

Australian Centre for Disease Preparedness FMD Activities

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Picture courtesy: Manda



SEACFMD-FAO Regional Experts Group

- Preparation of protocols for sample collection (nasal and oral swabs, probang samples)
- Preparation of an algorithm for genomic identification and characterisation of FMD viruses in SEA and China



RRL Pak Chong and NIAH

- Validation of protocols for reduction of AgPath Reagent Used in FMDV Multiplex Real-Time TaqMan Assay (0.6X, total volume 15 μ L)
- There was a need to reduce the volume of the reactions as a cost saving investigation
- Under the quality system, this had to be validated to ensure there is no loss in Se and Sp
- RRL Pak Chong kindly agreed to facilitate the live virus lab work



Reduced volume qRT-PCR assay

• Limit of detection test

- Strong positive
- Moderate positive

Limit of detection approx. 100 copy numbers for both assays

Copy numbers/ml	Strong Positive Sample					
	1X Reaction Mix			0.6X Reaction Mix		
	R1	R2	R3	R1	R2	R3
1.56E+07	19.09	19.20	19.09	18.34	18.24	18.32
1.56E+06	24.18	24.14	24.19	23.49	23.49	23.46
1.56E+05	27.02	26.98	27.02	26.30	26.36	26.36
1.56E+04	29.00	29.00	29.01	28.31	28.31	28.38
1.56E+03	31.47	31.62	31.50	31.04	30.97	31.10
1.56E+02	33.59	33.10	33.40	33.18	33.25	33.08
1.56E+01	45.00	45.00	34.98	45.00	34.22	34.47

Copy numbers/ml	Moderate Positive Sample					
	1X Reaction Mix			0.6X Reaction Mix		
	R1	R2	R3	R1	R2	R3
2.98E+04	27.57	27.53	27.56	27.05	27.08	27.02
2.98E+03	30.81	30.85	30.84	30.59	30.59	30.51
2.98E+02	32.13	32.14	32.05	31.92	31.78	31.64
2.98E+01	35.23	45.00	34.28	34.54	35.47	34.79

- The assay with reduced volume (0.6x)
 - Was comparable to the standard 1.0x assay
 - Showed no loss in sensitivity
 - Helps reduce the reagent volume by 40% (we can do 16,666 reactions with the same testing budget supplied for 10,000 reactions)

Capacity building

- Capacity building in Lao PDR, Myanmar, Vietnam and RRL-Pak Chong
- Sero surveillance for FMD in goats, Lao PDR 2017-2018 (Manuscript under review)
- Projects impacted due to COVID-19
 - Characterisation of FMDV isolates against commercial vaccine strains
 - NGS analysis and development and validation of real-time serotyping assays

Inactivation of FMD virus in tissue samples

- FMDV in swabs are inactivated at high rate by inactivation buffers
- Little is known about virus inactivation rates in tissue samples
- Collaboration with FLI – evaluate inactivation of serotype O and A viruses in tongue epithelium
 - RNAlater
 - RNAShield
- Conclusion: RNA well preserved with both buffers, but long time to reach sufficient inactivation undesirable
- Manuscript published (Horsington et al 2019)
- Further work ongoing

FMD inactivation kinetics

- Studying the inactivation kinetics of FMD under different temperatures and humidity conditions
 - Three temperature (Temp) conditions – 10, 20 & 30°C
 - Three Relative Humidity (RH) conditions – 80, 60 & 40%
- Virus survival was significantly impacted by increasing temperatures, whereas changes in relative humidity appeared to have less effect
- Continue with this work using different viruses from more serotypes
- Analysis of the data is ongoing and completion of the project was hampered by COVID-19 due to travel restrictions

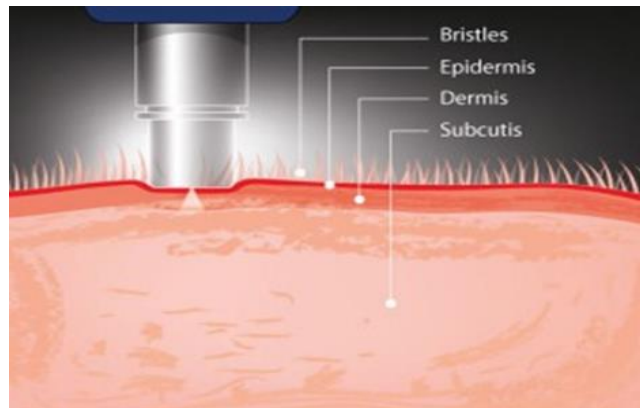
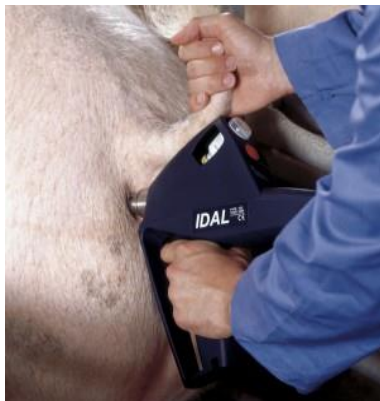


Vaccine efficacy studies

- Vaccine efficacy studies using serotype A vaccines (A Malaysia 97 and A-GVII vaccines) – a collaboration between CSIRO, WVBR and PI
- A Malaysia 97 vaccine cross-protected cattle challenged with an A-GVII virus of Iranian origin
- However, a newly developed G-VII vaccine did not offer cross-protection when cattle were challenged with an A IRAN-05 lineage virus
- Therefore, it was concluded that G-VII vaccine strain cannot replace A IRAN-05 lineage vaccine strain

Vaccine efficacy studies

- The **IntraDermal Application of Liquid (IDAL)** device
 - Uses high pressure air to force the vaccine to the skin dermis
- IDL at full dose performed similarly to IM vaccination using ISA206 adjuvant
- The study showed that the IDAL device is a promising alternative to over IM vaccination





Summary

- CSIRO remains committed to work with our partners in SEA to improve FMD control
- Once travel restrictions are lifted, we will plan future visits to the region
- In collaboration with GFRA, EUFMD, SEACFMD and FAO we are planning a virtual scientific FMD conference in December 2020
 - Anybody interested to assist please contact us*

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