



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



HANAA ALY



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Comparative Molecular Studies on FMD Virus in Some Egyptian Governorates

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Abstract

Foot and mouth disease (FMD) is a cross-border Transmissible viral disease affecting a wide variety of animals. Egypt is under the potential risk of infection from neighboring countries with a background of the disease epidemics from 1950 till now although a comprehensive vaccination programme has been adopted. The present study aims to make a molecular comparison between foot and mouth disease virus in some Egyptian governorates, 14 FMD suspected samples were collected from diseased animals in the period from 2016 to 2019, the samples were FMD positive by Antigen detection ELISA, subjected for trials of FMDV isolation on the BHK-21 cell line, RT-PCR serotyping, and VP1 sequencing. VP1 encoding region sequencing and phylogenetic analysis were performed for some representative samples for each serotype. Antigen detection serotyping ELISA results were three samples positive for A serotypes, three for serotype O, and eight for serotype SAT2. The isolation attempt was successful for the A and O serotypes on the BHK-21 cell line. RT-PCR confirmed the ELISA results for both samples and tissue culture harvest. VP1 sequencing and phylogenetic analysis revealed that all serotype O strain belonged to topotype East Africa 3(EA-3) and were identical to each other with a percentage of 91 to 94%, while serotype A belonged to topotype Africa, lineage G-IV with 97 to 99 identity to each other, and serotype SAT2 samples were identical to each other with a percentage of 99% and were related with a percentage of 96% identity to topotype VII, Lib-12 a lineage that varies from previously recorded Egyptian Ghb-12 lineage G-VII strains.

Keywords: FMDV; ELISA; RT-PCR; Phylogenetic analysis; vaccine.

Dedication

*Every challenge work needs self-efforts as
well as the guidance of elders specially those
who were very close to our heart*

*My humble effort dedicate to my sweet and
loving*

..... My Mother's Soul,

..... My Father's Heart

..... My Twin Sister

..... My Dear Brothers

..... My Life Twin, My Wife

..... My Spirit, Mariam

*Whose affection, love, encouragement and
prays of day and night make me able to get
such success and honor*

*Along with all hardworking and respected
Teachers.*

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List of Abbreviation

Abbreviation	Meaning
aa	Amino acid
Ab	Antibodies
Ag	Antigen
AUG	Adenine-uracil-guanine
BEI	binary ethyleneimine
BHK	Baby Hamster Kidney Cell line
bp	base pair
cDNA	Complementary deoxyribonucleic acid
C-ELISA	Competitive ELISA
CFT	Complement Fixation Test
CPE	Cytopathic effect
CRE	Cis-acting replication element
DAS ELISA	Double antibody sandwich ELISA
DIVA	Differentiation between infected and vaccinated animals
Elf-4G	Eukaryotic initiation factor 4 G
ELISA	Enzyme Linked Immunosorbent Assay
FAO	Food and Agriculture Organization
FMD	Foot and Mouth Disease
FMDV	Foot and Mouth Disease Virus
GAGs	Glycosaminoglycans
G3BP	GTPase-activating protein-binding proteins
hpi	hour post-infection
IBRS	Instituto Biologico Rim Suino
ICAM	Intercellular Adhesion Molecule
IgG	Immunoglobulin-G
IFNs	Interferons
IFN- α/β	alpha/beta interferon
IRES	Internal Ribosome entry site
IRF	interferon regulatory factor
IS	Indirect Sandwich ELISA
ISGs	interferon-stimulated genes
LFD	Lateral Flow Device
LK	Lamb Kidney
LPB-ELISA	Liquid Phase Blocking ELISA
LPro	Leader Proteinase
MAB	Monoclonal Antibody
MEM	Minimal Essential Medium

Abbreviation	Meaning
MHC	major histocompatibility class
mPCR	Multiplex PCR
MSD	Monoclonal antibody – Based Sandwich direct ELISA
NCEs	Non-Coding Elements
NCRs	Non-Coding Regions
NEMO	NF- κ B essential modulator
NK	Natural Killer cell
NSPs	Non-Structural Proteins
OIE	Office International Des Epizooties
OP	Esophagopharyngeal
ORF	Opening Reading Frame
PABD	Poly A Binding Protein
PBT	Primary Bovine Thyroid
PBS	Phosphate Buffer Saline
PCP-FMD	Progressive Control Pathway for FMD
PCR	Polymerase Chain Reaction
PH	Potential of Hydrogen
PI	Percentage Inhibition
PKR	RNA-dependent protein kinase
PTB	Polypyrimidine tract binding protein
RGD	Argenin – Gyan – Aspartic
RLRs	RIG-I like receptors
RNA	Ribonucleic Acid
RT-PCR	Reverse Transcriptase Polymerase Chain Reaction
RT-RPA	Real-time reverse transcription-recombinase polymerase amplification
SAT	South African Territories
SG	Stress Granule
SNT	Serum Neutralization Test
SPC ELISA	Solid Phase Competitive ELISA
SPs	Structural Proteins
TCID	Tissue culture infection dose
UTR	Untranslated region
UV Light	Ultra Violet Light
VNT	Virus Neutralization Test
VP1	Virus Protein
WRL	World Reference laboratory
μ L	Microliter