



Cairo University



Faculty of Veterinary Medicine  
Department Of Virology

# **A Trial for Preparation of Mucosal Vaccine for Foot and Mouth Disease Virus**

**A Thesis Submitted By**

**Manar Essam Mohamed Khalifa**

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M.V.Sc.  
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**Under Supervision of**

**Prof .Dr. Hussein Ali Hussein Ahmed**

**Professor of Virology**

**Faculty of Veterinary Medicine, Cairo University**

**Dr. Ayman Hany El Deeb**

Lecturer at Virology Department  
Faculty of Veterinary Medicine  
Cairo University

**Prof. Dr. Sayed Zeidan**

Chief Researcher at veterinary serum  
and vaccine research institute

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**Cairo University**

**Faculty of Veterinary Medicine**

**Department of Virology**

**Name: ManarEssam Mohamed Khalifa**

**Nationality: Egyptian**

**Date and place of birth: 1/10/1990, Egypt**

**Under Supervision of:**

**Prof. Dr. Hussein AlyHussein. Professor of Virology, Faculty of Veterinary Medicine, Cairo University.**

**Dr. Ayman.H.El Deeb.Lecturer at Virology department, Faculty of Veterinary Medicine ,Cairo University.**

**Prof. Dr. SayedZeidan .Chief Researcher at Veterinary serum and vaccine research institute.**

**Thesis Title:A trial for preparation of mucosal vaccine for Foot and Mouth Disease Virus.**

#### ABSTRACT

Mucosal vaccines for foot and mouth disease virus are expected to block viral entry, thus, limiting (FMDV) spread in the cattle herd. Immunization strategy based on both mucosal and systemic immunity platforms is greatly needed to control FMD. In this study, several immunization strategies, using two foot and mouth disease vaccine formulations, including Montanide ISA 206 oil - based FMD inactivated vaccine and Montanide IMS 1313 VG N PR - based concentrated semi-purified FMD mucosal vaccine were applied. Results of intra nasal immunization with the prepared FMD mucosal vaccine given, once or twice, induced IgA levels in both nasal and salivary secretions besides a high response of lymphocyte proliferation with protection levels reaching 20% and 40%, respectively, in a challenge trial in cattle. Prime boost strategy based on the administration of mucosal vaccine followed by inactivated vaccine appeared to be the most potent strategy, achieving 100% protection against an FMDV challenge. Indeed, the study reports the efficacy of the prepared IMS 1313 FMD mucosal vaccine and the possible use of this vaccine in the context of different vaccination strategies to control FMDV.

**Keywords:**FMDV; mucosal vaccine; immunization strategy; prime boost.

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## List of Abbreviation

<b>AEI</b>	Acetyl ethylene imine
<b>APCS</b>	Antigen presenting cells
<b>BEI.</b>	binary ethylene imine
<b>BHK 21</b>	Baby hamster kidney cells
<b>BID<sub>50</sub></b>	Bovine infective dose fifty
<b>CPE.</b>	Cyto-pathic effect
<b>DNA</b>	Deoxyribonucleic acid.
<b>DDW</b>	Double Distilled water
<b>ELISA</b>	Enzyme linked immunosorbent assay.
<b>FMDV</b>	Foot and mouth disease virus
<b>IL</b>	Interleukine
<b>IRES</b>	Internal ribosome entry site
<b>IgA</b>	Immunoglobulin A
<b>IgG</b>	Immunoglobulin G
<b>I.U</b>	International unit
<b>I/N</b>	Intranasal.
<b>KDa</b>	Kilo dslton
<b>L pro</b>	Leader protein
<b>MALT</b>	Mucosal associated lymphoid tissue
<b>MEM</b>	Minimal essential medium
<b>M cells</b>	Micro-fold cells
<b>Min</b>	Minutes
<b>µl</b>	Micro liter.
<b>mg</b>	miligram

<b>mRNA</b>	Messenger RNA.
<b>NALT</b>	Nasopharynx Associated lymphoid tissue
<b>Nm</b>	Nanometer
<b>NSP</b>	Non structural proteins
<b>OIE</b>	Office des epizootic international (World Animal health organization).
<b>O.D</b>	Optical density
<b>PBS</b>	Phosphate buffer saline
<b>PEG</b>	Poly etyhlene glycol
<b>pH</b>	Hydrogen Ion Concentration.
<b>PBMC</b>	Peripheral blood mononuclear cells
<b>PD<sub>50</sub></b>	Protective dose fifty
<b>PI</b>	Proliferative indec
<b>RNA</b>	Ribonucleic acid.
<b>RPM</b>	Round per Minute.
<b>RPMI</b>	Roswer park Memorial Institute
<b>S</b>	Svedberg unit
<b>SD</b>	Standard deviation
<b>S/C</b>	Subcutaneous.
<b>SNT</b>	serum neutralization test
<b>ss</b>	Single stranded.
<b>TCID<sub>50</sub></b>	Tiissue culture infective dose fifty
<b>UTR</b>	Un translated region
<b>VNT</b>	Virus Neutralization Test
<b>VP</b>	Viral protein

<b>VSVRI</b>	Veterinary Serum and Vaccine Research Institute
<b>TIRS</b>	Tol like receptors
<b>UV</b>	Ultraviolet