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Virological and Molecular Studies on Peste Des Petits Ruminants Virus (PPRV) in Small ruminants and Camel in Some Egyptian Governorates

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LIST OF CONTENTS

LIST OF TABLES

LIST OF PHOTOS AND FIGURES

SUMMARY

CONCLUSIONS AND RECOMMENDATION

The data obtained from this study revealed that:

1. PPRV is still circulating widely in Egypt leading to outbreaks in its major host (small ruminants) and extended to other Egyptian governorates causing severe economic losses.
2. Exclusion of the circulation of the PPRV in camel which needs more future studies using more recent and accurate tests to confirm the outcome of this study especially that PPRV has been detected and isolated from camel population in neighboring countries which are the source of imported camels to Egypt.
3. Strict quarantine measures of imported animals particularly from other countries where the disease is endemic.
4. There is a rise need for development of DIVA diagnostics or marker vaccines to differentiate between antibodies induced due to the wild-type and vaccine strain PPR viruses. Strict quarantine measures of imported animals particularly from other countries where the disease is endemic.
5. Egyptian veterinary medical authorities should apply mass vaccination program according to OIE/FAO global pathway for PPR eradication with a plan for covering all governorates to protect high susceptible animals from infection .Consequently this study provided that PPRV isolate for future purposes.

CONCLUSION

6. SUMMARY

PPR is an acute highly contagious pneumoenteric transboundary viral disease specific to small ruminants manifested by fever, respiratory and intestinal signs. PPRV has been classified in order *Mononegavirales* family *Paramyxoviridae* subfamily *Orthoparamyxovirinae* genus *Morbillivirus*. PPRV is linear non-segmented, single stranded, negative sense RNA virus. PPRV shedding occurs in all secretions and excretions of all diseased animals as nasal and ocular discharges and diarrhea fluids and transmitted through close contact between diseased and susceptible animals mainly through aerosols contaminated with virus. Egypt was exposed to high risk of PPR spread according to PPRV history in Africa and small ruminant animal trade between Egypt and neighboring countries including Sudan.

During 2017–2018, several PPR outbreaks, involved mainly goats and to lesser extent sheep were reported in different governorates of the Egypt including ElSharkia, Marsa matrouh and Kafr El-sheikh. A total number of 33 samples were collected during these outbreaks. The samples were obtained from different farms in three governorates of Egypt (ElSharkyia, Marsa-matrouh, Kafr El-Sheikh)from 33 small ruminant animals (14 sheep and 19goats) showed signs of the disease with severe symptoms in goats than sheep.The samples include 16 swabs (10nasal,2rectal,3oral,1occular),5buffy coat samples,2 tissue

samples(lung tissue and intestinal mucosa tissue from necropised goat) and 10 serum samples.

After preparation of swabs, buffy coats and tissue samples collected from small ruminant animals .These samples were later examined for demonstration of PPR antigen using IC-ELISA and there were 16 PPRV antigen positive samples including; 3 positive buffy coat samples,5 positive nasal swab samples,4 positive oral samples,2 positive rectal swab, 1 positive ocular swabs and 1 positive tissue sample(Intestine from necropised goat).The antigen positive tissue sample was furtherly examined using rRT-PCR for molecular identification of PPRV RNA and tested positive.

For further identification, PPRV was isolated from field tissue sample on Vero cells obtained from AHRI, Egypt, after PPR viral antigen has been detected by rapid IC-ELISA and rRT-PCR. The study revealed that the inoculation, isolation and propagation of PPR virus on Vero cells was successful after three successive blind passages of one antigen positive tissue sample . Antigen positive tissue sample was isolated on vero cells and after 3 successive blind passages, remarkable CPE was observed at the 5^{th}, 4^{th}, 3^{rd} dpi respectively. The Vero cells tissue culture PPRV isolate was confirmed by rRT-PCR. For demonstration of PPRV antibodies, serum samples were subjected to C-ELISA which revealed an overall antibodies sero-prevalence of 8 samples (80%) collected from sheep and goats. This is in accordance with previous studies in Sudan that demonstrated a higher overall antibodies sero-prevalence of

80.9% among both sheep and goats.Goat sera yielded the higher antibodies seroprevalence 3 samples(100%) compared to a lower seroprevalence obtained from sheep sera 5(71.4%) out of 7.

Recently camels have been reported to play a role in circulation and dissemination of PPRV.To investigate PPRV infection in Egyptian camels, during 2017-2018, a total number of 103 samples were collected from camels in four different governorates Cairo,Giza, Sharkiya and Red sea. These samples include; 83 serum samples and 10 nasal swabs collected from apparently healthy camels, while 10 pneumonic lung tissue samples were collected post slaughtering at abattoirs (Aslogy-Zagazig &Mumtaz-Cairo). The nasal swabs and tissue sample were tested with IC-ELISA for identification of PPRV antigen and all samples of camel were negative.Serum samples were subjected to IC-ELISA to determine the presence of antibodies against PPRV and all camel sera were demonstrated to be negative.

The data obtained from this study revealed that PPR is still circulating in Egypt leading to outbreaks in its major host (small ruminants). Effective PPR vaccination program is recommended to be applied regularly in Egypt to protect the animals exposed to high risk of PPRV infection.While, PPRV antigen or antibdoies have not been identified in camel which may exclude camel from the probapility of circulation of PPRV which requires more studies on PPRV in camels especially that PPRV was reported and identified recently in camels in neighbouring countries (Sudan and Ethiopia)..