



Istituto Zooprofilattico Sperimentale
della Lombardia e dell'Emilia Romagna



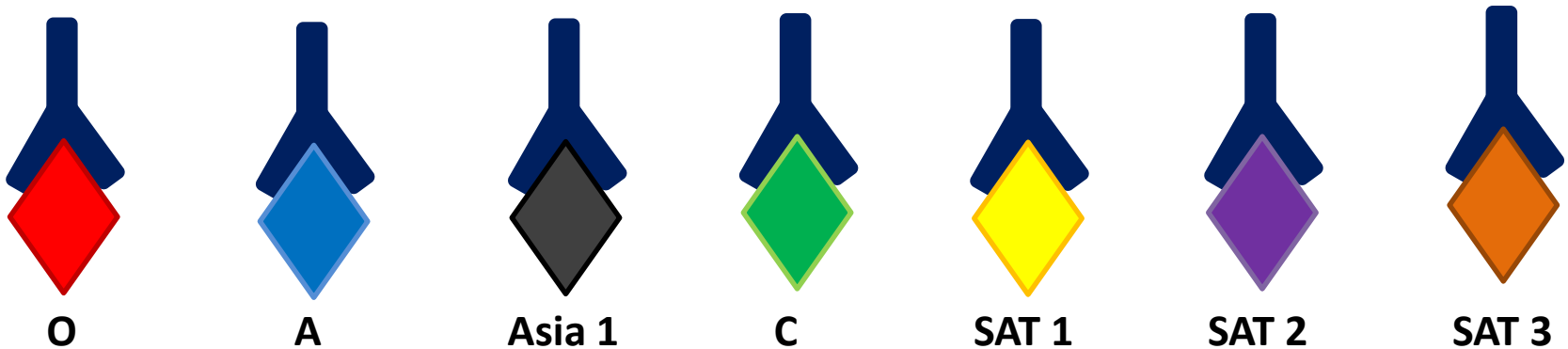
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Innovative Diagnostics

Understanding Serotypic Cross-reactivity of Antibody ELISAs and the Impact on Interpretation

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Serotypic Cross-reactivity

‘The ability of an antibody to react with similar antigenic sites on different proteins’



JIM 04063

A new enzyme-linked immunosorbent assay (ELISA) for the detection of antibodies against foot-and-mouth disease virus

I. Development and method of ELISA

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TABLE I

(A) CROSS-NEUTRALISATION OF THE SEVEN IMMUNOLOGICALLY DISTINCT FMDV TYPES BY ELISA AND VN

Serum virus	O ₁ BFS 1860	A ₅ FRA 1/68	C ₁ NOVILLE	SAT 1 BOT 1/68	SAT 2 SWAZ 1/69	SAT 3 BEC 1/65	ASIA 1 PAK 1/54
O ₁ BFS 1860	2 048 ^a 641 ^b	≤ 22 ≤ 45	≤ 22 58	73 12	≤ 22 ≤ 11	≤ 22 16	≤ 22 ≤ 45
A ₅ FRA 1/68	≤ 22 ≤ 45	1660 558	40 ≤ 45	85 ≤ 45	≤ 22 27	≤ 22 10	≤ 22 ≤ 45
C ₁ NOVILLE	≤ 22 ≤ 45	≤ 22 ≤ 45	2422 997	85 ≤ 45	≤ 22 ≤ 11	≤ 22 ≤ 11	≤ 22 ≤ 45
SAT 1 BOT 1/68	≤ 22 ≤ 45	≤ 22 ≤ 45	≤ 22 ≤ 45	1235 562	≤ 22 ≤ 11	≤ 22 ≤ 11	≤ 22 ≤ 45
SAT 2 ZIM 5/81	≤ 22 66	≤ 22 ≤ 45	67 74	67 90	1024 316	67 389	48 550
SAT 3 BEC 1/65	85 158	128 62	178 112	323 191	153 78	1790 437	56 71
ASIA 1 PAK 1/54	41 ≤ 45	60 ≤ 45	49 ≤ 45	49 ≤ 45	101 43	346 646	2198 631

^a Reciprocal ELISA titres.

^b Reciprocal VN titres.

Experimental design (n=365)

Serotype	Infected	Vaccinated	Vaccinated /Infected	Total
O	57	39	20	116
A	23	51	46	120
C	14	4	-	18
SAT 1	5	9	-	14
SAT 2	6	12	12	30
SAT 3	1	5	-	6
Asia 1	20	18	23	61

Monovalent experimental sera

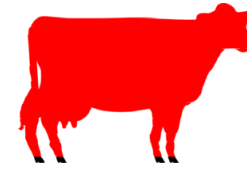
ELISA set-up



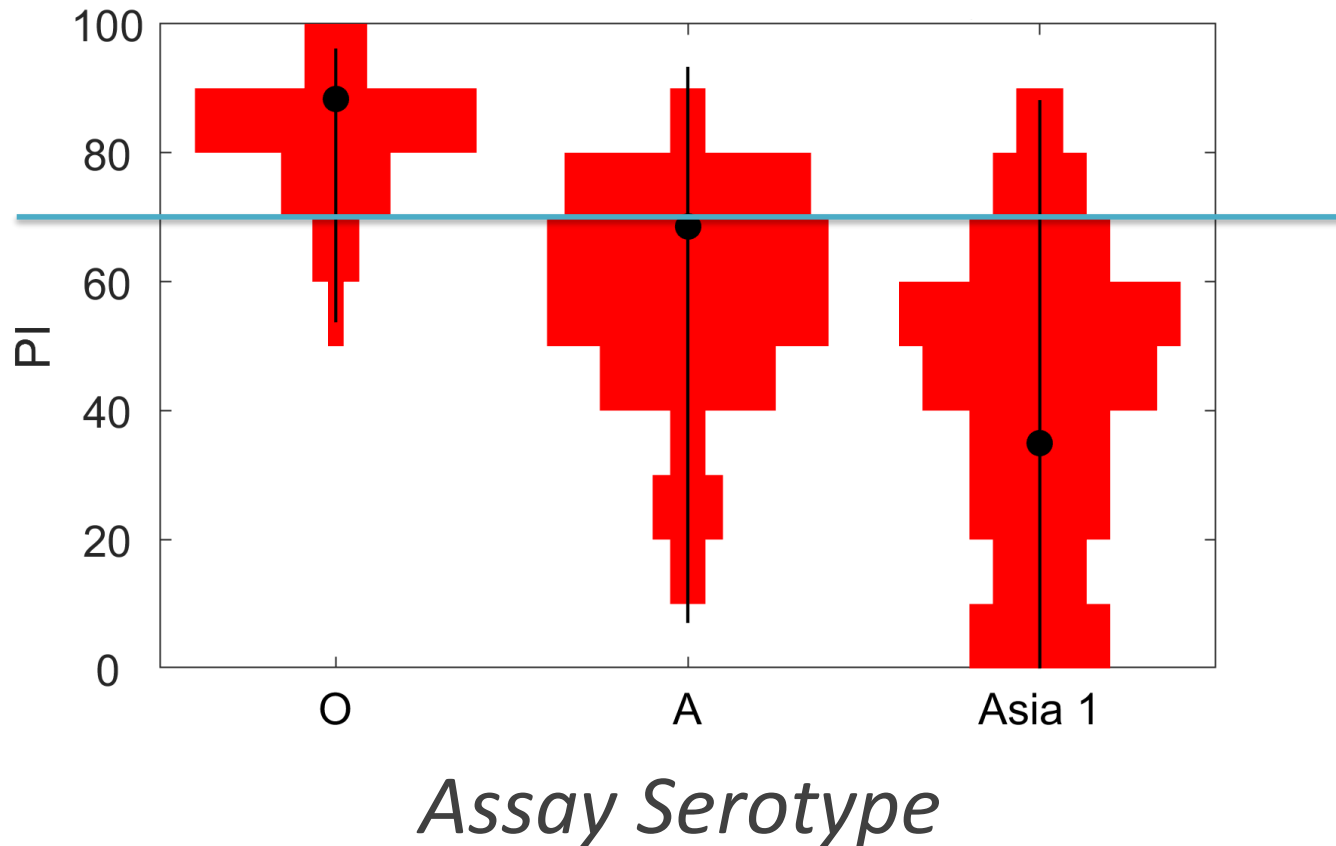
Liquid phase ELISA	TPI LPBE	In-house	Polyclonal	O, A, C, Asia 1, SAT 1, SAT 2 and SAT 3
	TPI SPCE			O, A, C, Asia 1, SAT 1, SAT 2 and SAT 3
Competition ELISA	IZSLER SPCE	Commercial	Monoclonal	O, A, Asia 1, SAT 1 and SAT 2
	IDVet			O, A and Asia 1
	PrioCHECK			O, A and Asia 1

9125 individual tests carried out!

Results (infected cattle)



Status of Animal (serotype O)



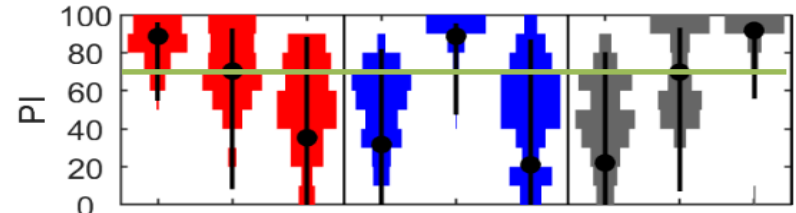
Status of Animal \Rightarrow

O

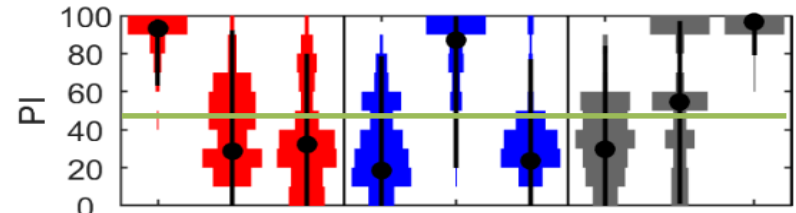
A

As 1

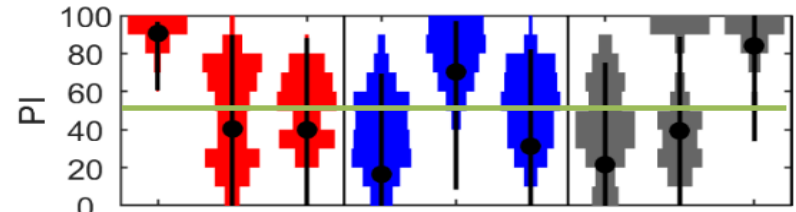
IZSLER



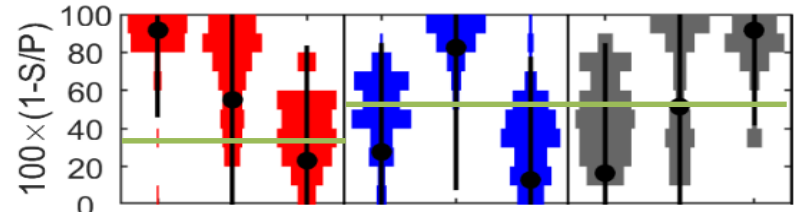
LPBE



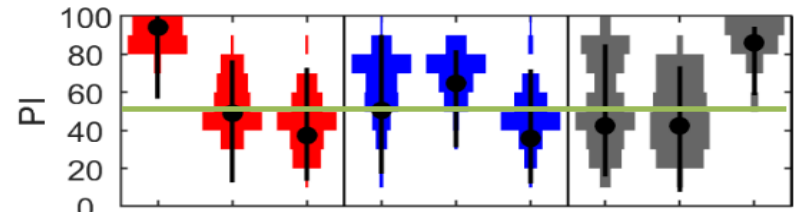
SPCE



IDVet



PrioCHECK

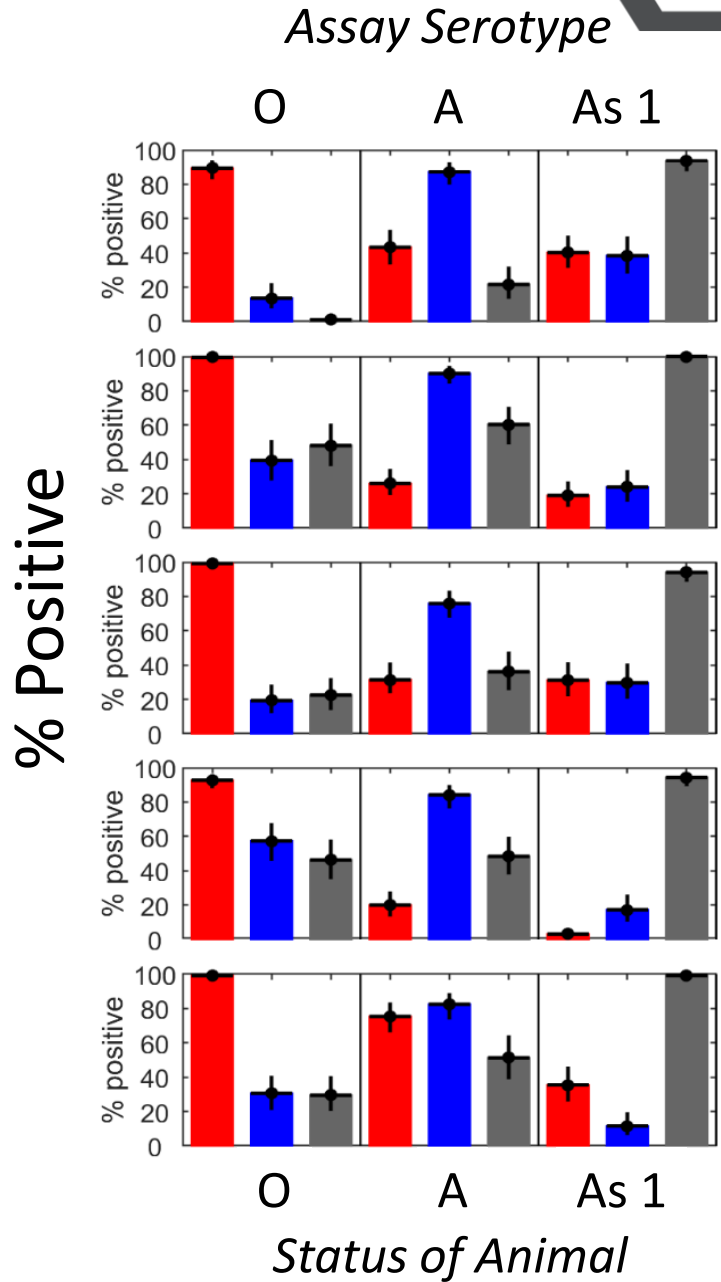


Assay Serotype \Rightarrow

O, A, Asia 1

If a 1000 animals are sampled.....

IZSLER
 LPBE
 SPCE
 IDVet
 PrioCHECK

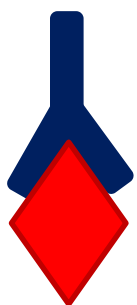


Conclusions

Serological ELISAs to serotype should be used with caution....

but depends on use:

Endemic vs Non-endemic region



O



A



Asia 1



C



SAT 1



SAT 2



SAT 3