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Reference Laboratory
Bluetongue

**Trasmissione transplacentare ed evoluzione
molecolare di 2 ceppi BTV-8 di campo in bovine a
fine gravidanza**

Alessio Lorusso, 23 Maggio 2013

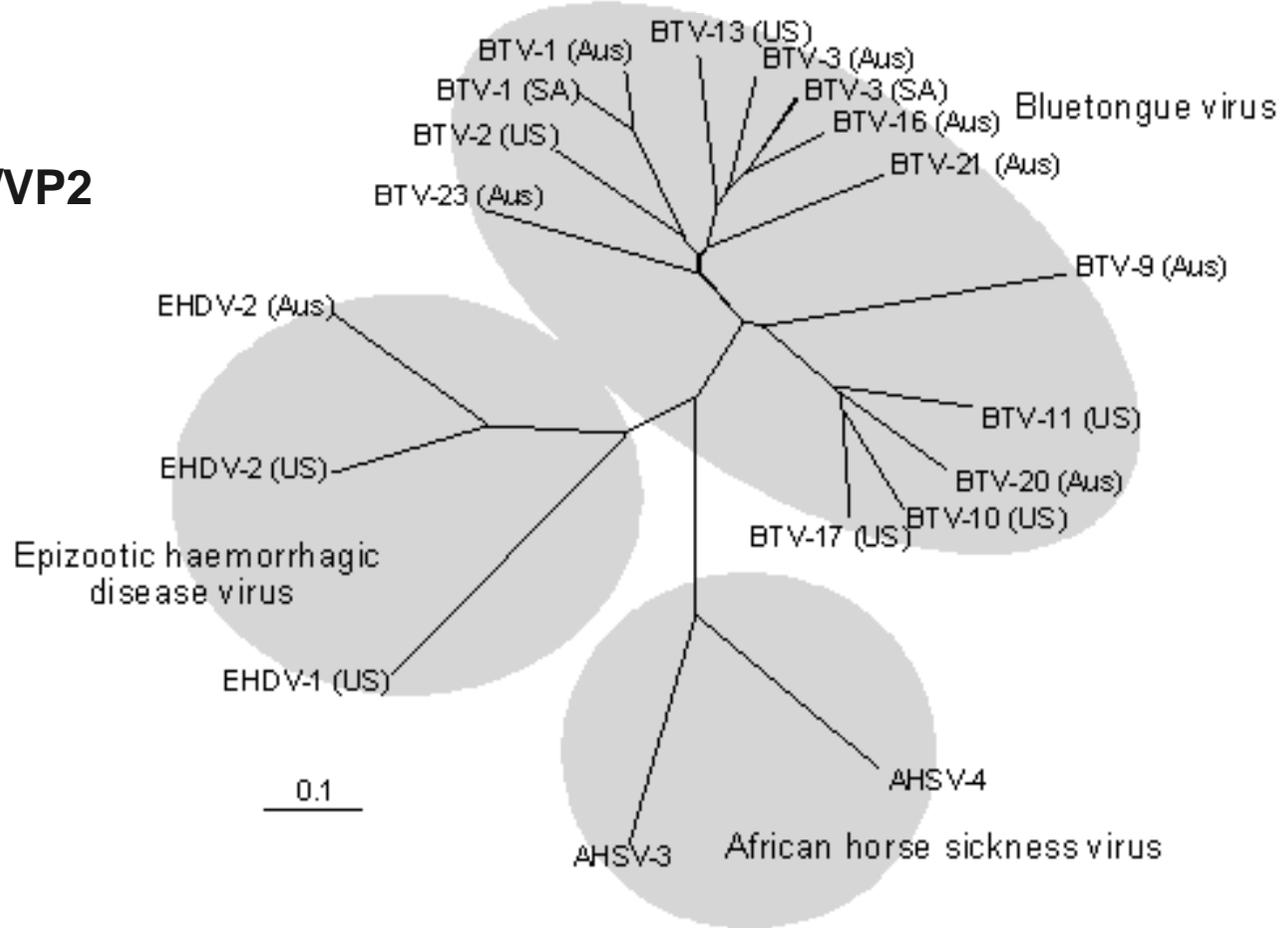


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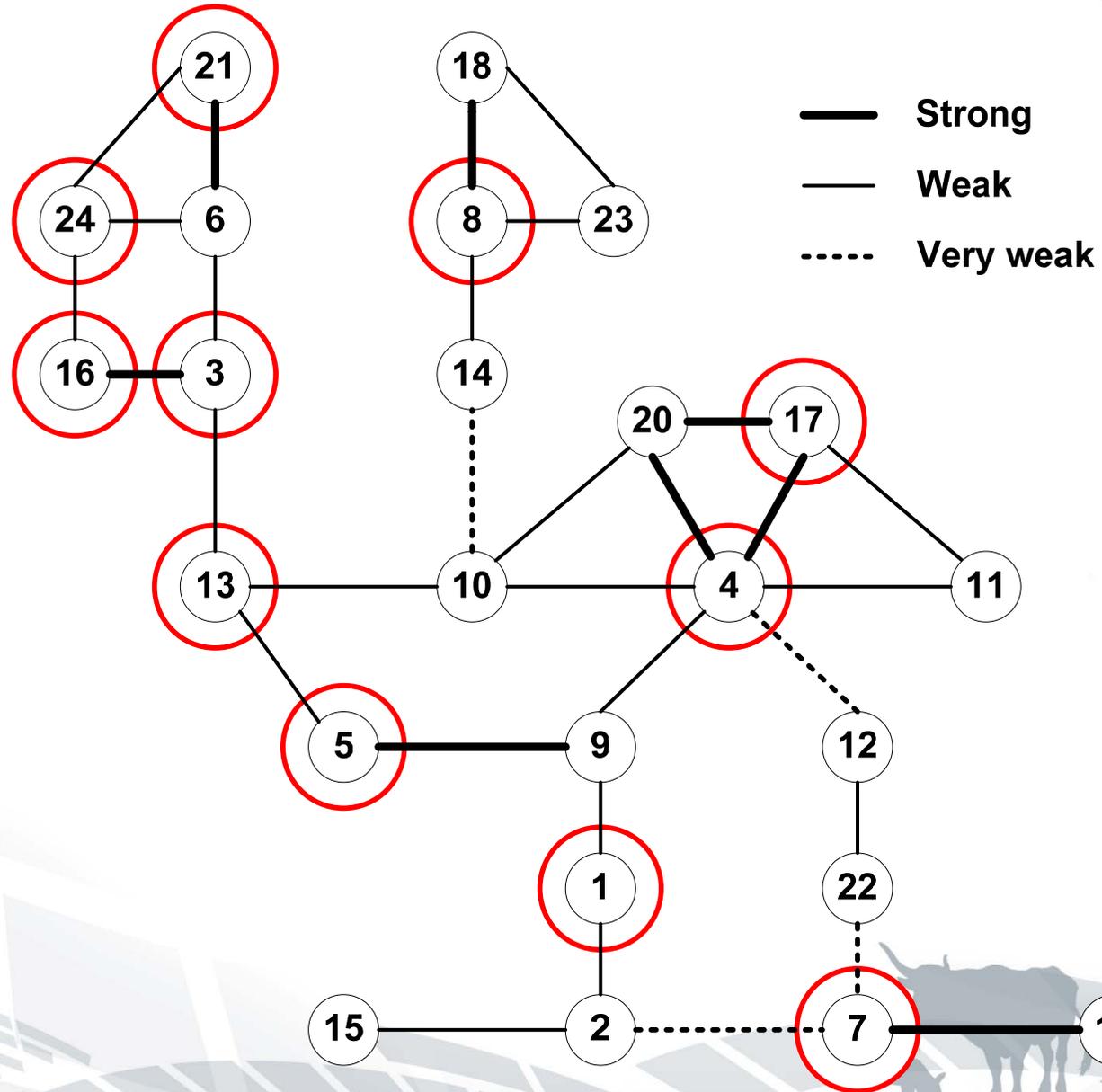
BTV

Seg-2/VP2





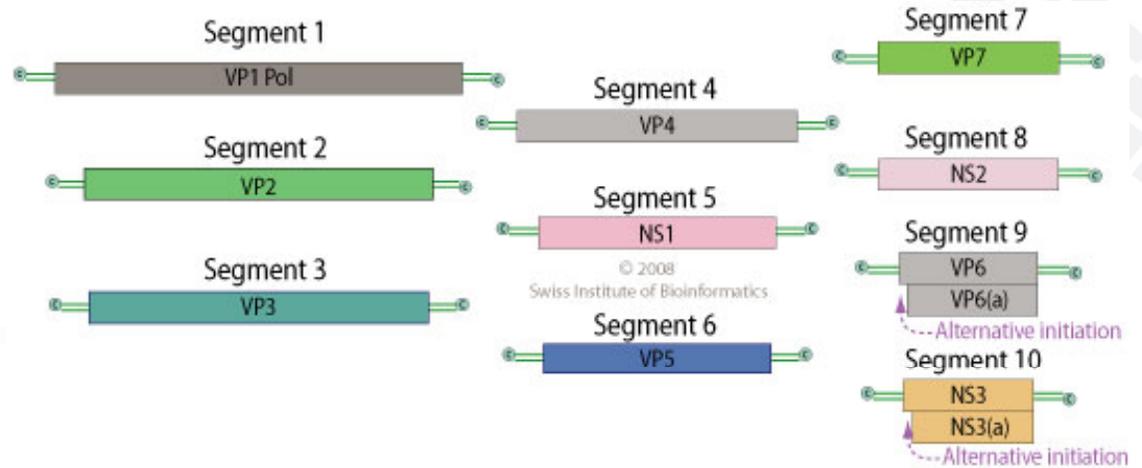
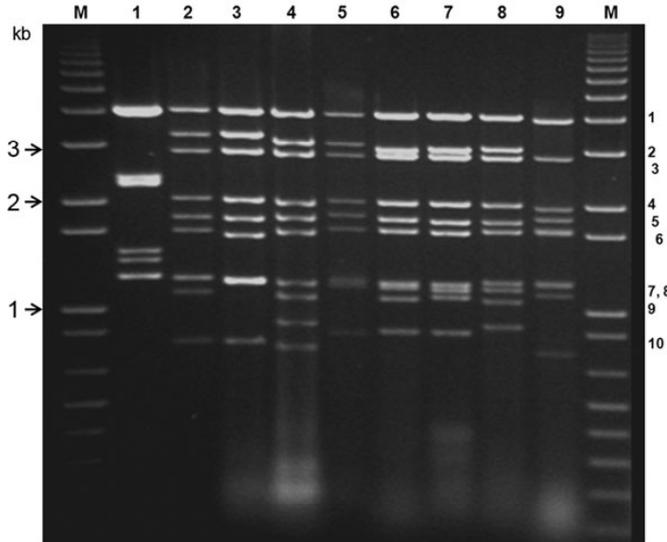
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ORGANIZZAZIONE GENOMICA



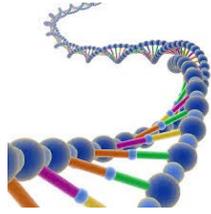
Maan et al

STRAORDINARIA PLASTICITA'





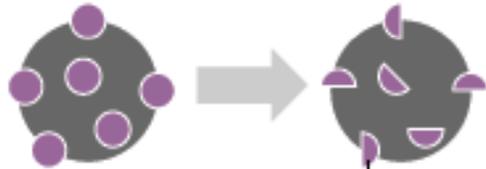
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EVOLUZIONE

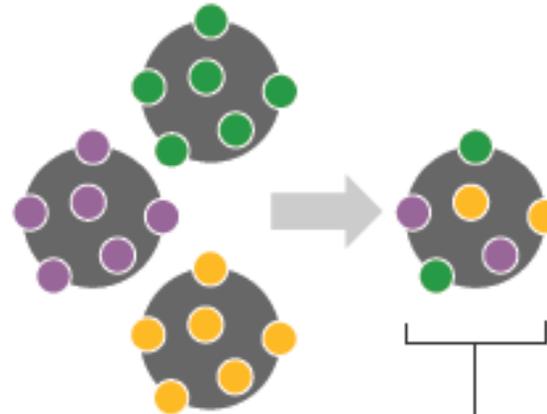
Mutation

Antigenic drift



small
mutations

Antigenic shift



new
strain





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DISTRIBUZIONE

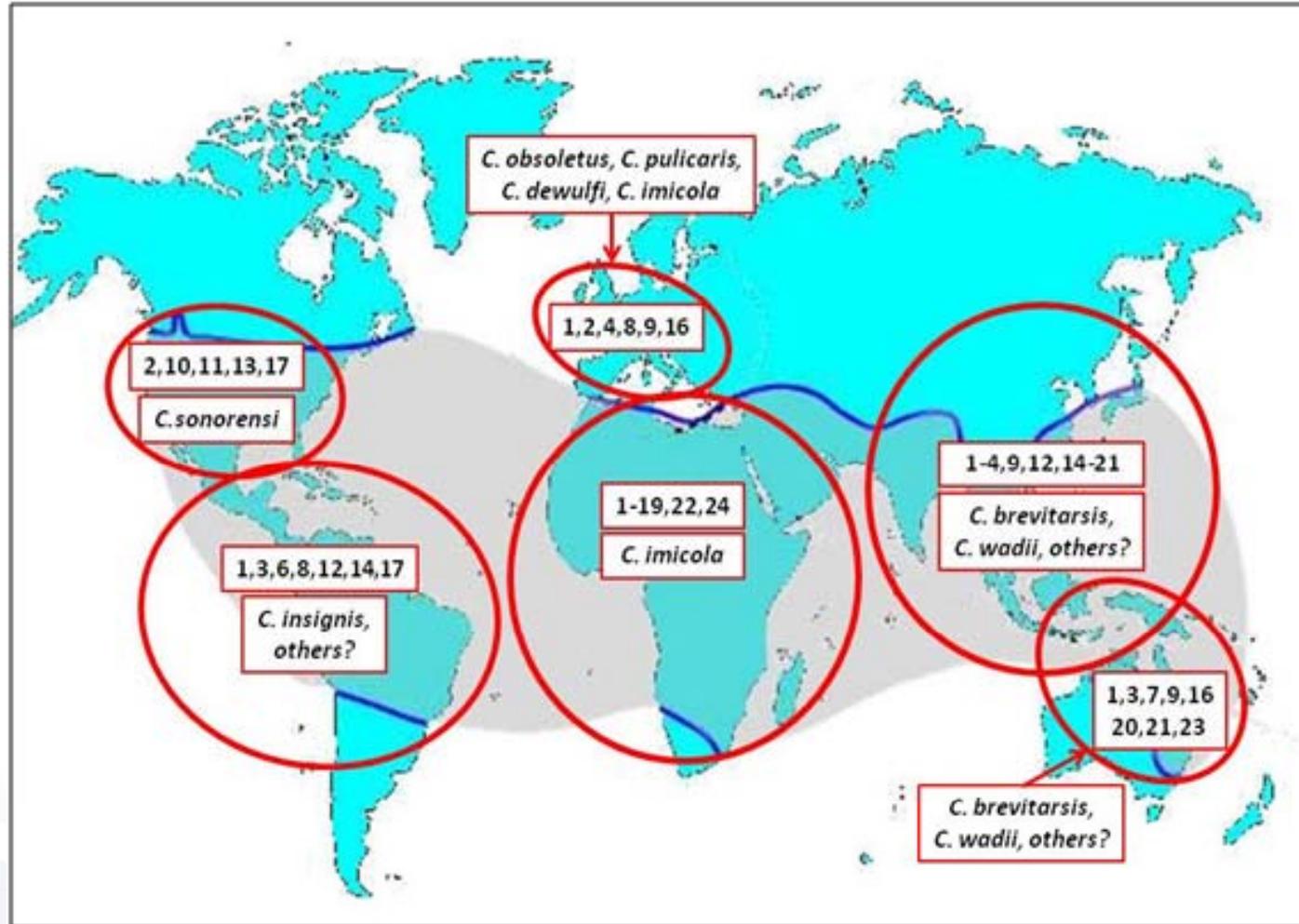
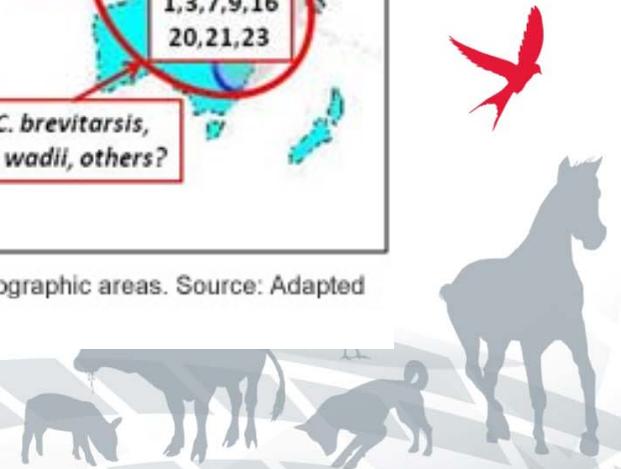


Fig. 2: Global distribution of serotypes of Bluetongue virus and *Culicoides* spp. of the geographic areas. Source: Adapted from Tabachnick (2010). *J Exp Biol*, 213: 946-954..





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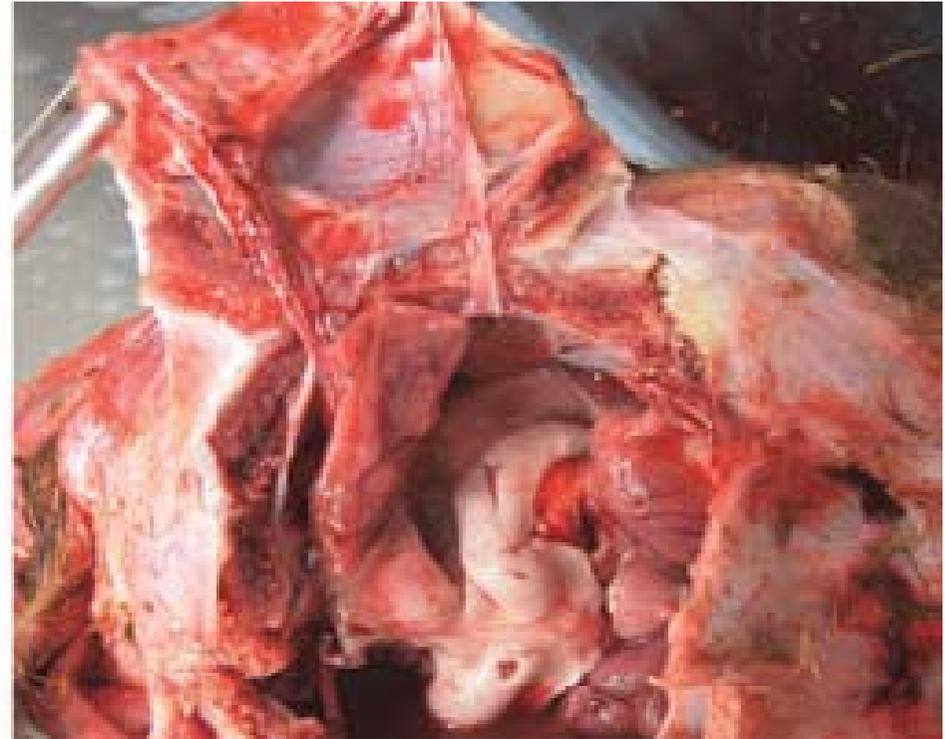


L'infezione transplacentare e' tipica di alcuni BTVs: stipiti adattati su cellule e MLVs





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Savini G, Lorusso A, 2013





Bluetongue

Restricted zones* as of 29 September 2009

This map includes information on the bluetongue virus serotypes circulating in each restricted zone, which permits, for the purposes of Articles 7 and 8 of Regulation No 1266/2007, the identification of the restricted zones demarcated in different Member States where the same bluetongue virus serotypes are circulating.

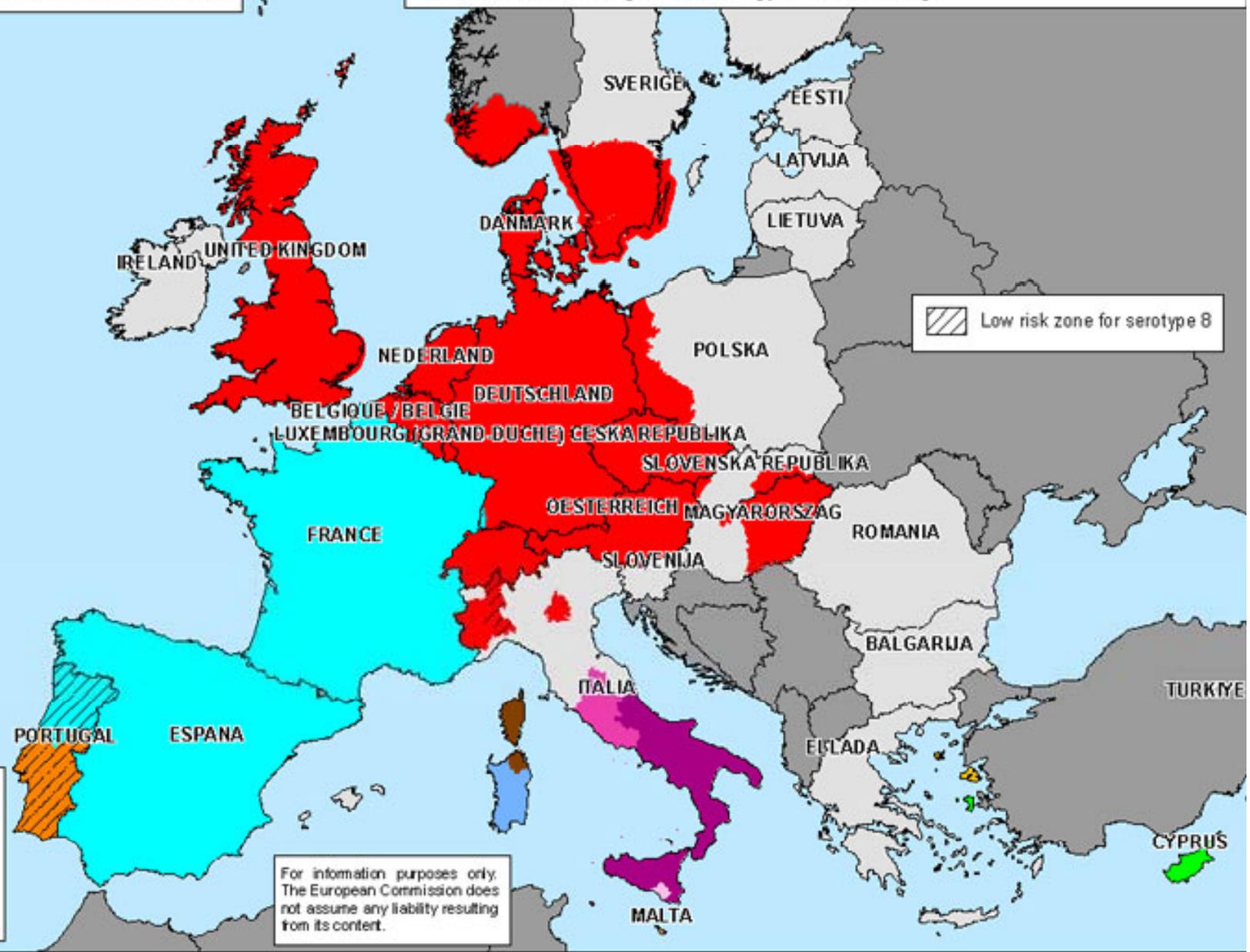
Zone (serotypes)

- A(2,4,9,16)
- B(2,16)
- D(16)
- F(8)
- G(1,2,4,16)
- K(1,8)
- S(1,4,8)
- T(1,2,4,8,16)
- U(16,8)
- V(2,4,8,9,16)

Low risk zone for serotype B

* as defined in Article 2 (d) of Commission Regulation No 1266/2007: geographic areas where surveillance and/or protection zones have been demarcated by the Member States in accordance with Article 8 of Council Directive 2000/75/EC.

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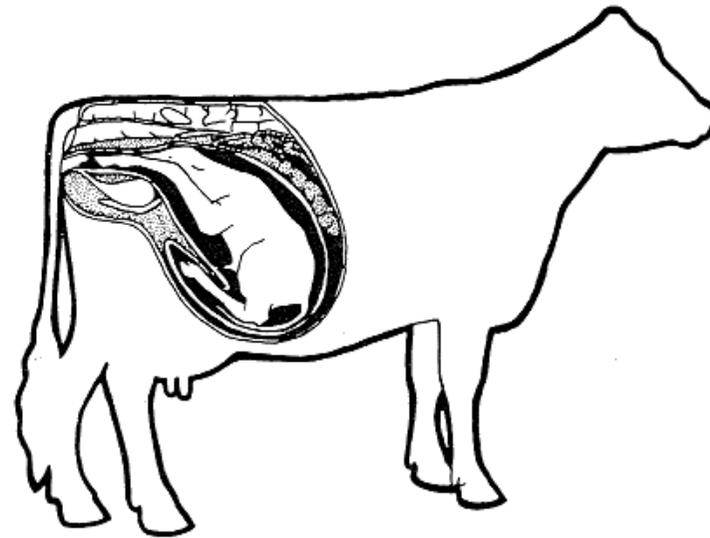




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Infezione persistente dei ruminanti a seguito della trasmissione verticale (TV) e' stata dimostrata per il **BTV-8 Europeo**

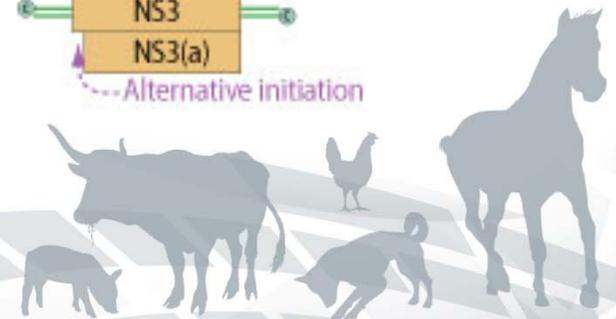
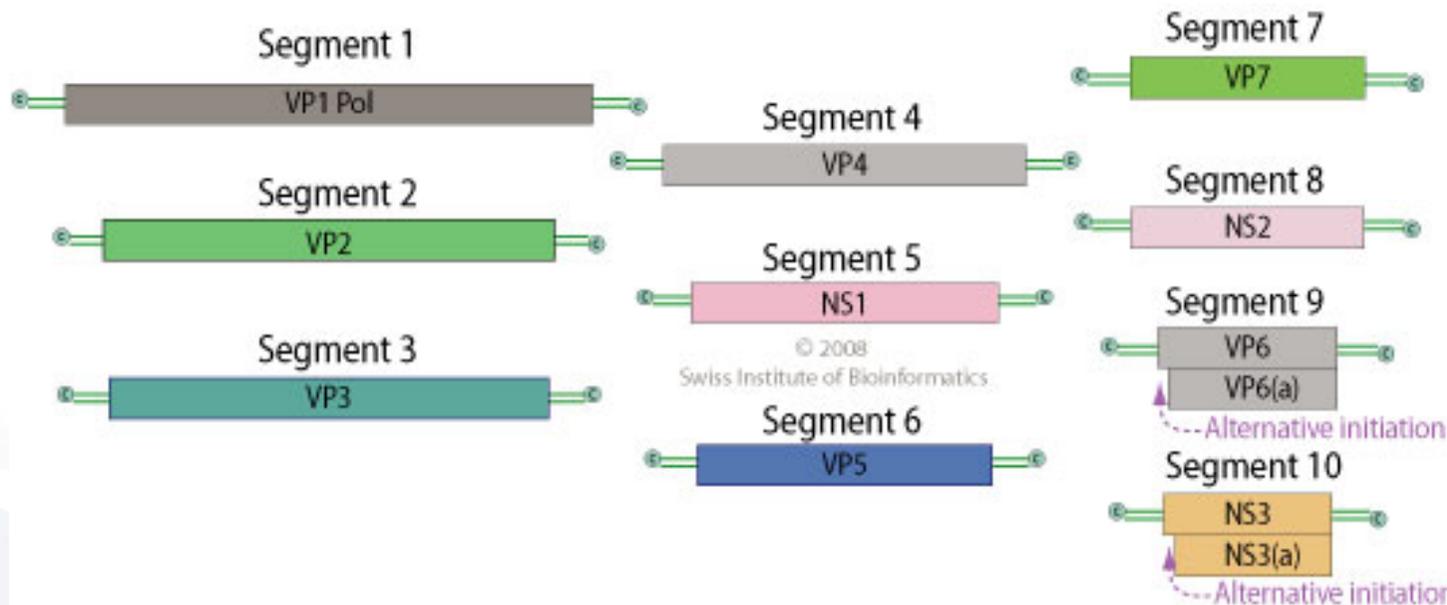




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IDENTIFICAZIONE DEI SEGMENTI GENOMICI RESPONSABILI DELLA TRASMISSIONE VERTICALE



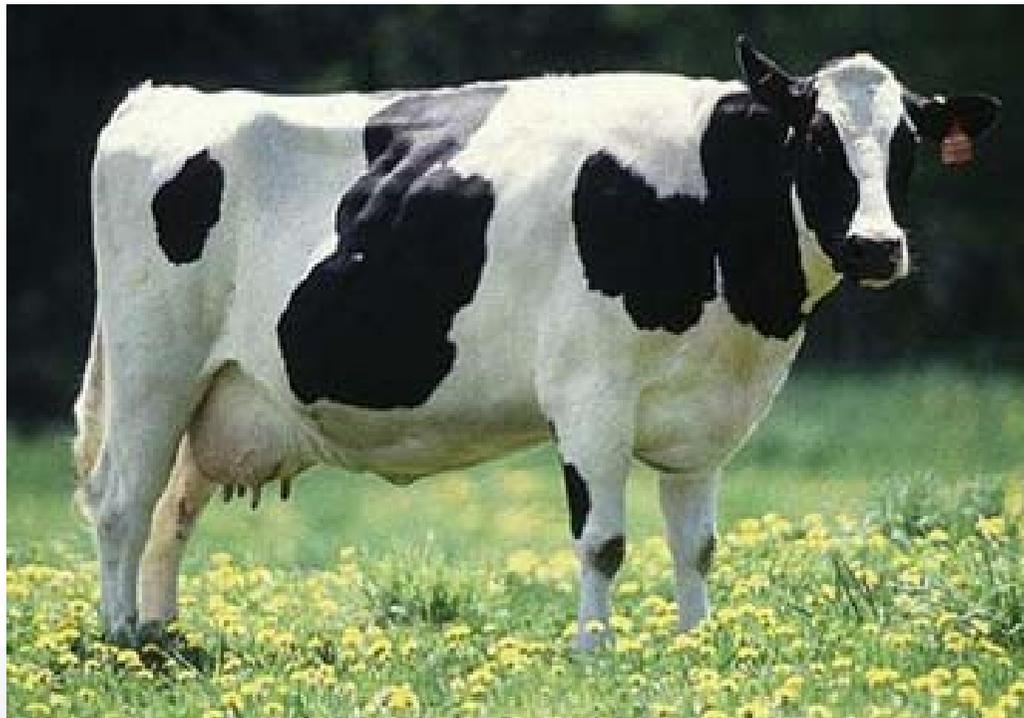


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BTV-8

Bovine a fine gravidanza





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Materials and Methods

Animals

- 24 cows free of respiratory, digestive diseases. Insect proof facilities
- late stage of pregnancy (approximately 7/8 months)

Infection

- Three groups were formed and infected as follows:
- 10 animals with BTV-8 European strain
- 10 animals with BTV-8 South African strain
- 4 animals with MEM culture medium

Strains

- European BTV-8 isolated in Belgium in 2008 (De Clercq)
- South African BTV-8 reference strain
- **Both strains were cell-adapted, low passage**

Length of the study

- Blood and serum samples were collected for six months
- Viraemia was assessed by virus isolation and qPCR

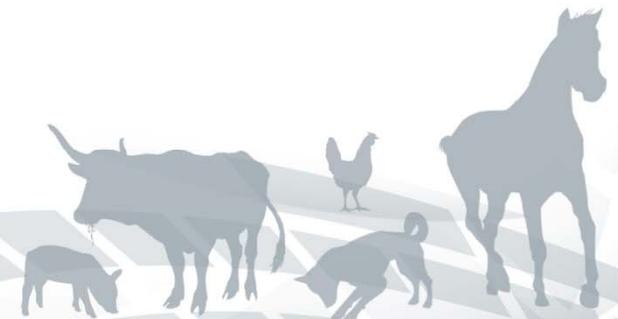
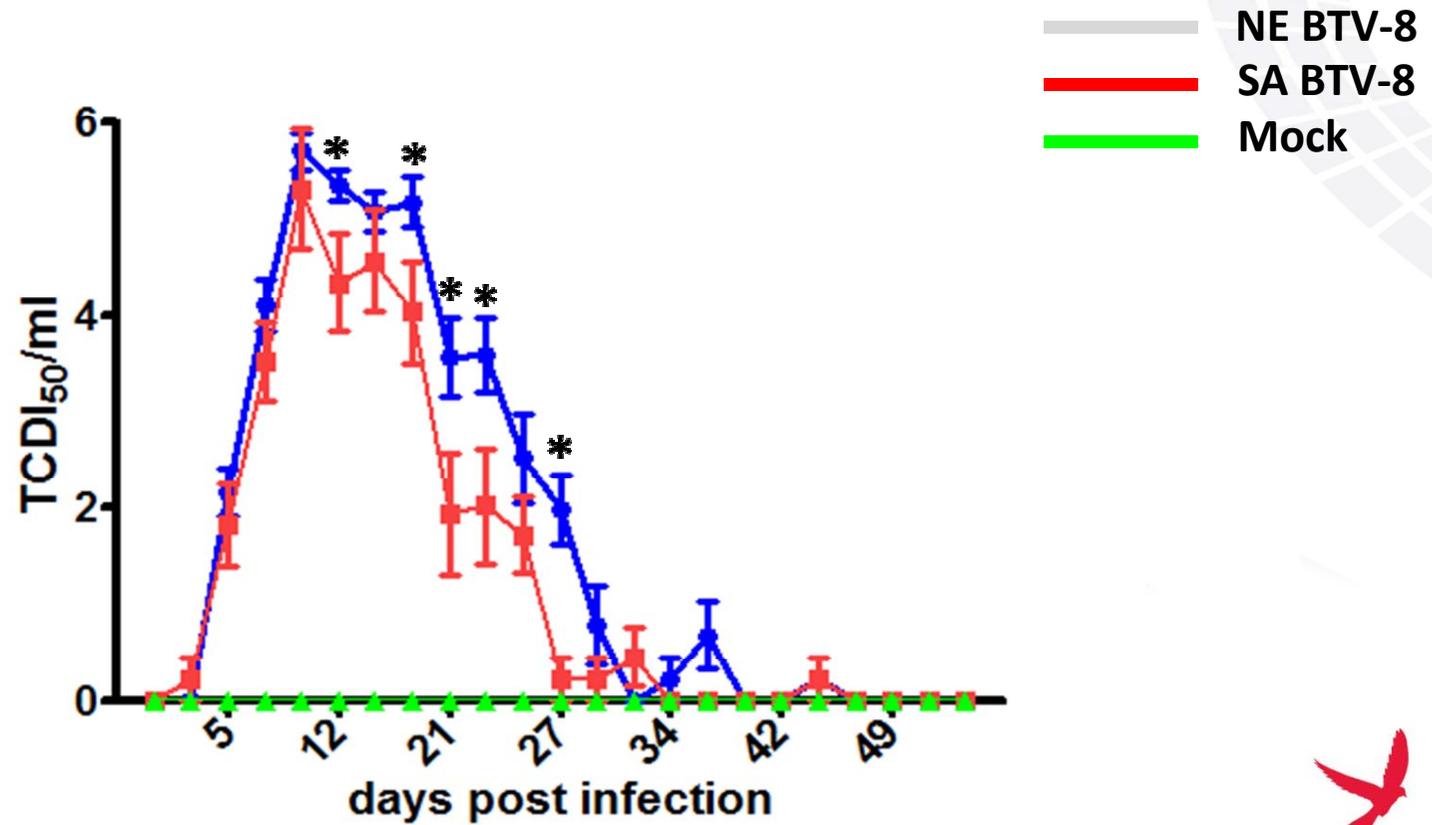




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VIREMIA NELLE MADRI



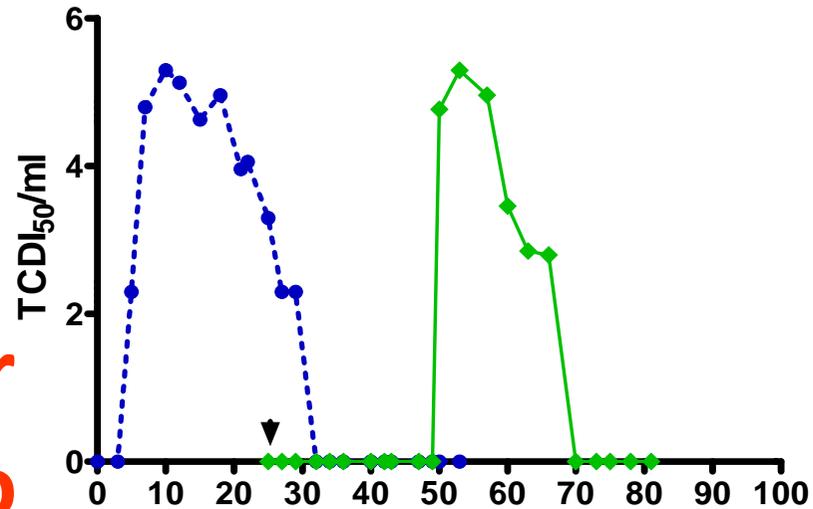


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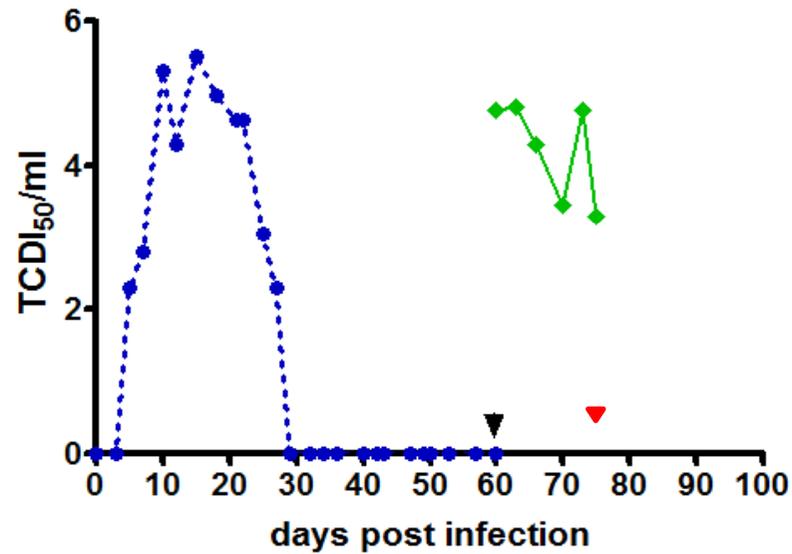
**Due vitelli per
gruppo hanno
mostrato
viremia**

Cattle D/Calf 34



NE BTV-8
cattle D/calf 34

Cattle L/Calf 37



NE BTV-8
cattle L/calf 37

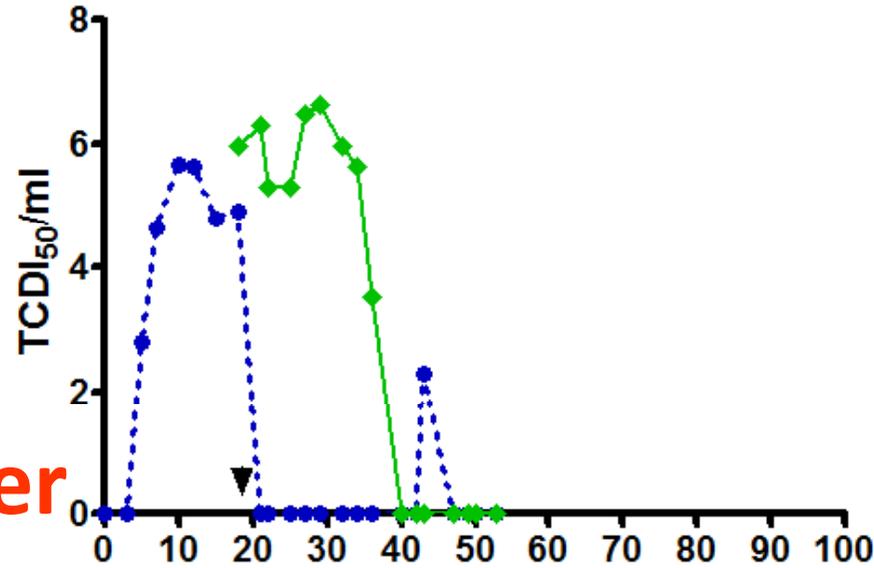




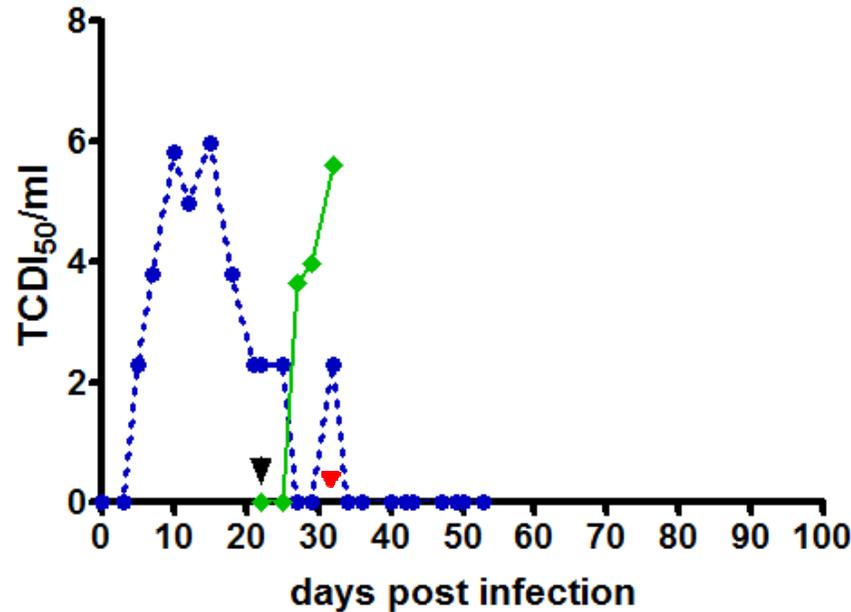
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**Due vitelli per
gruppo hanno
mostrato
viremia**



SA BTV-8
cattle J/calf 29



SA BTV-8
cattle S/calf 32





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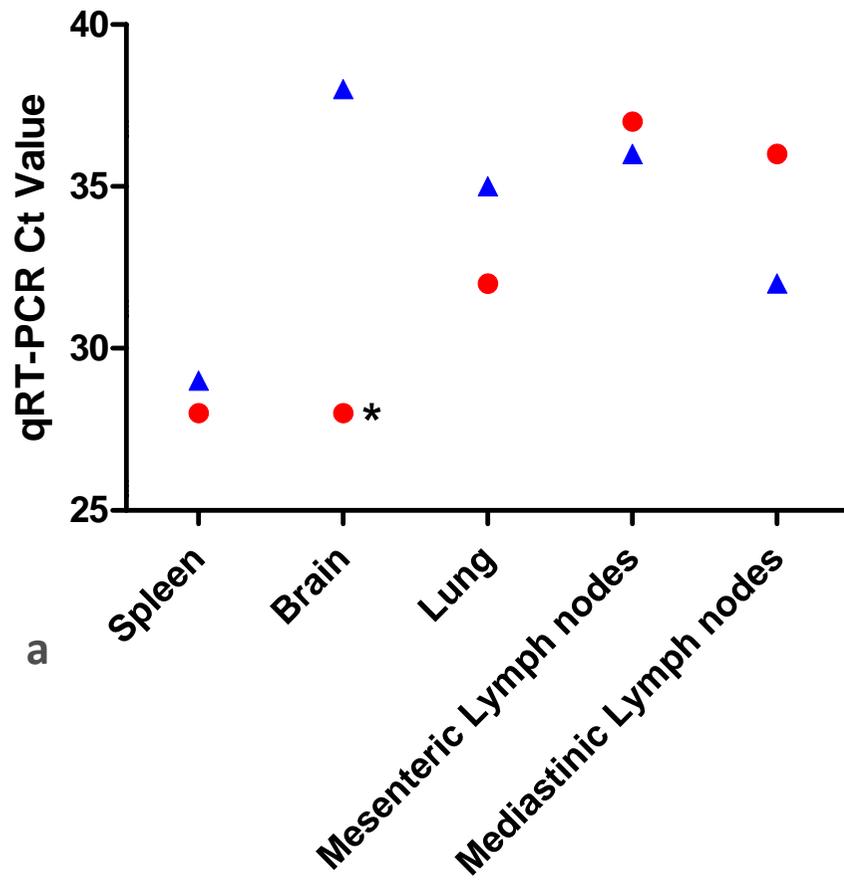


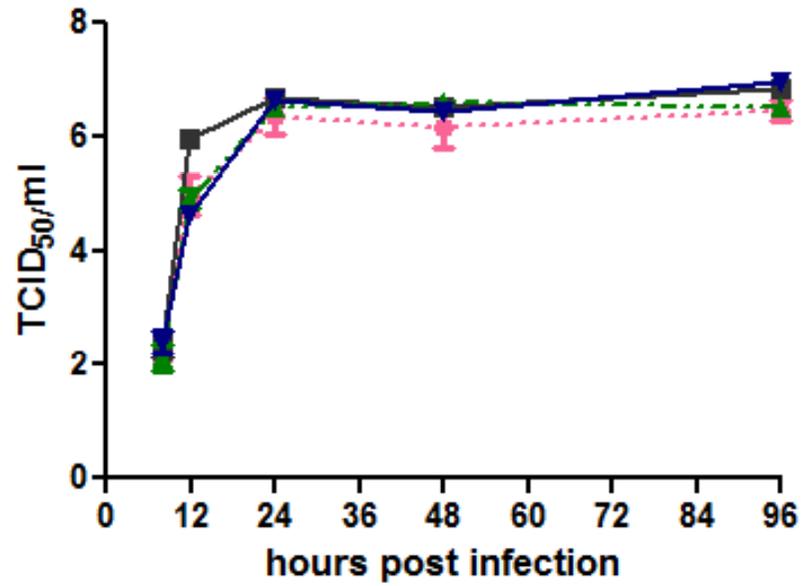
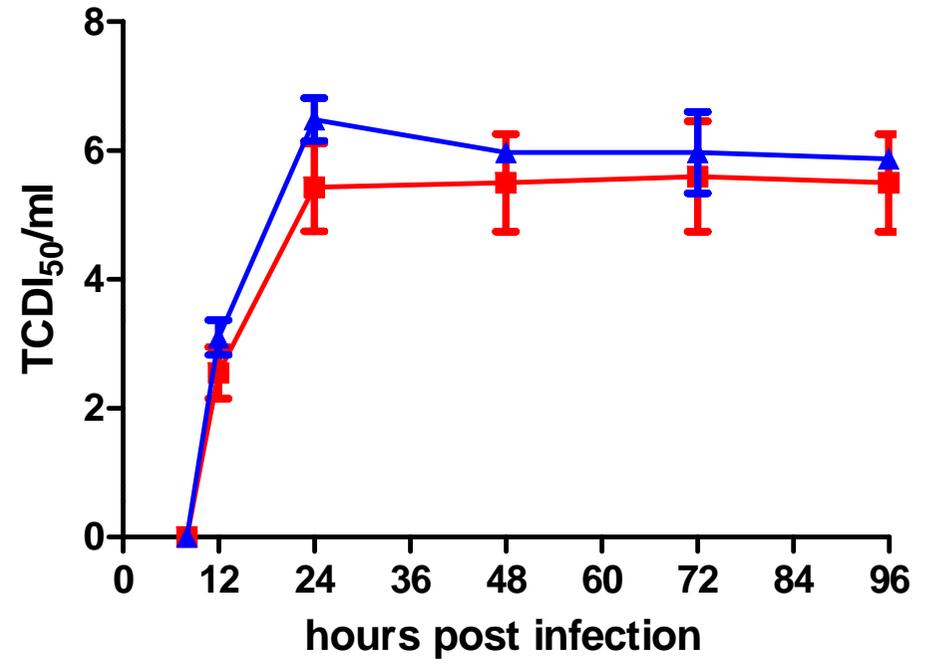
Tutti i virus isolati dal sangue dei vitelli e madri sono infettanti in vitro



La viremia di piu' lunga durata
nei vitelli e' di 20 giorni









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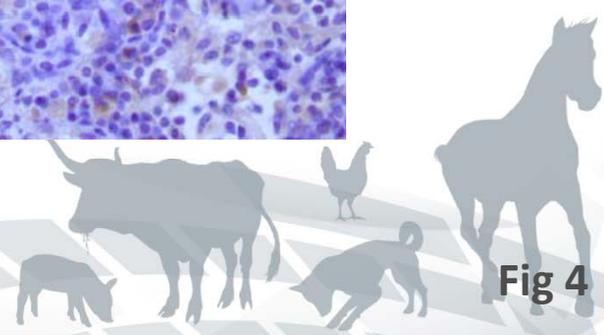
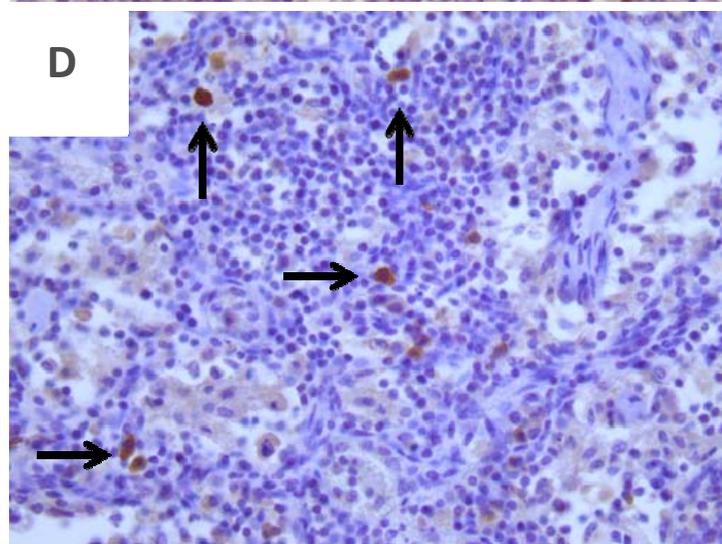
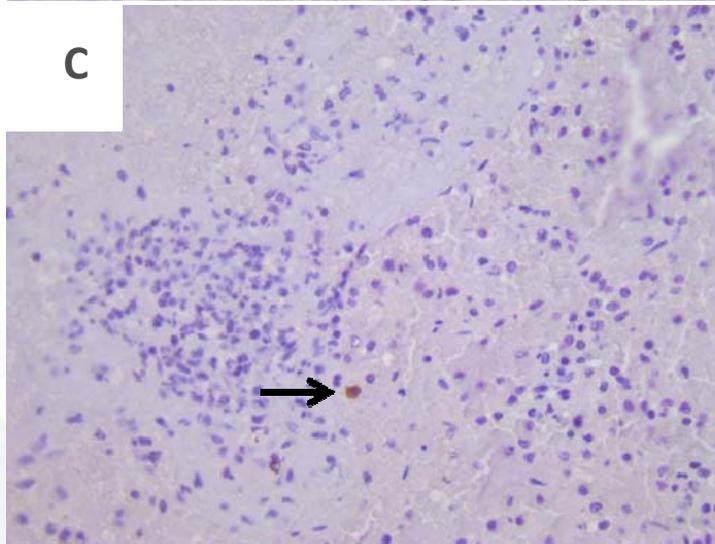
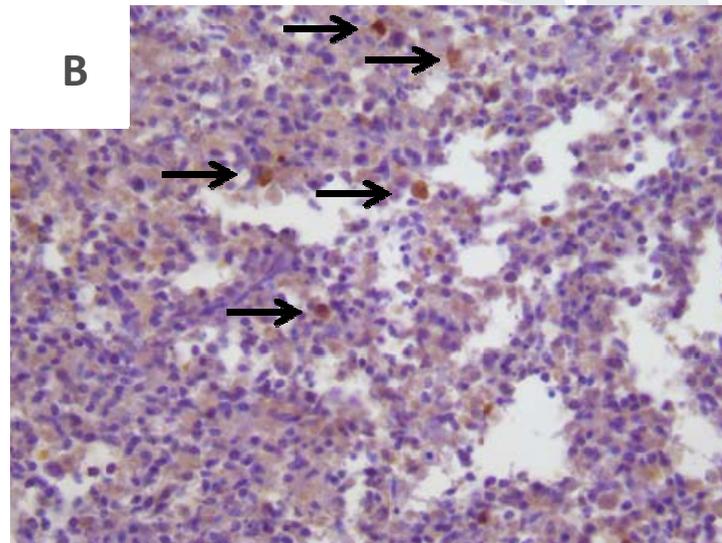
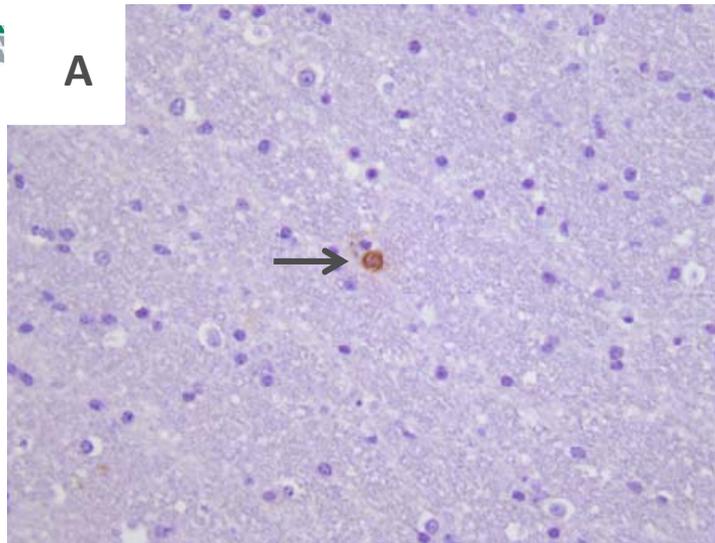


Fig 4

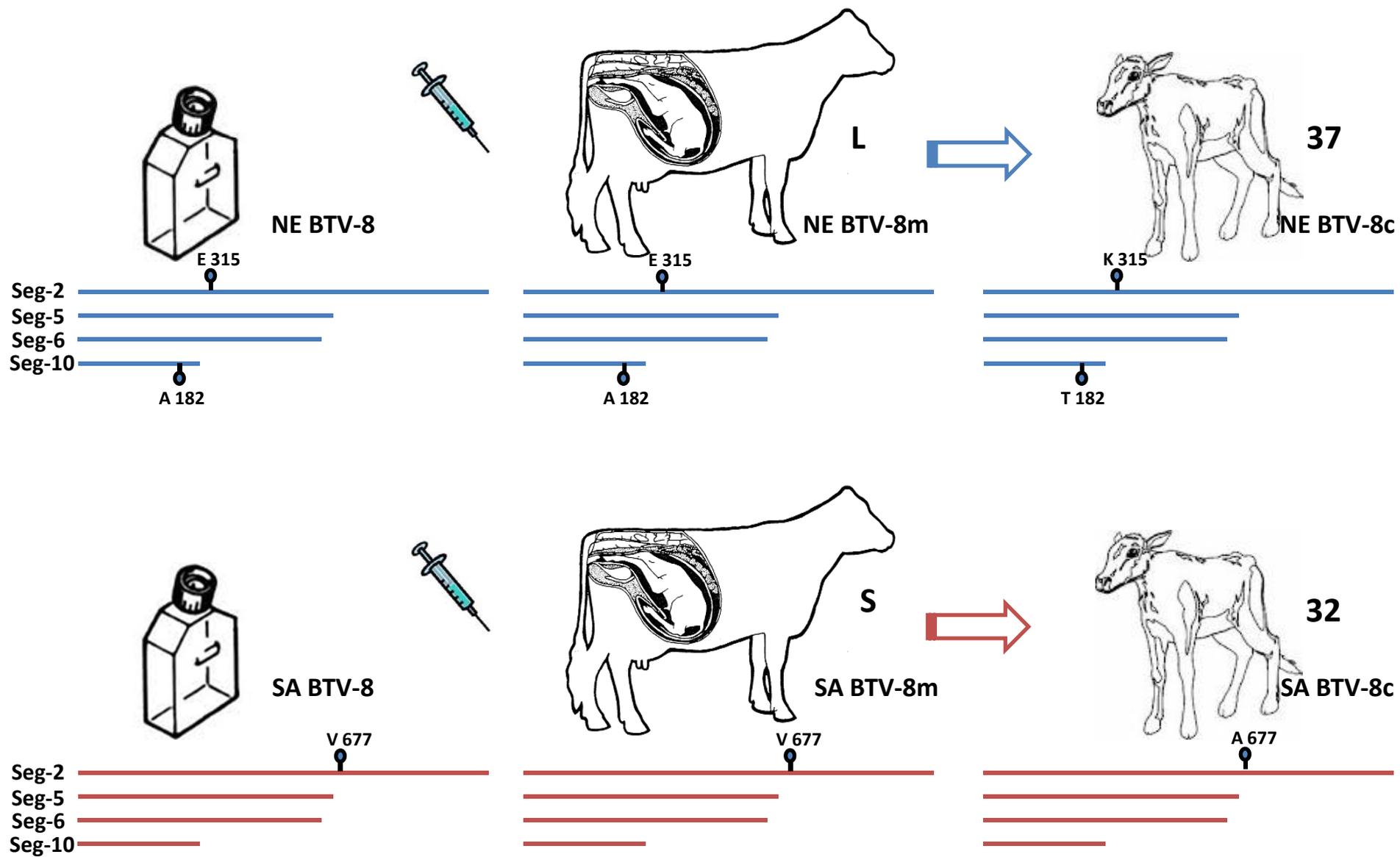


Fig 5

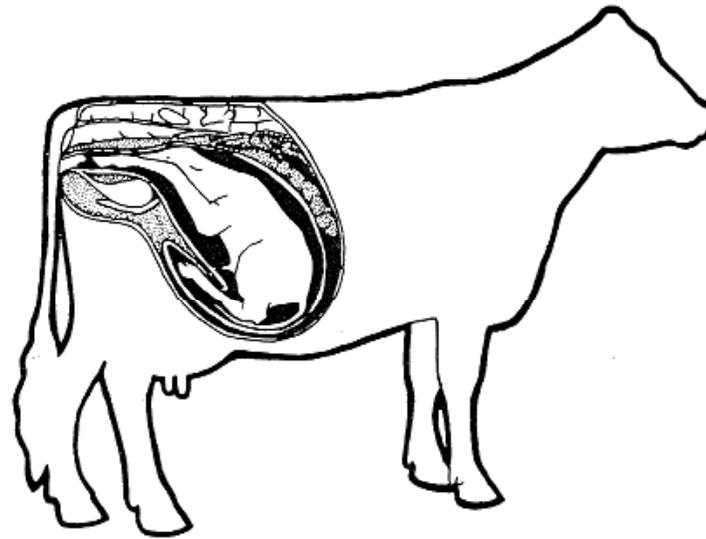


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Conclusioni 1

BTV-8 SA viene trasmesso per via verticale



Isolato dal cervello di un vitello viremico



Fig 4

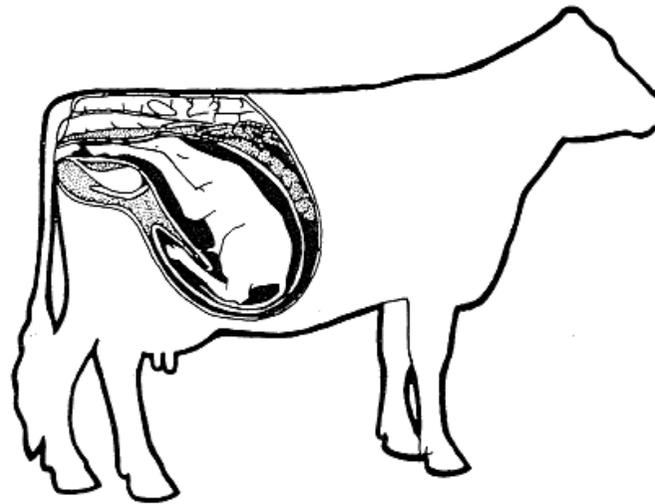


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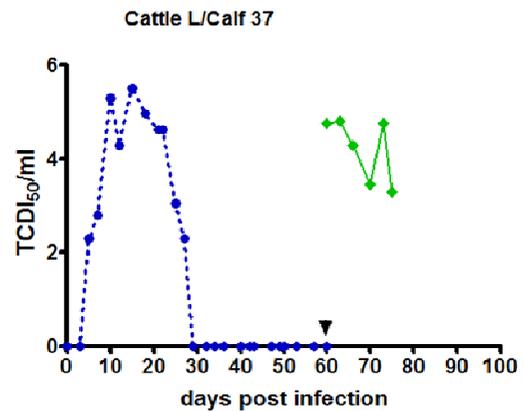
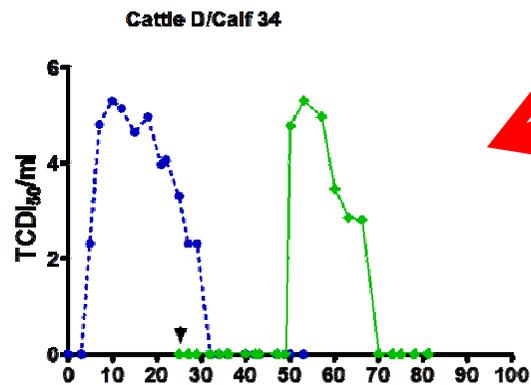
Conclusioni 2

Bovine a fine gravidanza rappresentano un ottimo modello per valutare la TV



Conclusioni 3

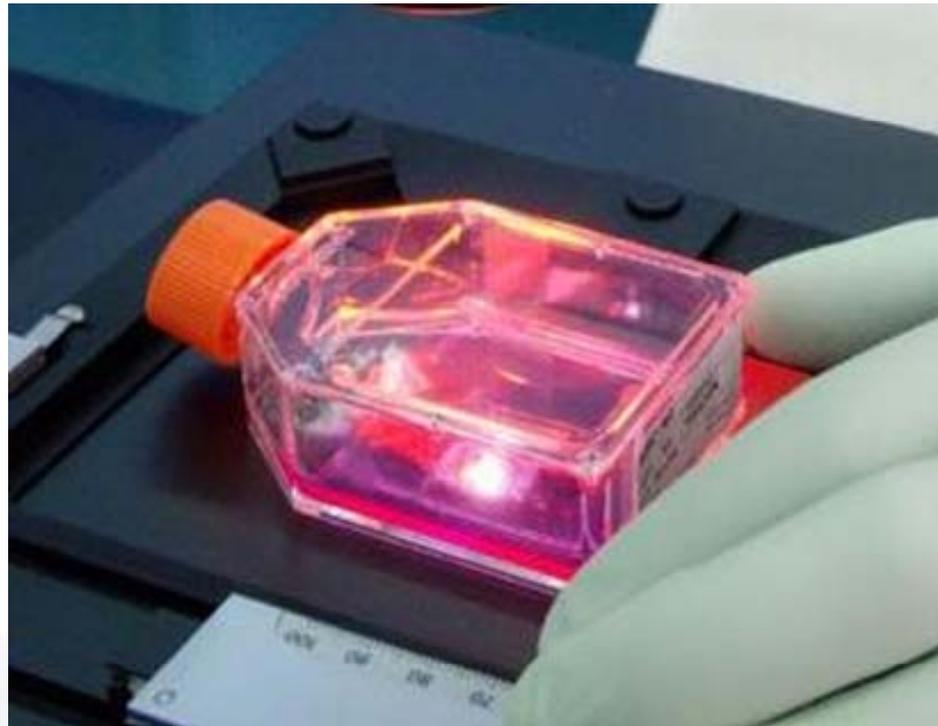
Finestra viremica Madre/Vitello: overwintering





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Entrambi i ceppi inoculati sono cell-adapted





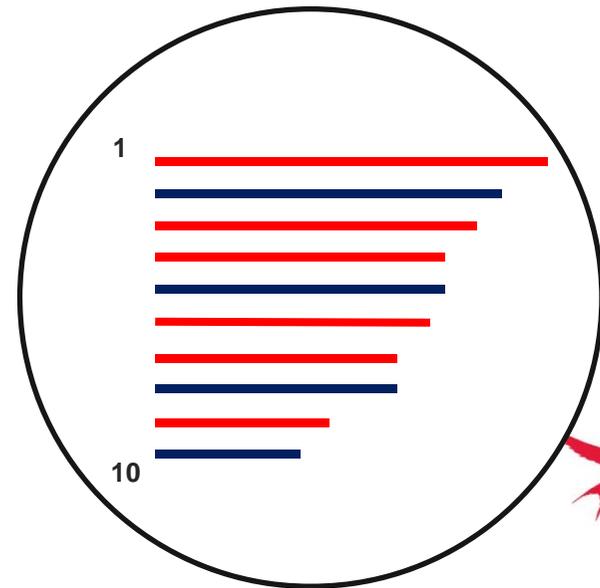
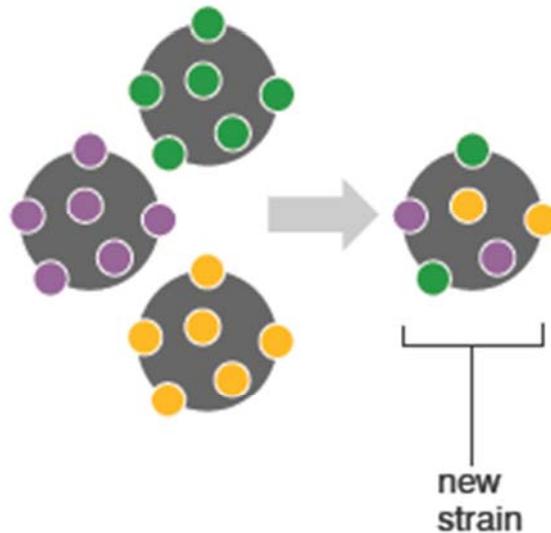
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BTV-1 x **BTV-8** (France); **BTV-8** x BTV-6

Antigenic shift



BTV-1 FRA2008/24

Shaw et al., 2012; Maan et al., 2010



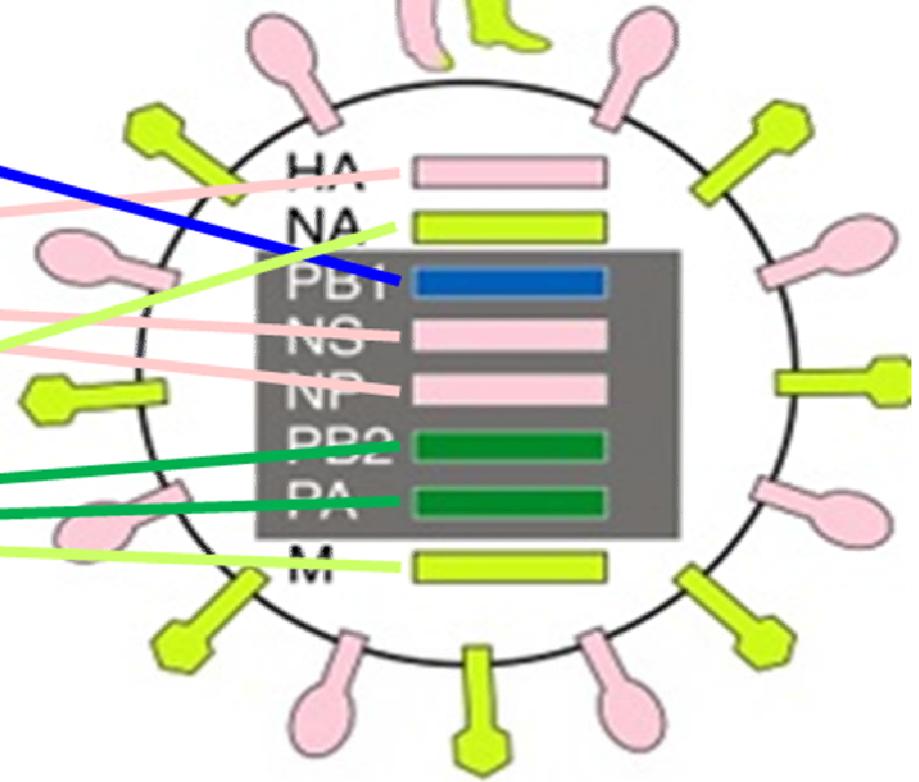
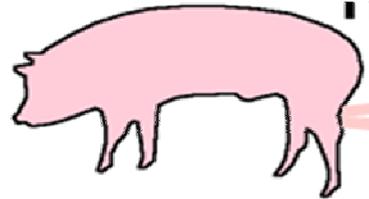
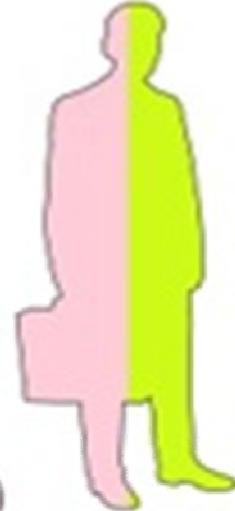


VIRAL FITNESS





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Pandemic H1N1



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FUTURE PERSPECTIVES (1)



NEXT GENERATION SEQUENCING in IZSAM



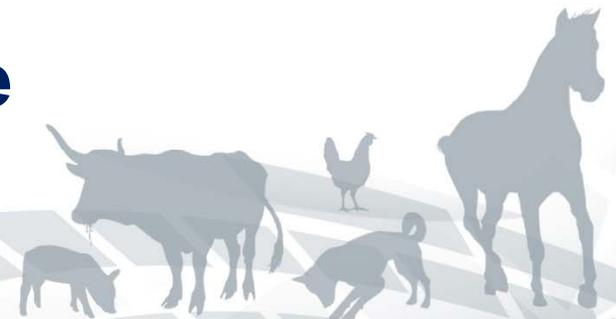


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FUTURE PERSPECTIVES (2)

I virologi della nuova generazione

- **Sequenziamento ed analisi filogenetica**
- **Studi di reverse genetics per patogenesi**
 - **Metagenomica**
 - **Evoluzione virale**





NO PERSONAL YARD but..

Team Work







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Virology Unit

- **Andrea Carvelli**
- ***Annapia Di Gennaro****
- **Valeria Marini**
- **Ottavio Portanti**
- **Irene Carmine**
- **Maura Piscicella**
- **Claudia Casaccia**
- **Alessandra Leone**
- **Massimo Spedicato**
- **Anna Lucia Bellacicco**
- **Liana Teodori**
- **Sabrina Olivieri**
- **Barbara Cipro**
- **Miriam Berti**
- **Giovanni Savini**

Histopathology Unit

- **Gabriella Di Francesco**
- **Annarita D'Angelo**
- **Giuseppe Marruchella**

Sequencing Unit

- **Maurilia Marcacci**
- **Cesare Camma'**
- **Chiara Pinoni**

Entomology Unit

- **Maria Goffredo**



They are all **DEAD**! Well, almost.

