



What the serological diagnosis of other animal retroviral infections taught us (eradicate AGID to eradicate retroviral infections)

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**Istituto Zooprofilattico Sperimentale
dell'Umbria e delle Marche**

Animal diseases caused by retroviruses: enzootic bovine leukosis, equine infectious anaemia and caprine arthritis-encephalitis

B. TOMA *, **M. ELOIT *** and **M. SAVEY ****

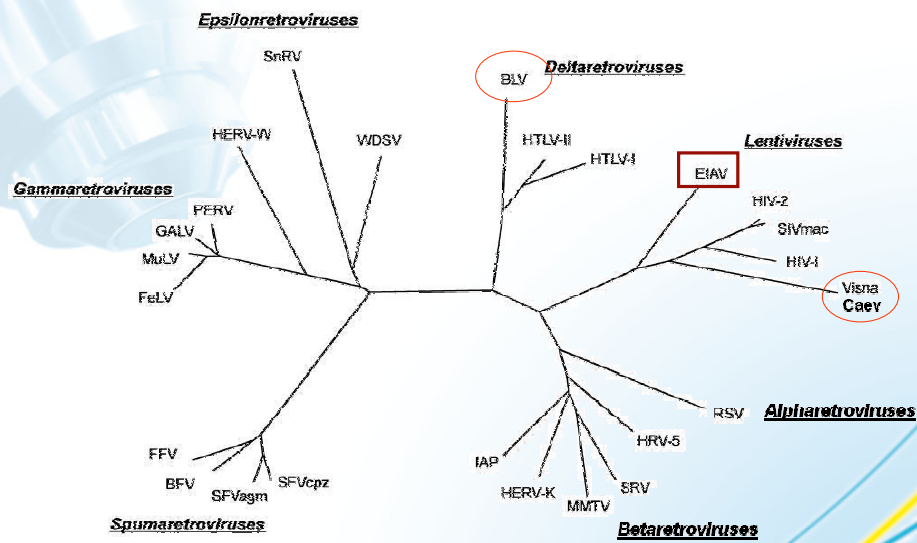
Summary: This article presents the essential features of three retroviral infections of animals: enzootic bovine leukosis, equine infectious anaemia and caprine arthritis-encephalitis.

A unique feature of these diseases is persistent infection, maintained throughout the life of the host animal by the presence of a provirus integrated into the cells of the host, thereby making an infected animal a continuous source of the pathogen.

Information currently available on the epidemiology and detection of these diseases is sufficient to institute effective disease control measures.



Genetical Retroviruses relationships

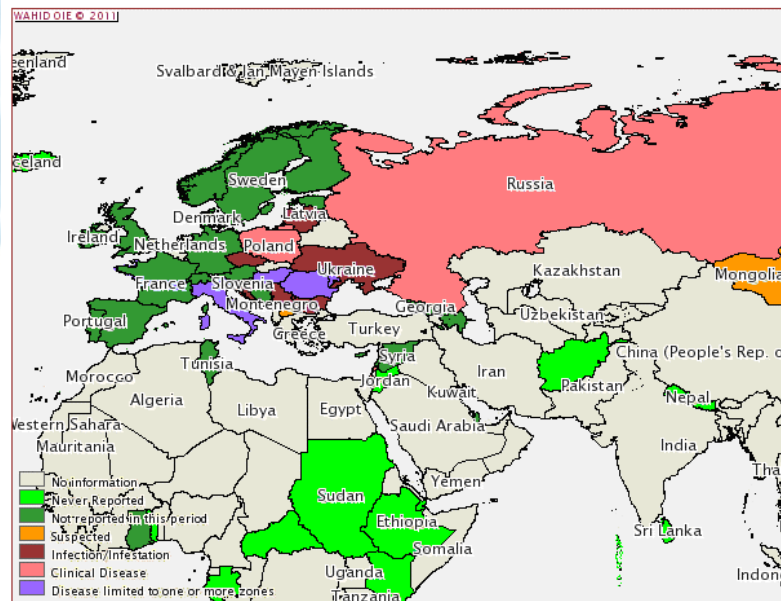


Enzootic Bovine Leukosis

- It is a viral, neoplastic disease of lymphatic system
- The seropositive animals are considered as permanently infected
- The viral genome is integrated into the DNA of the target cells, involving a low level of viral expression



Enzootic Bovine Leukosis



2012 LEB epidemiological situation (OIE data)

Enzootic Bovine Leukosis



2012 Italian LEB epidemiological situation

Enzootic Bovine Leukosis

National eradication plan – report of activity official data

ALLEGATO II

PROVE NELLE AZIENDE

Dal 01/01/2011 al 31/12/2011

REGIONE: -

ASL: -

Malattia: Leucosi Bovina Enzootica

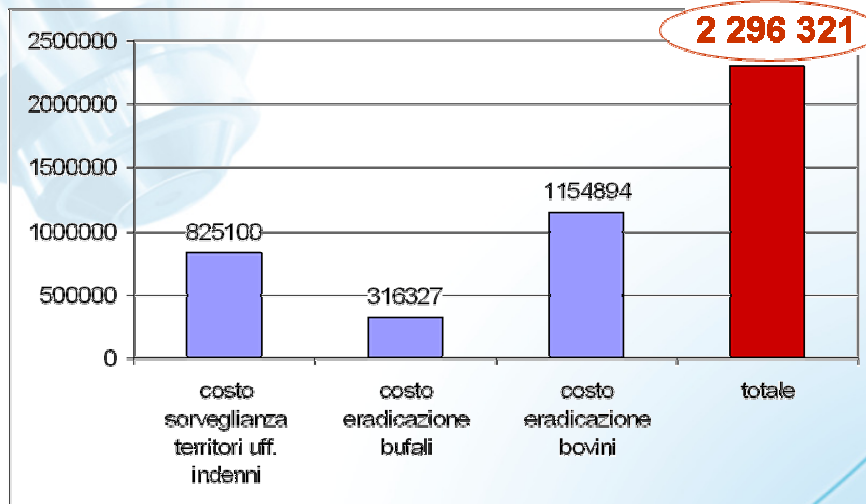
Specie: Bovini

Decorazione statistica: 15/04/2012

Regione	N. totale delle aziende (1)	N. di aziende soggette a controlli (2)	N. di aziende controllate (3)	N. di aziende positive (5)	INDICATORI		
					% copertura aziende (%Az. controllate) (8)	% aziende positive (prevalenza) (9)	% nuove az. positive (incidenza) (10)
140 - Molise		1.015	0	0	67,68	0,00	0,00
150 - Campania		8.053	12	12	99,20	0,15	0,15
160 - Puglia		3.263	3.053	4	93,36	0,13	0,13
180 - Calabria	7.222	3.216	4.890	5	93,73	0,10	0,10
190 - Sicilia	10.514	10.138	10.093	18	99,36	0,18	0,18
TOTALE	37.007	28.340	27.004	39	98,29	0,14	0,18

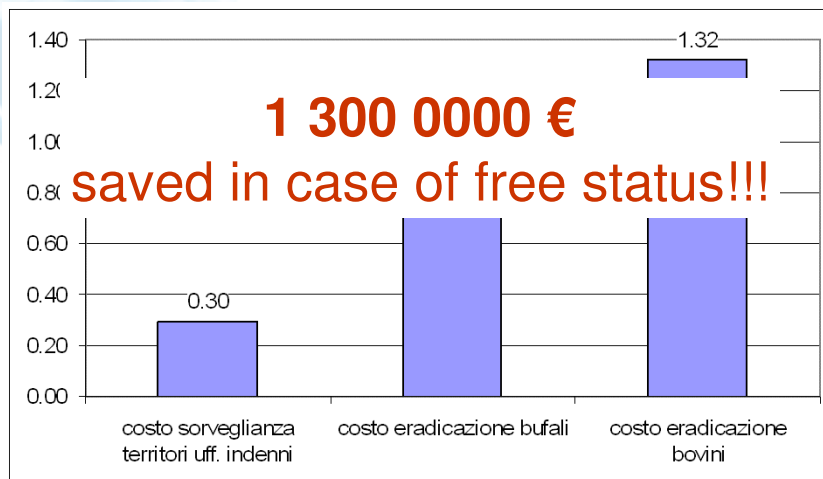
1336 uncontrolled farms

Enzootic Bovine Leukosis



Surveillance and/or eradication plans: Documented costs (in euro)

Enzootic Bovine Leukosis



Enzootic Bovine Leukosis

- Available diagnostic tests

- AGID
- ELISA

} serology

- PCR - REAL TIME
- Istologico

} Discriminatory diagnosis

- Gold Standard unavailable

Enzootic Bovine Leukosis

Current surveillance goals:

reduce the costs, maintaining the effectiveness

Southern Regions:

still infected territories

goal:

identify and eradicate the last infected farm

Northern Regions:

free of infection territories

goal:

Certify the maintenance of the high sanitary status

Enzootic Bovine Leukosis

National and International legislation

DECISIONE DELLA COMMISSIONE del 15 dicembre 2009
amending Annex D to Council Directive 64/432/EEC as regards
diagnostic tests for enzootic bovine leukosis

DECRETO LEGISLATIVO 22 maggio 1999, n.196
Attuazione della direttiva 97/12/CE che modifica e aggiorna la direttiva
64/432/CEE relativa ai problemi di polizia sanitaria in materia di scambi
intra-comunitari di animali delle specie bovina e suina.

DECRETO MINISTERIALE 2 maggio 1996.
Regolamento concernente il piano nazionale per l'eradicazione della
leucosi bovina enzootica.

Enzootic Bovine Leukosis

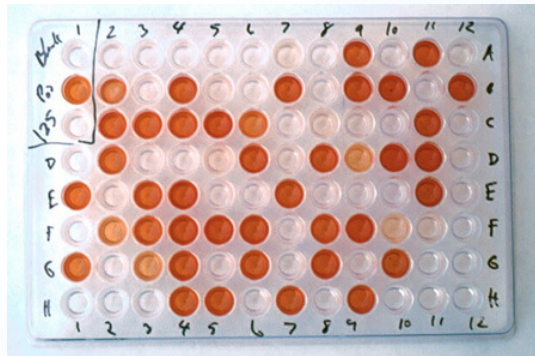
National and International legislation

ALLEGATI TECNICI

La diagnosi di laboratorio della leucosi bovina enzootica è effettuata mediante un esame di immunodiffusione su gel di agar (AGID) come riportato alla lettera A o mediante la prova immunoenzimatica (ELISA) come riportato alla lettera B. La diagnosi di linfosarcoma è effettuata mediante esame istologico come riportato alla lettera C.

Enzootic Bovine Leukosis

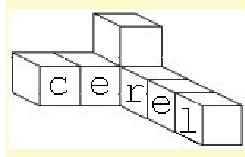
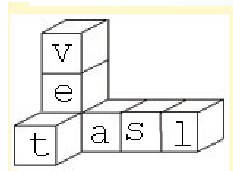
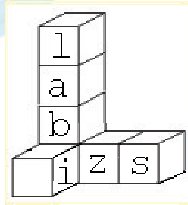
Progress vs Experience: this is the question



Enzootic Bovine Leukosis

AGID Test vs ELISA Test

Points of View



Enzootic Bovine Leukosis

AGID Test vs ELISA Test



The regional point of view:

CHEAPNESS

Pro AGID

- Low cost of reagents and laboratories facilities
- No needing of specialized personnel

Pro ELISA

- negative trend of Equipment and Reagents costs
- Testing of pool of sera and bulk milk samples

Enzootic Bovine Leukosis

AGID Test

vs

ELISA Test



The veterinary service point of view:

RELIABILITY

TIMING

Pro AGID

- High specificity
(but very low sensitivity)

Pro ELISA

- High specificity and sensitivity
- Results available in >24 hours

Enzootic Bovine Leukosis

AGID Test

vs

ELISA Test



Pro AGID

- Inertia of tradition
- Prescribed test (but not recommended)

The laboratory point of view:

USER FRIENDLINESS

RESULTS RELIABILITY(17025)

Pro ELISA

- objective results
- Reading documentation available
- Automation available
- Repeatability of results

Enzootic Bovine Leukosis

AGID Test vs ELISA Test



The CEREL point of view:

LAW COMPLIANCE

RESULTS RELIABILITY(17025)

Pro AGID

- Reagents Production

Pro ELISA

- Standards availability (E5 serum)
- High purified reagents availability
- Future researchs availability

Enzootic Bovine Leukosis

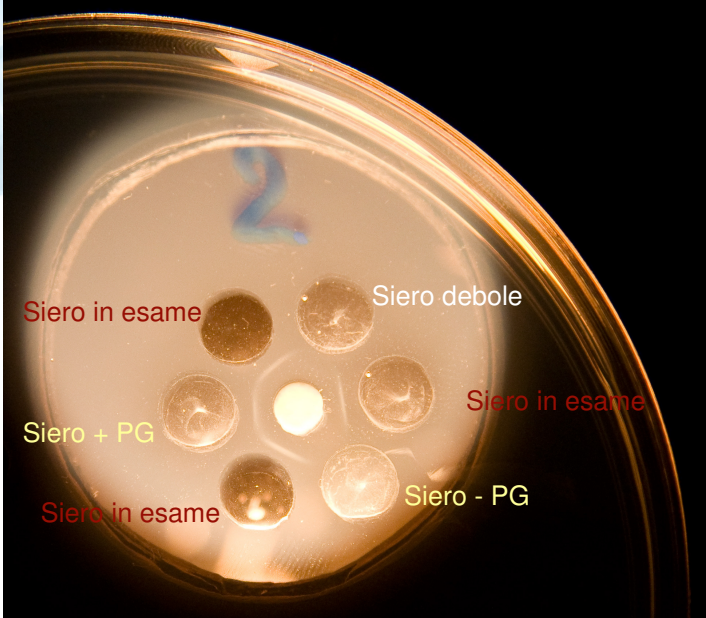
AGID test reading



IZS Umbria Marche

Enzootic Bovine Leukosis

AGID test reading





Ordine di stampa:
 1. Dati grezzi
 2. DELTA.DD

	1	2	3	4	5	6	7	8	9	10	11	12
A	1.79 1.426	0.364	0.26 0.1	0.26	0.289 -0.025	0.314						
B	0.338 0.028	0.26	0.283 0.053	0.23	0.276 0.032	0.244						
C	0.465 0.154	0.312	0.219 0.096	0.223	0.281 0.056	0.225						
D	0.22 0.062	0.258	0.271 0.033	0.238	0.258 0.072	0.196						
E	0.259 0	0.259	0.492 -0.004	0.496	0.247 0.018	0.229	NO DP					
F	0.279 0.025	0.264	0.2 0.025	0.175	0.047 -0.001	0.048	NO CONTINUES					
G	0.285 0.025	0.23	0.227 -0.668	0.895	0.246 0.043	0.203	NO SISE NO					
H	0.367 -0.188	0.555	1.304 0.993	0.311	0.237 0.004	0.233	NO CONTINUES					

Ordine di stampa:
 1. RISULTATO S.I.P
 2. Risultati finali estremo

	1	2	3	4	5	6	7	8	9	10	11	12
A			7.0126 NEG (-)		-1.7532 NEG (-)							
B			3.7167 NEG (-)		2.244 NEG (-)							
C	10.799 NEG (-)		6.7321 NEG (-)		3.9271 NEG (-)							
D	4.3478 NEG (-)		2.3142 NEG (-)		5.0491 NEG (-)							
E	0 NEG (-)		-0.2805 NEG (-)		1.2633 NEG (-)							
F	1.0519 NEG (-)		1.7532 NEG (-)		-0.070126 NEG (-)							
G	3.8569 NEG (-)		-46.844 NEG (-)		3.0154 NEG (-)							
H	-13.184 NEG (-)		69.635 POS (+)		0.28051 NEG (-)							



Enzootic Bovine Leukosis

Test AGID vs Test ELISA



Why the AGID test is obsolete?

Consideration n. 1.

eradication of infection was only based on AGID TEST (in the past)

Enzootic Bovine Leukosis

Test AGID vs Test ELISA



Why the AGID test is obsolete?

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Consideration n 2.

The epidemiological situation changed

- The infection moved from diary to free ranging farms
- Surveillance plans

Enzootic Bovine Leukosis

Test AGID vs Test ELISA



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The epidemiological situation changed

- The infection moved from dairy to free ranging farms
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Consideration n 3.

Unsolved cases: specific plans → ELISA

- Increasing of monitoring
- Early diagnosis (>6 mesi)

Enzootic Bovine Leukosis

Test AGID vs Test ELISA



Why the AGID test is obsolete?

Consideration n. 1.

Eradication of infection was only based on AGID TEST (In the past)

Consideration n 2.

The epidemiological situation changed

→ Infection moved from dairy to free ranging farms

→ Surveillance plans

Consideration n 3.

Unsolved cases: specific plans → ELISA

→ Increase the monitoring

→ Early diagnosis (>6 mesi)

Consideration n 4.

the diagnostic tests should conjugate high sensitivity with effectiveness and cheapness (pool of sera– bulk milk)

ALLEGATO

Il capitolo II dell'allegato D della direttiva 64/432/CEE è costituito dal testo seguente:

CAPITOLO II

ESAMI PER LA RICERCA DELLA LEUCOSI BOVINA ENZOOTICA

La ricerca della leucosi bovina enzootica è effettuata mediante un esame di immunodiffusione su gel di agar (AGID)

In case of properly justified controversy of test results, an additional AGID test should be arranged.

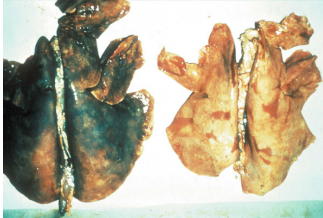
Federal Research Institute for Animal Health
OIE Reference Laboratory for Enzootic Bovine Leukosis (EBL)
Stüdelufer 10
17493 Greifswald — Insel Riems
GERMANY.

A. Reazione di immunodiffusione su gel di agar per la leucosi bovina enzootica

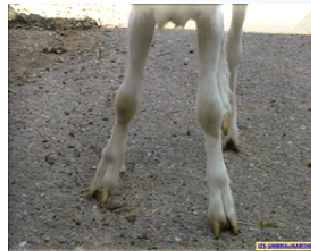
1. L'antigene da impiegare nella prova deve contenere glicoproteina del virus della leucosi bovina. L'antigene deve essere standardizzato rispetto al siero EO5.

SMALL RUMINANTS LENTIVIRUSES

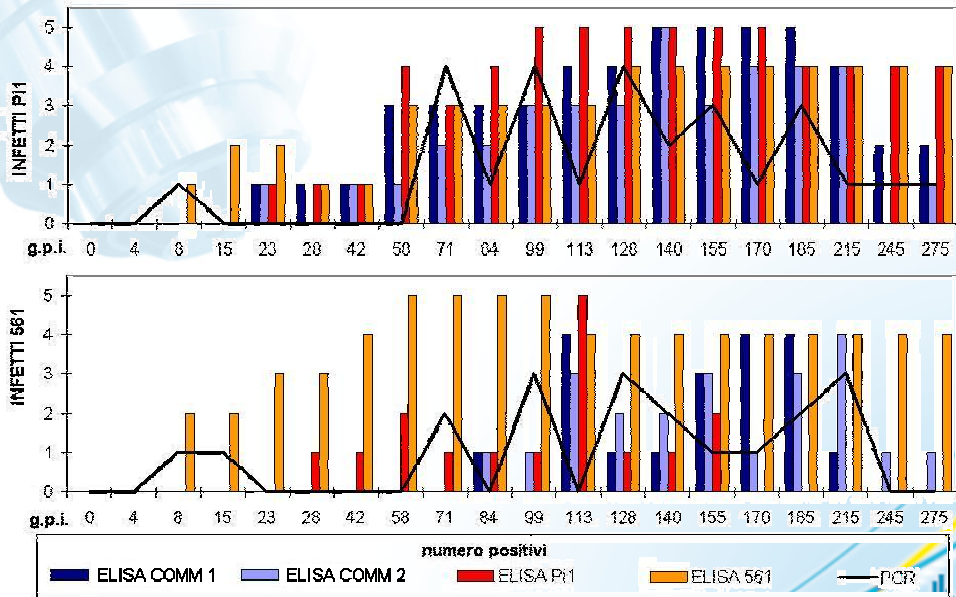
CAUSE MULTISYSTEMIC INFECTION INVOLVING:



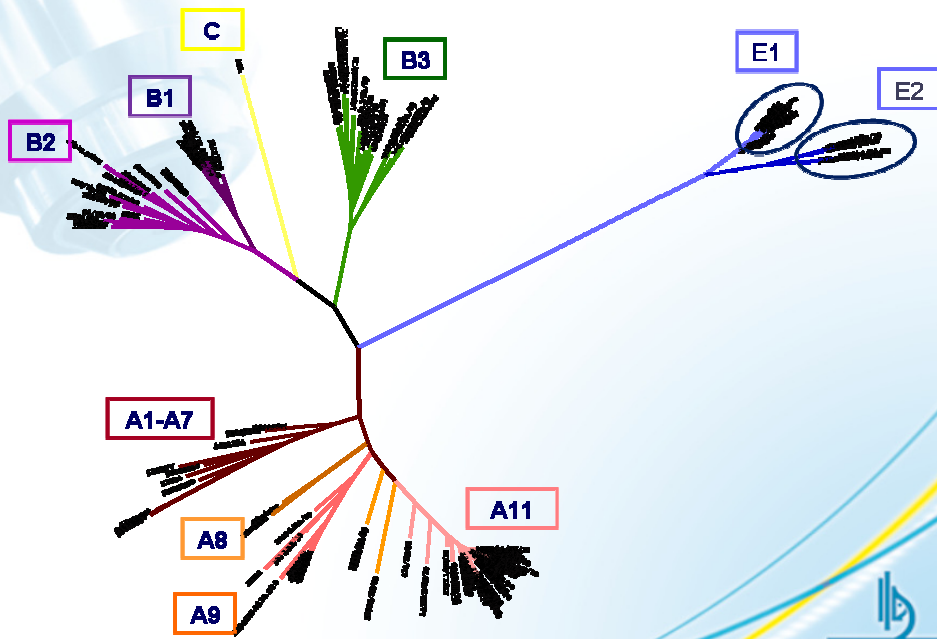
LUNGS
UDDERS
CNS
ARTICULATIONS



SMALL RUMINANTS LENTIVIRUSES



SMALL RUMINANTS LENTIVIRUSES



Progress vs Experience: this is the question

Young vs Old
Modern vs ancient

Falls to the floor



Break the screen

Falls to the floor



Break the floor

