

MAPPING THE ANTIGENIC VARIATION OF FMDV SEROTYPE A

A. Ludi^{*1,2,3}
 D. Horton^{3,4}, M. Mahapatra¹, D. King¹, N. Knowles¹,
 D. Paton¹, D. Smith³, J. Wood², Y. Li¹, J. Hammond¹

1. Institute for Animal Health Pirbright Laboratory UK
 2. Cambridge Infectious Disease Consortium, Univ. of Cambridge
 3. Center of Pathogen Evolution, Univ. of Cambridge
 4. Veterinary Laboratories Agency, Weybridge UK

Summary
 Antigenic cartography is being used to quantify and visualize antigenic relationships of FMDV Serotype A with the data then being compared to full capsid sequences.

Conclusion
 Virus neutralization assays and capsid sequencing for 53 Serotype A viruses so far does not show a simple relationship between the antigenic and the genetic data. As well as increasing the data set further analytical work is currently being carried out.

What is antigenic cartography?

Explanation of Antigenic Cartography

	Neutralization Value	r ₁ -values
Vaccine Virus: A/IRQ/24/64	426	1
Field Virus: A/SUD/77	115	0.27

Explanation of Antigenic Cartography

	Neutralization Values	r ₁ -values
A/IRQ/24/64	427	1
A/SUD/77	115	0.27

Visualizing and quantifying antigenic relationships among viruses using serological data

Explanation of Antigenic Cartography

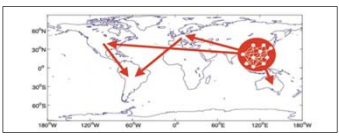
	Neutralization Values	r ₁ -values
A/IRQ/24/64	427	1
A/PAK/02/2009	115	0.27

Visualizing and quantifying antigenic relationships among viruses using serological data

Increased resolution as virus position not dependent on one serological test

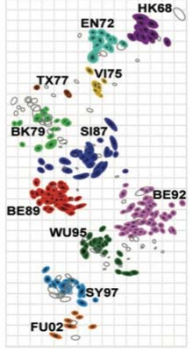
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Explanation of Antigenic Cartography



- Visualizing and quantifying antigenic relationships among viruses using serological data
- Increased resolution as virus position not dependent on one serological test
- A key component of vaccine selection of pandemic and seasonal flu*

*Smith, DJ. Mapping the Antigenic and Genetic Evolution of Influenza Virus. Science 2004, 305:371-376.



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How are the maps constructed? A Vienna Example

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Eugene Fritz McDonald




Prater Fair
1.86km



Hofburg Palais
1.25km



Palais Liechtenstein
1.28km

<http://www.planetware.com/pictures/-vienna-a-w-vie.htm>

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1.28km
1.86km
1.25km

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Explanation of antigenic cartography

- Each neutralization value is converted to an antigenic unit

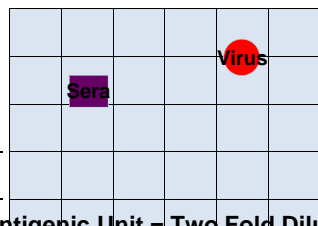
Equation

$$\frac{(\log_2 \text{ of highest neutralization titer})}{(\log_2 \text{ of field virus neutralization titer})}$$

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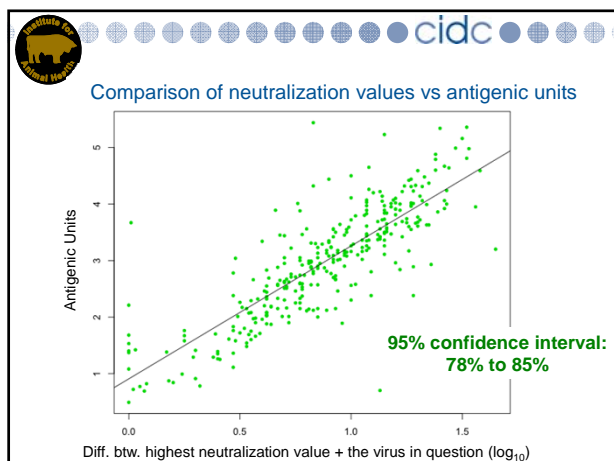
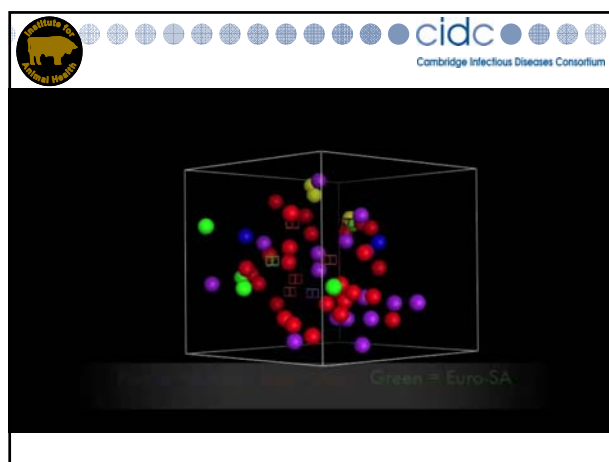
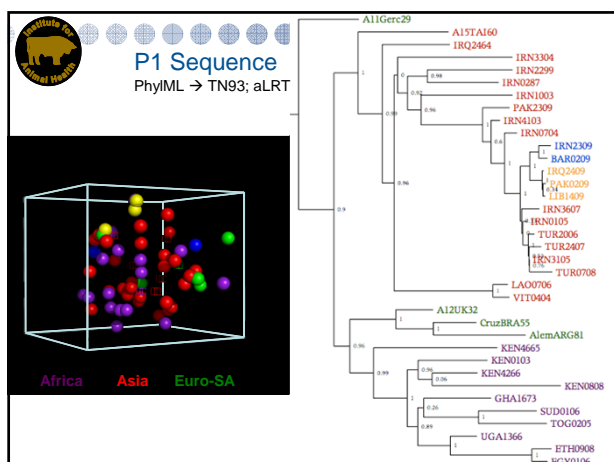
Explanation of antigenic cartography

- A map is then constructed using these antigenic values as distances



1 Antigenic Unit

1 Antigenic Unit = Two Fold Dilution



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Conclusion

The antigenic data does not obviously reflect the genetic data. Current work focused on increasing the resolution and generating more data for comparison.

Future Work

- ✦ More in depth analysis of both sequence and antigenic data
- ✦ Addition of more serum to increase the resolution of antigenic maps
- ✦ Construct the antigenic map using LPBE
- ✦ How does pooled sera compare to individual serum?
- ✦ Does sera from different species produce the same antigenic map?

