREVIATIONS

ABC-	Avidin Biotin System
ACRIA-	Antibody Capture Radio Immunoassay
AES-	Acute Encephalitc Syndrome
AFRIMS-	Armed Force Research Institure Of Medical Sciences
API-	Alpha -1 Protease Inhibitor
BHK-21-	Baby Hamster Kidney
C-	Core Protein
CDC-	Centre for Disease Control and prevention
CMF-	Cardiac Myofibroblast
CNS-	Central Nervous System
COX-	Cyclooxygenases
CSF-	Cerebrospinal Fluid
Cx-	Culex
E-	Envelope Protein
HI-	Haemagglutination Inhibition
HLA-	Human leukocyte antigen
HRP-	Horse Radish Pero-Oxidase
IgG-	Imunoglobulin G
IgM-	Immunoglobulin M
IL-	Interleukin
iNOS -	Immunologic Nitric Oxide Synthetase
JE-	Japanese Encephalitis

JEV-	Japanese Encephalitis Virus
LLCMK2-	Rhesus monkey kidney epithelial cells (Macaca mulatta)
Mab-	Monoclonal Antibody
MAC-ELISA-	IgM Antibody Capture Enzyme Linked Immunosorbent Assay
MCP-1-	Monocyte chemotactic protein 1
MIF-	Macrophage Inhibiting Factor
MoHP-	Ministry Of Health and Population
MRI-	Magnetic Resonance Imaging
NADPH-	Nicotinamide Dinucleotide Phosphate Hydrogen
NO -	Nitric Oxide
NPHL-	National Public Health Laboratory
NS-	Non Structural
ORF-	Open Reading Frame
PrM-	Pre-Membrane Protein
PRNT-	Plaque Reduction Neutralization Test
RANTES-	Regulation upon Normal T-Cell Expressed and Presumably Secreted
RBCS-	Red Blood Cells
RNA-	Ribonucleic Acid
ROS-	Reactive oxygen species
RT-PCR-	Reverse Transcriptase-Polymerase Chain Reaction
SEA-	South East Asia
TNF-α-	Tumor Necrosis Factor
UTR-	Untranslated Region
WHO-	World Health Organisation