Establishment and application of the diagnostic technology system for foot-and-mouth disease

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Manila, Philippines

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02 **WOAH-Recommended Diagnostic Technical System**
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04 **Rapid Response: SAT1 Detection & Immune Assessment**
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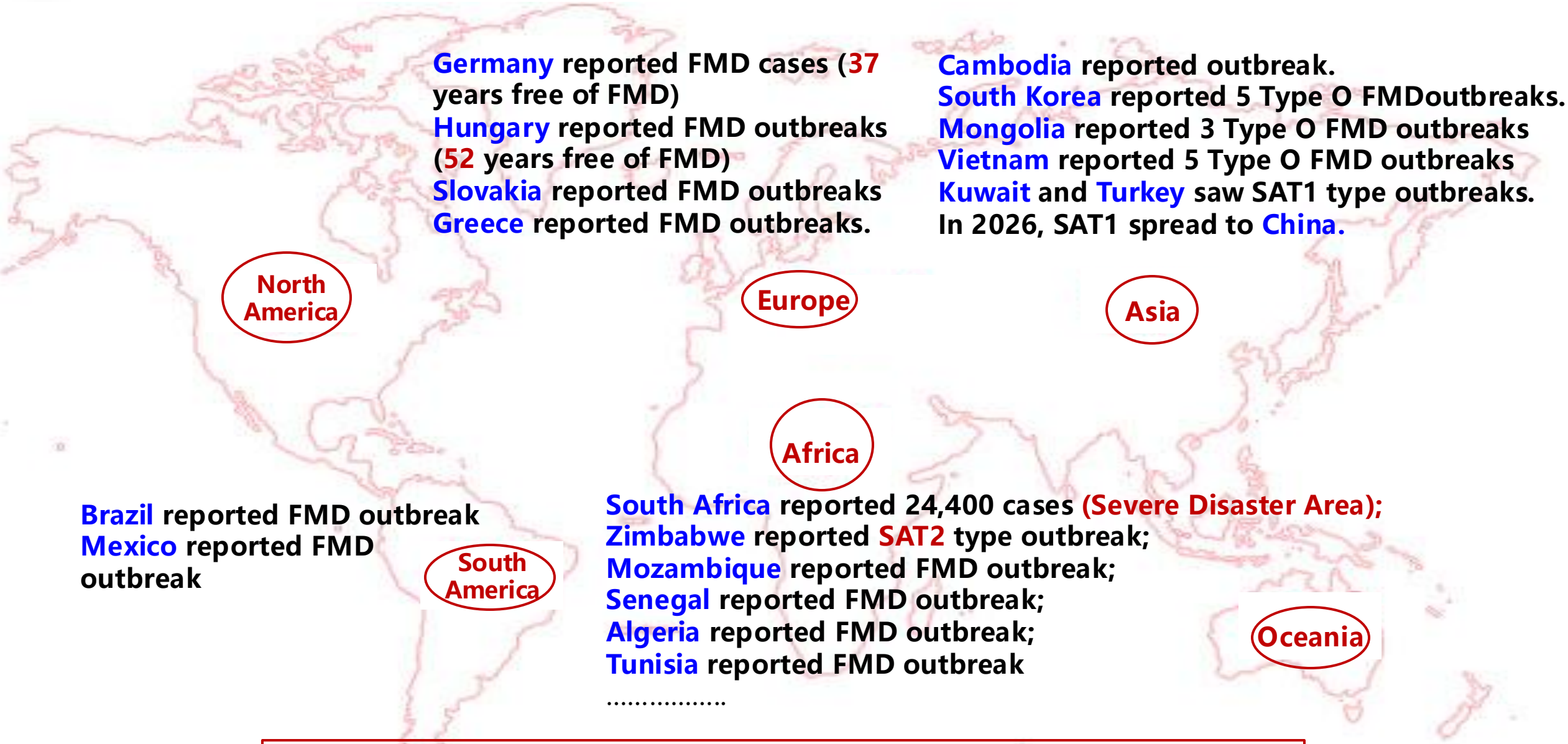
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Severe Global FMD Outbreaks 2025–2026: High Transboundary Risks



Germany reported FMD cases (**37** years free of FMD)
Hungary reported FMD outbreaks (**52** years free of FMD)
Slovakia reported FMD outbreaks
Greece reported FMD outbreaks.

Cambodia reported outbreak.
South Korea reported 5 Type O FMDoutbreaks.
Mongolia reported 3 Type O FMD outbreaks
Vietnam reported 5 Type O FMD outbreaks
Kuwait and **Turkey** saw SAT1 type outbreaks.
In 2026, SAT1 spread to **China.**

Brazil reported FMD outbreak
Mexico reported FMD outbreak

South Africa reported 24,400 cases **(Severe Disaster Area);**
Zimbabwe reported **SAT2** type outbreak;
Mozambique reported FMD outbreak;
Senegal reported FMD outbreak;
Algeria reported FMD outbreak;
Tunisia reported FMD outbreak
……

Source: Global Animal Disease Updates (2025–2026) & https://wahis.woah.org/

Significance of Constructing a Precision Diagnostic Technology System



Rapid Detection and Confirmatory Diagnosis

During the early stage of an outbreak, rapid and accurate diagnosis is essential for implementing timely control measures, including isolation, movement restriction, and stamping-out, thereby preventing further disease spread.

Epidemiological Investigation and Traceback

Molecular diagnostic analyses of viral genetic characteristics enable source tracing and transmission-chain reconstruction, providing scientific evidence for targeted and precise control strategies.

Evaluation of Immune Efficacy

Serological testing enables scientific assessment of post-vaccination immune responses, determination of population immunity coverage, and maintenance of adequate herd protection.

FMD-Free Status Certification

Following outbreak control, continuous surveillance and diagnostic evidence demonstrating the absence of viral circulation are prerequisites for resuming international trade and regaining FMD-free status.

Differentiation of Infected from Vaccinated Animals

Accurate discrimination between field virus infection and vaccinated animals provides critical technical support for implementing vaccination-and-elimination strategies while balancing disease control and production needs.

Differences in Detection Indicators between Natural Infection and Vaccination

Natural Infection

Viral load: High viral loads during early infection, prolonged virus shedding, and potential transmission risk.

Clinical signs: Typically associated with vesicles, fever, depression, and other characteristic pathological manifestations.

Antibody response: Strong IgM peak; IgG rises rapidly and subsequently declines relatively quickly.

NSP antibodies: Become detectable 7–14 days after infection and persist for months to years.

Immune memory: Establishment of long-term protective immune memory.

Vaccine Immunity

Viral load: **No viremia, no virus shedding, and no transmission risk**.

Clinical signs: No pathological signs after vaccination; animal health remains unaffected.

Antibody response: Low and transient IgM peak; gradual and stable IgG increase.

NSP antibodies: **Remain negative throughout — the gold standard for DIVA diagnosis**.

Immune memory: Robust, long-term protective immunological memory can be elicited.

Implication: Vaccination delivers full protection safely**. NSP antibodies distinguish infected from vaccinated animals (DIVA gold standard)**

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WOAH International Standardised Diagnostic Technology System

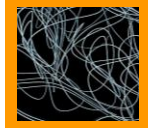
Method	Purpose					
	Population freedom from infection	Individual animal freedom from infection prior to movement	Contribute to eradication policies	Confirmation of clinical cases	Prevalence of infection – surveillance	Immune status in individual animals or populations post-vaccination
Detection and identification of the agent						
Virus isolation	–	+	+++	+++	–	–
Antigen detection ELISA	–	–	+++	+++	–	–
CFT	–	–	+	+	–	–
LFD	–	–	+++	+++	–	–
Real-time RT-PCR	+	+	+++	+++	+	–
RT-PCR	+	+	+++	+++	+	–
Detection of immune response						
NSP Ab ELISA	+++	++	+++	+++	+++	–
SP Ab ELISA(b)	++	++	+++	+++	++	+++
VNT(b)	++	++	+++	+++	++	+++
AGID(b)	+	+	+	+	+	–

WOAH. (2024). In *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals.*
Available from: https://www.woah.org/fileadmin/Home/eng/Health_standards/tahm/3.01.08_FMD.pdf

Limitations of Current Diagnostic Technologies

High cost limits wide clinical deployment

Imported diagnostic kits cost around ¥15,000 each, unaffordable for low-income endemic regions and limiting large-scale regular surveillance.

 SAT detection kits exhibit prominent cross-reactivity

Current reagents lack full SAT serotype coverage, suffer cross-reactivity and low usability, unsuitable for local detection & tracing.

 Complicated workflows & long turnaround times

LPBE, VNT and other assays are lengthy and complicated. They demand advanced instruments, cold-chain reagents and skilled staff, and cannot be widely used at grassroots labs.

Key takeaway: '**Low cost, broad-spectrum, portable, and high stability**' are the core requirements for future global FMDV detection.。

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FMD Diagnostic Technology System in China

1、Antigen detection technologies

- Molecular biology methods (qPCR/RT-PCR)
- Double-antibody sandwich ELISA
- Immunochromatographic test strips

2、Antibody detection technologies

Structural protein antibody detection (for immune efficacy evaluation)

- Liquid-phase blocking ELISA
- Solid-phase competition ELISA
- Immunochromatographic test strips

Non-structural protein antibody detection (for differentiating infection from vaccination)

- Blocking ELISA
- Chemiluminescence immunoassay
- Immunochromatographic test strips





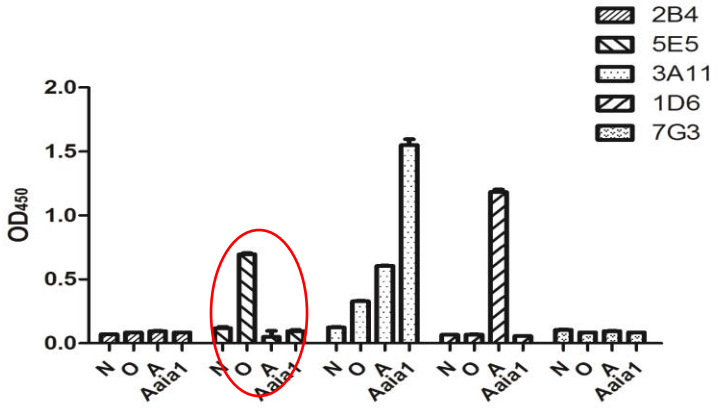


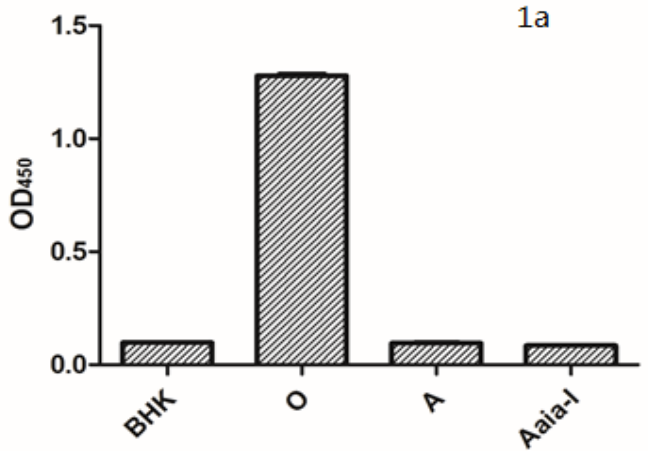




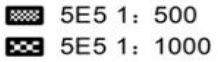
CHINA has built a **comprehensive**, **full-spectrum** FMD diagnostic system that supports pathogen detection, vaccine efficacy evaluation and infection differentiation to meet diverse clinical and surveillance demands.

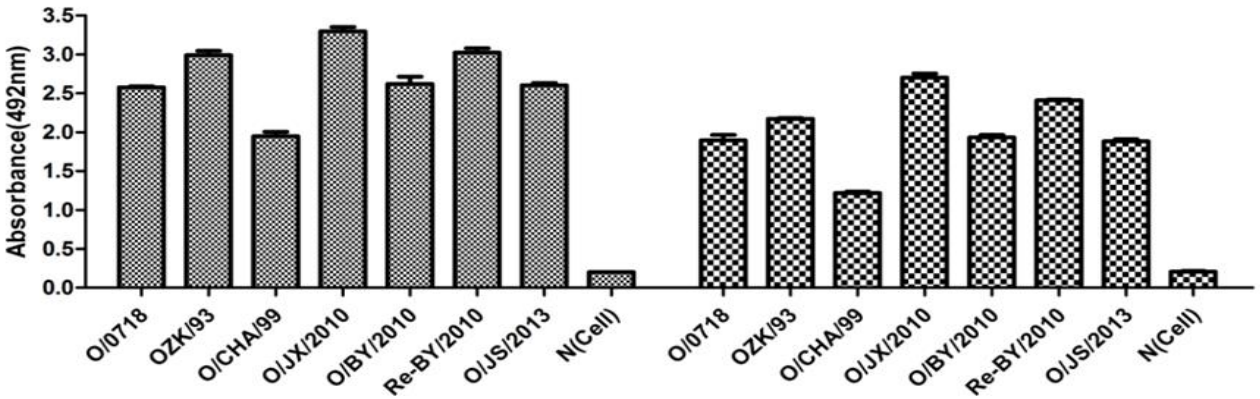
FMD solid-phase competition ELISA: serotyping and titer determination （O,A,Asia,SAT1 and SAT2）.





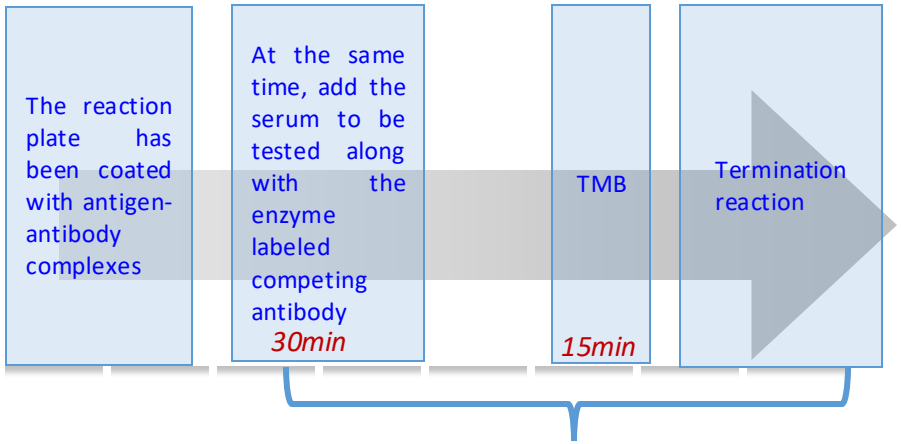
Good specificity: no cross-reaction between serotypes





Broad response spectrum: serotype-specific, reacts well with both historical and circulating strains





Test completes within **45** minutes

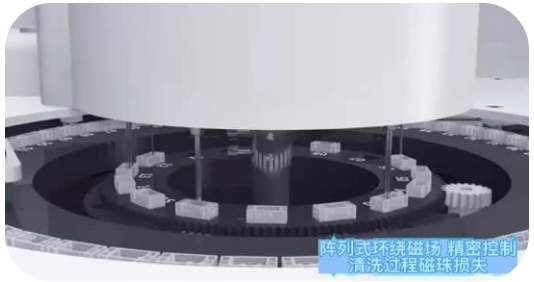
Chemiluminescent antibody assay: high-throughput, rapid differential detection of infection and vaccination（3ABC and SP）

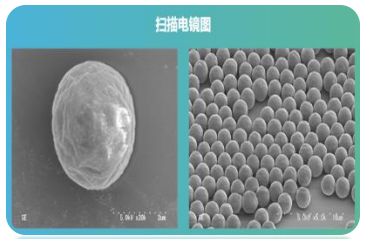

试剂


样本


检测


报告





稀释倍数	ELISA(IDEXX)		CLIA（本试剂盒）	
	OD	OD（N）/OD（样本）	RLU	RLU(1：2)/RLU(样本)
N	2.369	1.00	4164	**827.77**
1:2048	2.59	0.91	15995	**215.50**
1:1024	2.429	0.98	26250	**131.31**
1:512	2.308	1.03	54348	63.42
1:256	1.48	1.60	94673	36.41
1:128	2.086	1.14	170371	20.23
1:64	1.892	1.25	359122	9.60
1:32	1.611	1.47	701881	4.91
1:16	1.24	1.91	1142169	3.02
1:8	0.904	2.62	1790977	1.92
1:4	0.597	3.97	2747217	1.25
1:2	0.429	5.52	3446847	1.00





Fully automated, simple operation

Multiplex testing

short on time
5~15min

Advantages of CLIA Technology

01 Fully automated, simple operation

02 short on time 5~15min

03 Wide linear range and high sensitivity

04 Multiplex testing

05 Precise quantification

06 Excellent repeatability

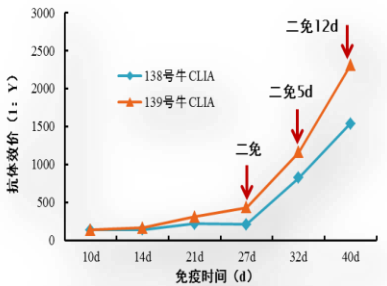
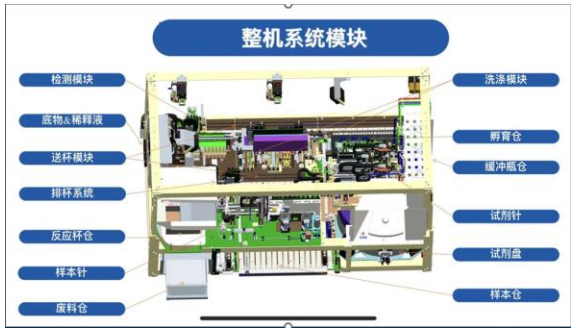


图1 口蹄疫病毒A型不同免疫阶段抗体效价监测（CLIA）

Precise quantification

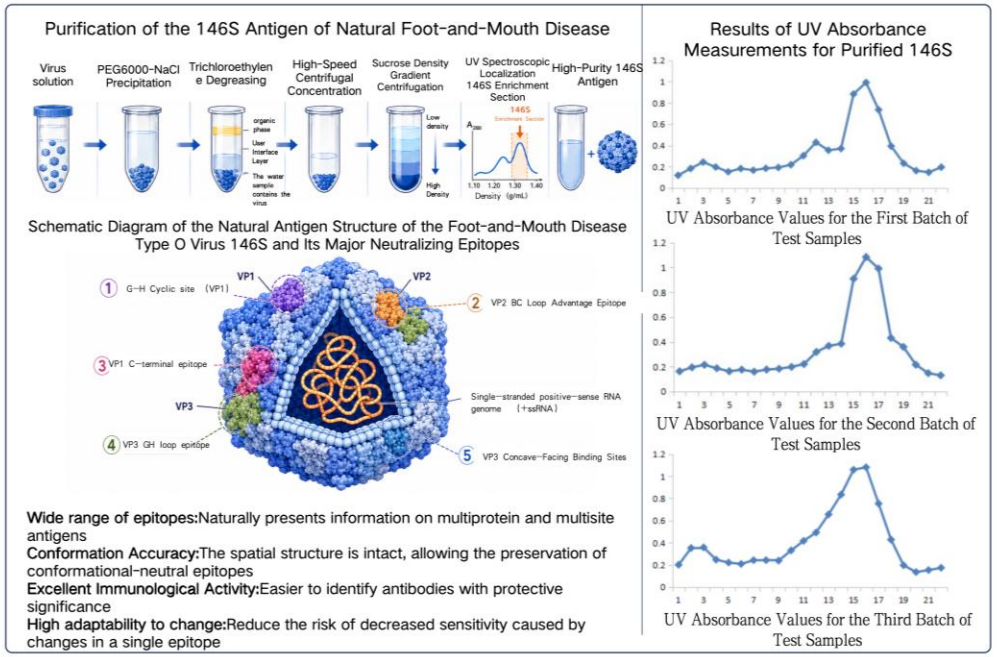
Excellent repeatability

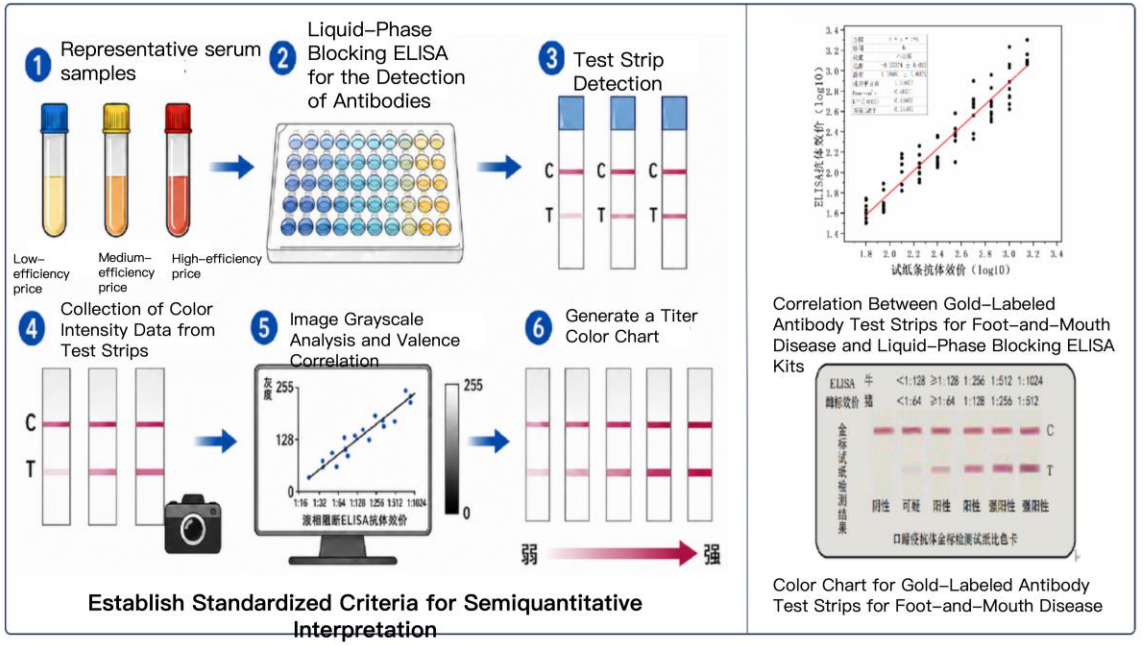


Wide linear range and high sensitivity

Antibody Testing with Test Strips: Convenient, Semi-Quantitative Testing(3ABC and SP)







This study overcame bottlenecks in 146S antigen purification and labeling. The developed colloidal gold strip detects intact FMD virions, realizing rapid field diagnosis and immune efficacy assessment.

Advantages of China’s FMD Testing System





【System Enhancement: Full-Scenario Diagnostic Coverage】

- **Additional rapid on-site testing technology:** 10–20 min on-site detection, supporting rapid screening at grassroots units and ports of entry.
- **Addition of a High-Throughput Automated Platform:** High-throughput, precise quantitative detection for large-scale epidemic surveillance.
- **Supplementing the Multi-Level Integrated System:** Built a three-tier FMD testing network with unified national standards, realizing closed-loop and efficient epidemic prevention and control



【Performance Upgrade: Leaps in Efficiency and Detection Performance】

- **Improved Testing Speed:** Screening duration is cut from hours/days (WOAH standard) to 10–20 minutes, greatly accelerating field testing
- **Increased Testing Throughput:** After optimizing the automation platform, the efficiency of batch sample processing increased by 4 to 8 times.
- **Improved Ease of Use:** POCT does not require large-scale equipment, which significantly lowers the barrier to testing at the grassroots level.
- **Improved Cost-Effectiveness:** Domestic kits achieve a 32.6% price reduction vs. imported WOAH-certified reagents, occupying >80% market share with superior cost-performance.

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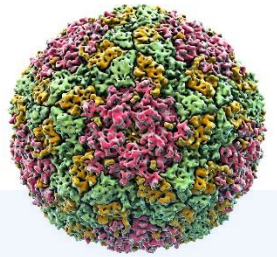
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Cross-border Introduction of SAT1 FMD in March 2026



01 Context of the Outbreak: First Cross-Border Spread of the African Variant

In March 2026, Africa-prevalent SAT1 FMD invaded Xinjiang and Gansu borderlands. Its high transmissibility and wide host range threatened livestock and biosecurity and initiated emergency response

02 Scientific Research Breakthrough: Precise Traceability Achieved in 72 Hours

LVRI initiated emergency work. Within 72 hours, researchers completed virus isolation, genome sequencing and strain analysis, defined its origin and molecular characteristics, and provided vital scientific basis for national risk assessment and control measures.

03 Technology Transfer: Rapid Industrialization of Emergency Test Kits

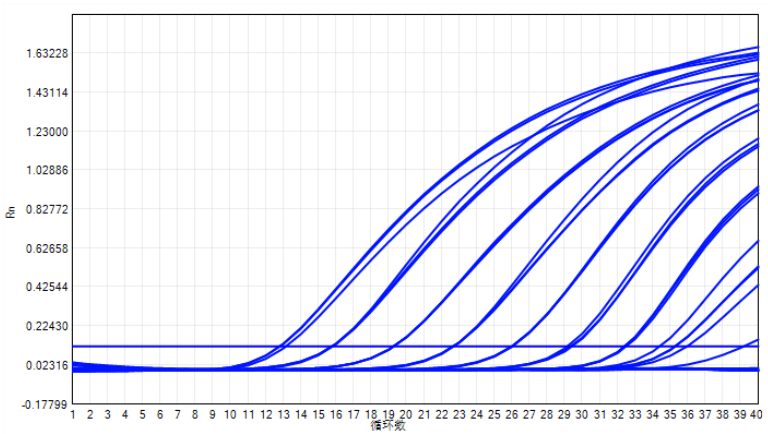
Drawing on LVRI's research achievements, the company rapidly developed an SAT1-targeted fluorescent PCR kit within one week post-outbreak. It achieved seamless lab-to-commercial translation and supported frontline emergency quarantine screening

04 Proven in Practice: Building a Closed-Loop, Full-Chain Prevention and Control System

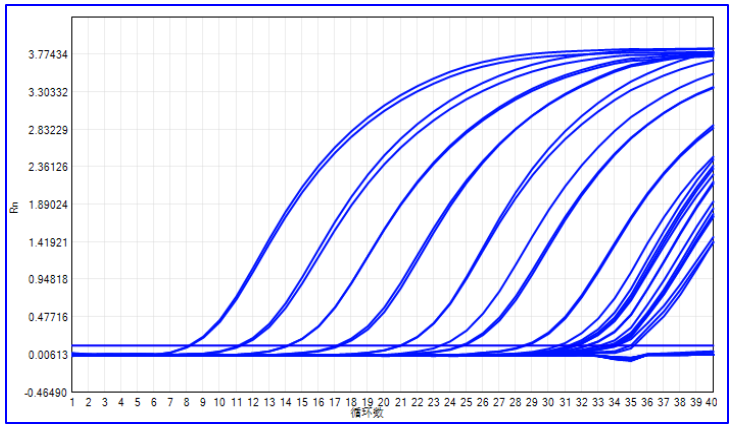
The incident validates China's complete emergency response chain: monitoring & early warning, pathogen identification, product R&D, and prevention & control application. It consolidates livestock biosecurity defenses and demonstrates China's tech and industrial coordination for exotic animal disease emergencies.

Pathogen Detection Technologies:

Development of a Fluorescent RT-PCR Detection Kit for Foot-and-Mouth Disease Virus SAT1



The lower limit of detection is 3 copies/μl



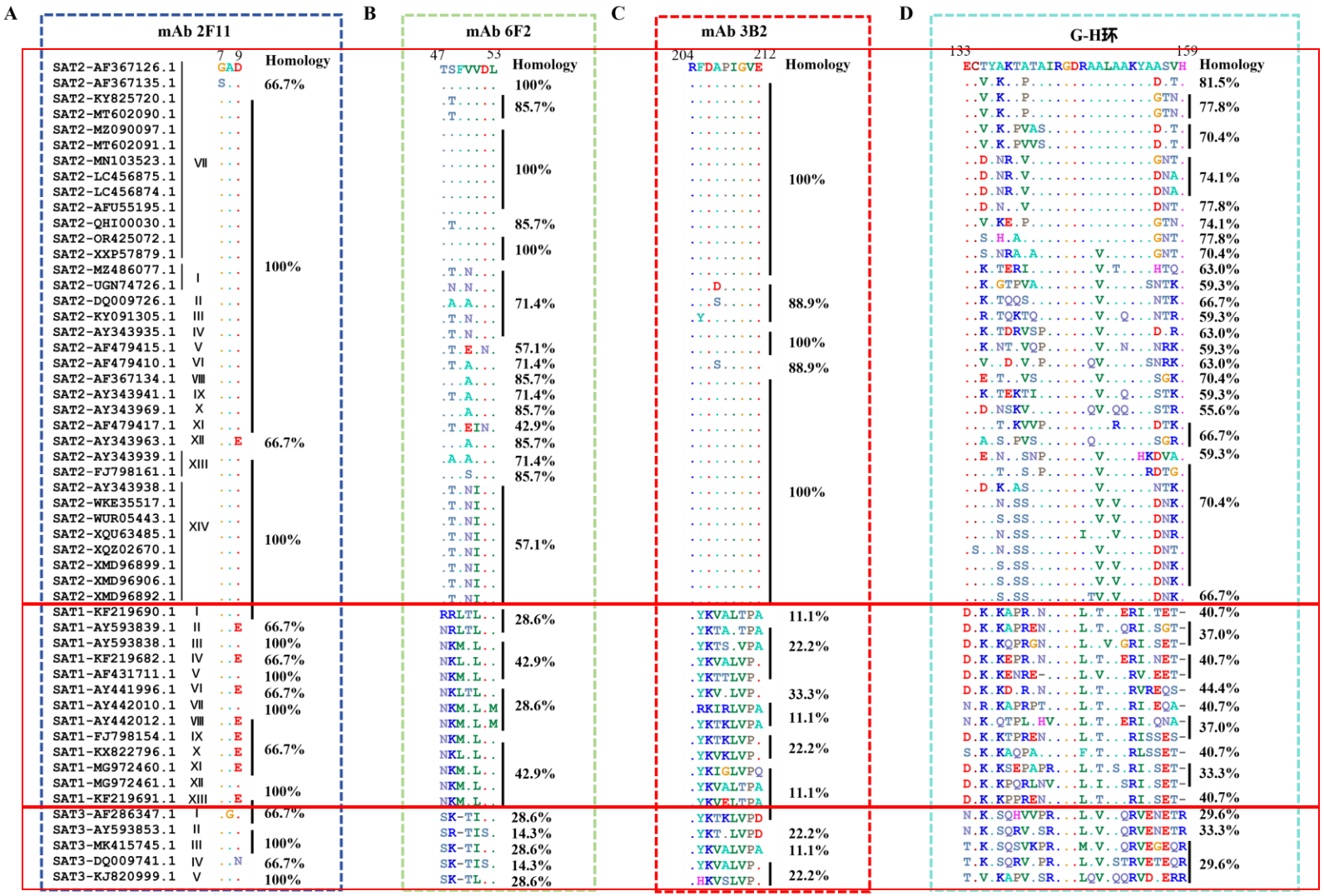
The limit of detection for FMDV-SAT1 nucleic acid reaches 2.43 fg/μL.

序号	样品编号	血清型	基因型	动物种类	通用Ct值	试剂盒Ct值
1	2018035	O	PanAsia	牛	17.92	NoCt
2	2024055-1	O	Ind-2001	牛	16.61	NoCt
3	2024057-25	O	Ind-2001	牛	18.12	NoCt
4	2025004	O	Cathay	猪	14.13	NoCt
5	2025003-4	O	Ind-2001	羊	16.22	NoCt
6	2024058-3	O	Cathay	猪	15.60	NoCt
7	AF72	A	A	猪	14.65	NoCt
8	2024079	O	Cathay	猪	15.10	NoCt
9	2019-A055-040	O	Ind-2001	猪	15.52	NoCt
10	2019012	O	Ind-2001	牛	15.60	NoCt
11	2021004-1	O	Ind-2001	牛	15.32	NoCt
12	2019007	O	Ind-2001	牛	16.65	NoCt
13	2021007-2	O	Ind-2001	牛	15.96	NoCt
14	2019-Gui272	O	PanAsia	牛	16.86	NoCt
15	A/GDMM	A	Sea-97G2	猪	16.99	NoCt
16	2021A052-1	O	Cathay	猪	19.94	NoCt
17	2025029-2	O	Ind-2001	牛	17.44	NoCt
18	2025048	O	Cathay	猪	18.88	NoCt
19	2026005	O	Ind-2001	牛	18.33	NoCt
20	TZ/2011	O	PanAsia	细胞培养	14.43	NoCt
21	2018074	O	Cathay	猪	19.96	NoCt
22	2013029	A	Sea-97G2	猪	19.91	NoCt
23	2025032	O	Ind-2001	奶牛	15.77	NoCt
24	2025031-4	O	Ind-2001	牛	14.94	NoCt
25	2024008-1	O	Mya98	猪	18.00	NoCt
26	2024008-2	O	Mya98	猪	15.00	NoCt
27	2024011-5	O	Mya98	猪	19.00	NoCt
28	2024030-8	O	Mya98	猪	18.00	NoCt
29	2024030-9	O	Mya98	猪	17.00	NoCt
30	2022006	O	Mya98	猪	19.71	NoCt
31	2024079	O	Cathay	猪	19.22	NoCt
32	2009006	A	Sea-97G1	牛	17.64	NoCt
33	2025011-1	O	Ind-2001	牛	18.54	NoCt
34	2025012-1	O	Ind-2001	猪	16.29	NoCt
35	2025014-1	O	Ind-2001	牛	16.21	NoCt
36	2025014-3	O	Ind-2001	牛	16.60	NoCt
37	原液	Asia1	/	/	20.30	NoCt
38	10倍稀释	Asia1	/	/	25.60	NoCt
39	361	SAT1	III	牛	36.23	31.92
40	362	SAT1	III	牛	25.44	22.24
41	364	SAT1	III	牛	34.35	30.26
42	365	SAT1	III	牛	31.06	25.79
43	368	SAT1	III	牛	33.80	30.13
44	369	SAT1	III	牛	29.37	25.14
45	51	SAT1	III	牛	32.87	29.47
46	52	SAT1	III	牛	38.43	33.18
47	53	SAT1	III	羊	No Ct	No Ct
48	C-	SAT1	III	羊	NoCt	No Ct

No cross-reaction against O, A, Asia1; consistent with 3D test outcomes.



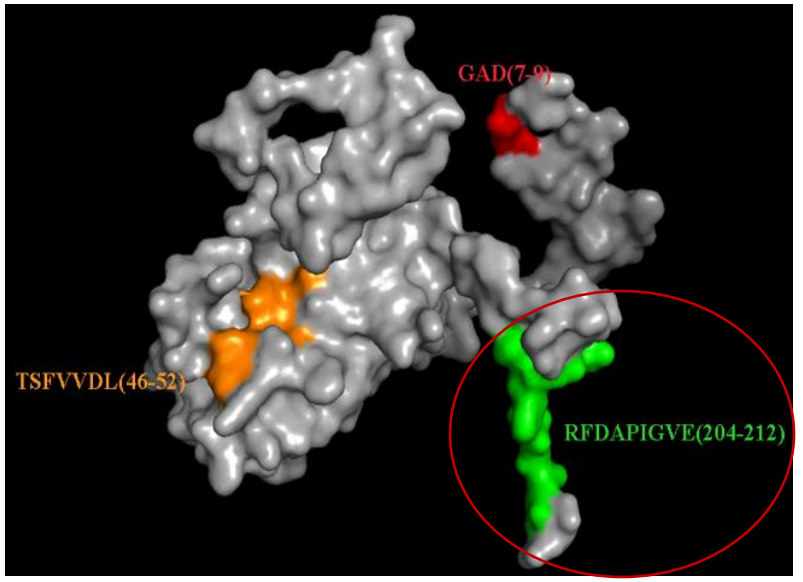
Serological detection technology: Preparation of SAT2-specific Monoclonal Antibodies



SAT2

SAT1

SAT3



3B2: The optimal detection target

2F11 Conservation of GAD within SAT serotypes;
6F2 TSFVVDL is relatively conserved in SAT2 serotype VII;
3B2 RFDAPIGVE is highly conserved within SAT2 serotype.

Identification of SAT2-specific monoclonal antibody epitopes was completed.
Zhu *et al*, Transbound Emerg Dis, 2026

Serological detection technology： SAT2-specific Monoclonal Antibodies

World FMD Reference Laboratory Report, Pirbright Institute

Sample Description	FMD SAT2 monoclonal antibody (clone 3B2)
Supplier	Lanzhou Veterinary Research Institute, Chinese Academy of Agricultural Sciences
Study purpose:	To determine the reactivity of a FMD SAT2 monoclonal antibody (3B2) against all seven FMDV serotypes[1]

Serotype	Isolate designation	Topotype/lineage	OD_{450nm}
A	ZAM 1/2015	AFRICA	0.1259
	EGY 1/1972	AFRICA	0.1156
	KEN 3/1964	AFRICA	0.1446
	EGY 3/2016	AFRICA	0.1228
	MAI 16/2006	AFRICA	0.1214
	ETH 12/2009	AFRICA	0.1308
	IRN 1/2016	ASIA	0.1229
	PAK 56/2015	ASIA	0.1341
	IRN 6/2016	ASIA	0.1372
	CAM 5/2015	ASIA	0.1366
	SAU 15/2016	ASIA	0.1297
	IRN 1/2005	ASIA	0.1484
	AFG 6/2007	ASIA	0.1274
	EGY 31/2014	ASIA	0.1179
	IRN 78/2009	ASIA	0.1252
	MYA 3/2015	ASIA	0.1122
Asia 1	AFG 1/2001	ASIA	0.1330
	IRN 26/2016	ASIA	0.1331
	IND 18/1980	ASIA	0.1394
	IRN 10/2004	ASIA	0.1233
	NKR 2/2007	ND	0.1272
C	KEN 1/2004	AFRICA	0.1139
	NEP 35/1996	ASIA	0.1145
	PHI 3/1994	EURO-SA	0.1195
O	HKN 1/2015	CATHAY	0.1249
	TAN 4/2014	EA-2	0.1526
	EGY 36/2014	EA-3	0.1205
	EGY 18/2016	EA-3	0.1424
	BAN 5/2009	ME-SA	0.1259
	KUW 3/1997	ME-SA	0.1381
	OMN 7/2001	ME-SA	0.1417
	NEP 17/2016	ME-SA	0.1492
	PAT 6/2015	ME-SA	0.1354
	IRN 72/2009	ME-SA	0.1267
	BAR 1/2014	ME-SA	0.1277
	IRN 18/2010	ME-SA	0.1187
	IRN 29/2013	ME-SA	0.1389
	PAK 16/2010	ME-SA	0.1269
	KUW 1/2016	ME-SA	0.1369
	EGY 32/2009	ME-SA	0.1334
	MAY 8/2014	SEA	0.1623
	MYA 5/2015	SEA	0.1985
	NIG 3/2014	WA	0.1578
SAT 1	KEN 4/2013	I (NWZ)	0.1187
	ZIM 14/2015	II	0.1077
	NMB 1/2015	III (WZ)	0.1116
	UGA 7/1999	IV (EA-1)	0.1205
	ETH 3/2007	IX	0.1272
	MOZ 1/1975	ND	0.1098
	NIG 1/1976	V	0.1091
	NIG 3/1980	VI	0.1133
	UGA 47/1971	VII (EA-2)	0.1294
SAT 2	MOZ 3/2015	I	2.8736
	ZIM 25/2015	II	2.6949
	BOT 3/2015	III	2.9576
	ZAM 2/2015	IV	2.6483
	UGA 9/1995	IX	2.2746
	GHA 8/1991	V	2.9066
	OMN 3/2015	VII	2.6467
	EGY 44/2012	VII	2.2847
	MAU 1/2014	VII	2.1445
	UGA 2/2002	X	2.3793
	UGA 3/1976	XII	2.3656
	SUD 6/1977	XIII	2.2584
SAT 3	KNP 48/1991 (Buffalo)	I (SEZ)	0.1349
	RHO 5/1975	I (SEZ)	0.1226
	SAR 1/2006	I (SEZ)	0.1472
	BOT P10/2010 (Buffalo)	II (WZ)	0.1327
	ZAM 3/2015	II (WZ)	0.1360
	ZIM 2/1984	II (WZ)	0.1399
	ZIM P25/1991 (UR-7 Buffalo)	III (NWZ)	0.1319
	ZAM P2/1996 (MUL-4)	IV	0.1375
	UGA 10/1997	V (EA-1)	0.1469

[1]The 3B2 antibody was tested in an antigen ELISA with recombinant αVβ6 integrin as a capture ligand against a selected FMDV isolates in a panel representative of sequence and antigenic diversity (*Morris et al., (2016). Development of a reference foot-and-mouth disease virus antigen panel for the consistent validation of diagnostic assays. In Proc. Open Session of the Research Group of the Standing Technical Committee of the European Commission for the Control of Foot-and-Mouth Disease, Cascais, Portugal. Available at: http://www.fao.org/3/a-bs510e.pdf*).

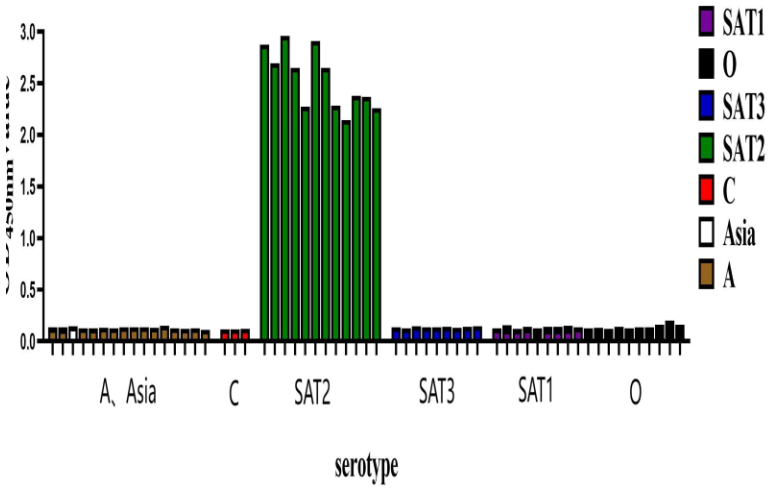
Conclusion: The SAT 2 mAb (3B2) was able to correctly detect the SAT2 viruses included in this panel and did not cross-react with isolates from other FMDV serotypes.

Testing performed by:

ALISON BURMAN
10th February 2026

Approved By:

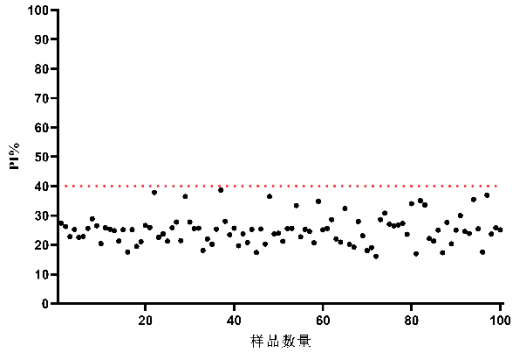
DONALD KING
10th February 2026



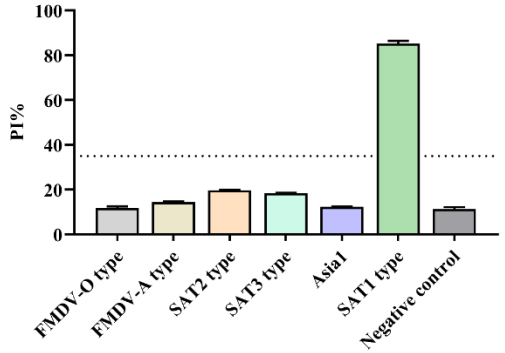
Validation of antibody effectiveness

Validation of SAT2 Serotype-Specific FMDV Monoclonal Antibodies at WRLFMD (Pirbright)

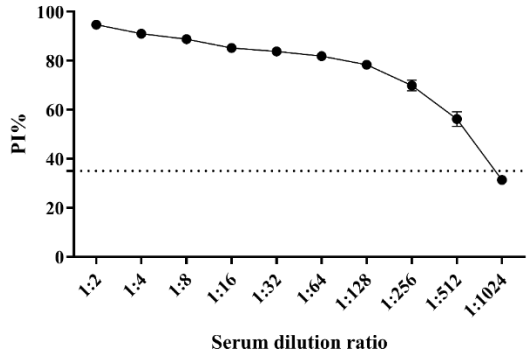
SAT1 Blocking ELISA



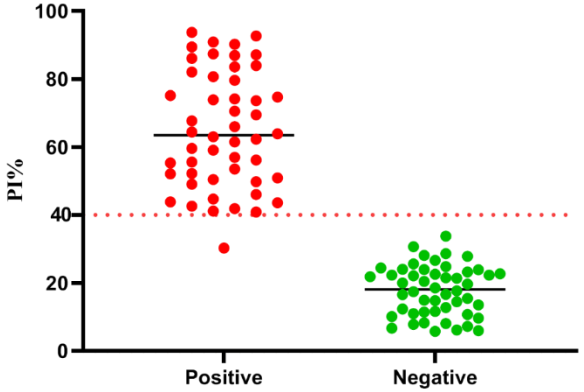
Cut-off Value Determination



Specificity Validation



Sensitivity Validation



Sensitivity: 96%; Specificity: 100%



Feature 1: High Sensitivity & Strong Specificity

✓ Sensitivity: 96%; Specificity: 100%

Feature 2: Simple Operation

✓ HRP-conjugated monoclonal antibody eliminates the need for secondary antibody

Feature 3: Time-Efficient

✓ Net reaction time: 72 minutes

SAT1 Competitive ELISA

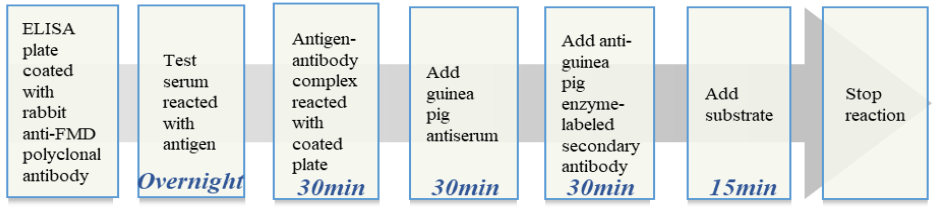
梯度稀释比例	24457	4404	530	4652	p1899390	15#	601-1
1:8	0.141	0.163	0.183	0.182	0.254	1.446	1.505
1:16	0.125	0.216	0.211	0.229	0.318	1.627	1.71
1:32	0.141	0.323	0.305	0.292	0.429	1.748	1.871
1:64	0.182	0.564	0.583	0.364	0.642	1.875	1.99
1:128	0.261	0.971	0.74	0.465	1.129	1.957	2.021
1:256	0.399	1.571	1.323	0.662	1.683	1.99	2.1
1:512	0.686	1.893	1.774	1.288	2.034	2.033	2.123
1:1024	1.185	2.169	2.049	1.589	2.148	2.182	2.188
检测检测	1024	180	180	360	128	<8	<8
中和效价	720	64	128	128	128	<8	<8

Titer detection comparable to or slightly higher than neutralization test results



☑ Serotyping ☑ Immunogenicity Evaluation ☑ Epidemiological Surveillance

LPB ELISA



SPC ELISA



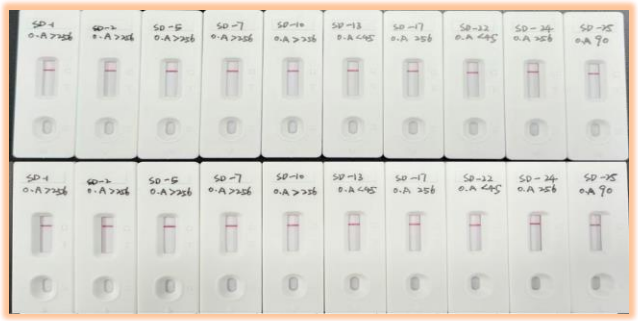
One-step assay with reaction time shortened to 45 minutes

- ✓ Precise serotyping with no cross-reactivity; high concordance with virus neutralization test (VNT)
- ✓ Gradient dilution enables accurate antibody titration for vaccine immunogenicity assessment
- ✓ Rapid detection: net processing time of 45 minutes

Portable Lateral Flow Strip (12–15 min)

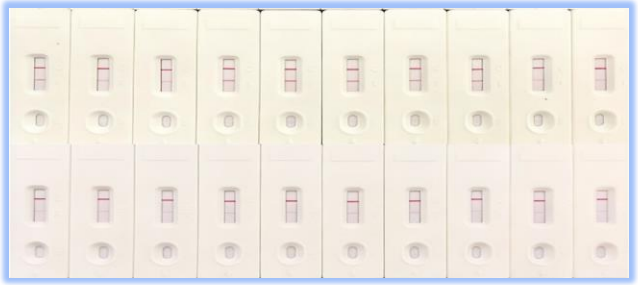


Sample Background		Specificity (%)	
		Blocking ELISA	Lateral Flow Strip
SAT1 antibody-negative sera (n=107)	O/A bivalent vaccine-immunized bovine sera (n=67)	100 (0/67)	100 (0/67)
	Healthy bovine and ovine sera (n=40)	100 (0/40)	100 (0/40)
Total		100 (0/107)	100 (0/107)



No cross-reactivity with other serotype antibodies

Sample Background		Positive Detection Rate (%)	
		Blocking ELISA	Lateral Flow Strip
Immune sera (n=79)	Subunit vaccine 1st dose + inactivated vaccine 2nd dose (n=37)	97.3 (36/37)	97.3 (36/37)
	Inactivated vaccine 1st dose, Day 7 (n=42)	83.3 (35/42)	45.2 (19/42)
Epidemic area collection (n=74)	bovine and ovine sera	68.9 (51/74)	85.1 (63/74)



High sensitivity for SAT1 antibody detection

Broadened application scenarios for SAT1 antibody detection

CONTENTS

01 **Analysis of the Epidemiological Situation of FMD**
Study on the overall epidemic situation based on up-to-date data and analysis of epidemic dynamics in key affected regions.

02 **WOAH-Recommended Diagnostic Technical System**
Systematic introduction of WOAH standard etiological and serological diagnostic methods, together with their advantages and limitations.

03 **China’s FMD Diagnostic System & Core Indicator Comparison**
Achievements in system development, DIVA technology and emergency research, and advantages of core indicators.

04 **Rapid Response: SAT1 Detection & Immune Assessment**
Practical outcomes in national case confirmation, large-scale surveillance and immune assessment.

05 **Technical Support for FMD Diagnosis and Surveillance in Asia & Africa**
Strengthen global regional cooperation, empower regional testing capacity and advance diagnostic technologies.

Regional Variations in Diagnostic Requirements

01 Europe

Regional Epidemic Characteristics

The EU is an FMD-free zone with routine prophylactic vacc ination banned.

Core Detection Requirements

- **Rapid preliminary screening**: LFD, DAS-ELISA, RT-qPCR.
- **Precise confirmation:** virus isolation, sequencing, VNT, LPBE.
- **Infection-immunity differentiation:** NSP-ELISA.

02 Asia

Regional Epidemic Characteristics

Predominant serotypes**: O, A, and Asia1**; cross-border risks from **SAT 1 and SAT2**.

Core Detection Requirements

Multiplex detection: O/A/SAT1/SAT2 multiplex PCR

- **Genetic tracing:** sequencing, LPBE, and cELISA.
- **Port frontier defense:** portable RT-RPA; 3ABC.

03 Africa

Regional Epidemic Characteristics

Predominant serotypes: **O, A, SAT 1, SAT2, SAT3.**
Complex epidemic patterns with extremely challenging prevention and control.

Core Detection Requirements

- **Broad-spectrum screening:** Ag-ELI SA, RT-qPCR, LFD, LPBE, and cELISA .
- **High-throughput detection:** fully automated.chemiluminescence NSP and SP detection methods .
- **Immunological detection:** LPBE, VNT, NSP, and cELISA.

04 South America

Regional Epidemic Characteristics

Predominant serotypes**: O and A**.

Core Detection Requirements

- **Routine surveillance:** NSP-ELISA, RT-PCR
- **Immunogenicity assessment:** cELISA, LPBE, VNT.
- **Trade certification:** 3ABC NSP.

Integrated Application of FMD Diagnostic Technologies

The integrated use of FMD diagnostic technologies is essential for animal disease prevention and control. No single technology can meet every need. Combining field testing with laboratory analysis, rapid screening with accurate confirmation, and immunity monitoring with outbreak diagnosis creates a comprehensive, efficient surveillance and early-warning network.

Future Directions:

Technology Integration: Develop multiplex kits for multi-target detection (such as nts and NSPs).

Workflow Automation: Automate testing and analysis for greater efficiency and accuracy.

Data Intelligence: Integrate diagnostic and farm data for predictive early warning.

This integrated approach supports effective FMD control and eventual eradication.

Strengthening FMD Control Capacity in Southeast Asia

1. Establishing an efficient laboratory diagnostic testing system must not neglect clinical diagnosis.

2. Laboratory capacity development among SEACFMD member countries is highly uneven and needs to be progressively strengthened in line with the SEACFMD Roadmap (2026–2030).

3. Given local conditions in Southeast Asian countries, on-site diagnostic tools such as lateral flow tests and LAMP assays should be developed and promoted.

4. As WOAH Reference Laboratories, Lanzhou and Pakchong should strengthen technical leadership in training, method standardization, and the development and adoption of novel diagnostics.

5. Given the threat of exotic FMD serotypes like SAT2, establishing a diagnostic technology reserve is urgent.

Let’s motivate each other:

Empowering FMD Prevention and Control Through Technological Innovation: **“A New Paradigm of Smart Diagnostics and Precision Disease Control”.**

Scientific, Precise, Timely

—Know Yourself, Know Your Enemy.


Thank you