308BMS Medical Microbiology COURSEWORK

Individual Poster Production

(Also see the Assessment Information sheet on Moodle)

Data based on 2 papers on a specific aspect of medical microbiology

Submission date:
Monday 30th April 2018

Aims of poster

- To enable "in-depth" study of a specific topic in pathogenicity **or** epidemiology .
  - You are given a microbial pathogen and YOU must decide on your specific topic in virulence **or** epidemiology.
- Based on a number of recent journal articles.

- To **demonstrate your critical appraisal of data and ability to assimilate information from different sources**,

- and to present your work in this **scientific format**.

What you need to do…..

- **Find the 2 initial references for the data sources.**
  - **Published in the last 10 years. Use Library and/or on-line. The more recent the better.**
  - **On your allocated pathogen – pathogenicity/virulence factor or epidemiology, i.e. a specific "topic".**
  - **Full journal research papers. Not a review article, NOT an abstract, NOT from a textbook.**
  - **The 2 papers must NOT be by the same authors and must NOT be from the same research group/institution.**

  - Poster **MUST CONTAIN DATA (as graphs, tables etc) - REQUIRES COMPARISON OF DATA FROM 2 scientific journal PAPERS. (You will probably need to select particular data from each journal article).**
  - **Carefully select your key reference papers – remember that you are producing an integrated comparison/analysis.**
  - **You will need other sources for your introduction and discussion. (As a guide your poster would be based on 4-6 referenced sources in total).**

Poster format (1)

- **SIZE**

  A single side

  FONT

  Easily readable

  Use “Formal” fonts – Times New Roman, Arial etc. Use of colour.

  Must be easily readable (look at examples)

- **“STYLE”**

  Short, succinct paragraphs/sections – write scientifically.

  Could use bullet points, but maintain depth of content and do not “over use”.

  Appropriate Formal Scientific layout style

- **PRODUCTION**

  Desk-top published e.g. Using Powerpoint™.

  A single page/slide

Poster format (2)

- **SECTION FORMAT – guidelines**

Title

of topic but not the title of a paper, e.g.

Adhesion of…. Epidemiology of ….. Intracellular survival of ….

Your name (as the author)

Background [space allocation: 15% of poster content]

introduces topic

to the disease/organism

focussing on topic area

Main section [space allocation: 70% of poster content]

*** integrating material/data from journal papers & other sources**

*** remember text**

*** some indication of methods**

*** highlighting aspects**

*** labelling diagrams/photos (arrows, text alongside images, etc.)**

*** results and discussion (comparisons, significance, incorporation of some wider literature etc. – make sure that results and discussion are clearly distinguished)**

It must be clear how the data have come from multiple journal papers

Summary [space allocation: 15% of poster content]

Summarise topic

References

in the CU Harvard format

cited correctly within text

correctly formatted at end

An example of how to use Powerpoint to produce a poster layout

Age-related seroprevalance to a recombinant immunodominant Cryptosporidium sporozoite antigen in Sao Paulo, Brazil.

M.J. Cox[1], R.S. Azevedo[3], K. Elwin[2], E. Massad[3].

[1]Cell and Molecular Biosciences, School of Science and the Environment, Coventry University

[2]Cryptosporidium Reference Laboratory, PHLS, Singleton Hospital, Swansea.

[3]Faculty of Medicine, Sao Paulo University, Sao Paulo, Brazil

Background

• Cryptosporidium is a ubiquitous protozoan parasite causing gastroenteritis which is usually self-limiting unless the host is immunocompromised (e.g. HIV infected) when it can be life-threatening. Repeat and asymptomatic infections are known to occur but the development of an effective immune response is not well understood.

• In order that effective control programmes can be implemented the epidemiology of the parasite needs to be understood. There have been few studies to investigate age-related rates of transmission and the dynamics of the humoral response in normal healthy communities.

• Two immunodominant sporozoite surface antigens (15/17kDa and 27kDa), which have been associated with protective responses, have been used in population based serological studies by Western blot analysis but the technique is laborious and expensive.

• Levels of oocsyt contamination in Sao Paulo water systems have been recorded as very high but there have been no population based serological studies. A recently developed recombinant form of the 27kDa antigen (Priest *et al*., 1999) has been used here to investigate transmission rates in Sao Paulo, Brazil.

Methods

•A total of 512 sera from all age groups and 39 pairs of maternal-cord sera were collected from the town of Caieiras, northern Sao Paulo, by random sampling techniques (Azevedo, R *et al*., 1994).

• Sera were screened by ELISA using recombinant cp23 protein as antigen which was produced based on methods previously described (Priest et al., 1999)

• Western blot analysis, using crude sporozoite as antigen, was used to confirm identity of the cp23 antigen, correlation of sera and comparative sensitivity of detection of the positive control.

Results

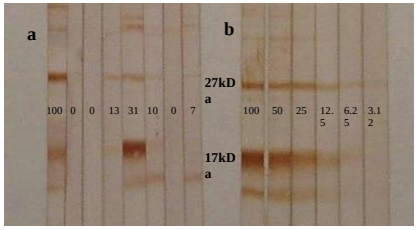


Figure 1. Western blot analysis of a) serum samples from Sao Paulo and b) a titration of a high titre positive control. Numbers shown are the percentage intensity of the 27kDa band compared to the positive control. The location of the 27- and 17kDa antigens are indicated. The sensitivity of the Western was below 10% of the positive control. Identity was also confirmed using a monoclonal antibody (data not shown)

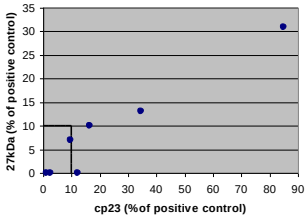


Figure 2. Comparison of antibody concentrations obtained from Western blot analysis using sporozoite antigen (intensity of the 27kDa band) versus the recombinant form of the 27kDa antigen, cp23. The graph illustrates the 10% threshold used to assign positive samples (Frost et al, 2000). A good correlation confirms the specificty of the cp23 but it appears to be more sensitive than crude sporozoite proteins used in the Western.

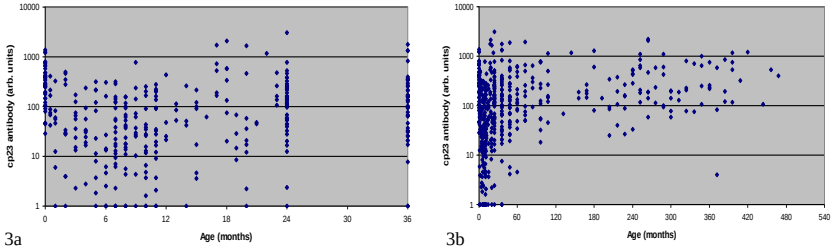


Figure 3a. Individual anti-cp23 antibody levels in infants aged 0 to 3 years. Cord sera are seen to contain high levels of maternal antibody. Some evidence of antibody decay is seen in the first 6 months. There is no clear distinction between seropositive and seronegative sera in infants 6 months of age and above. Analysis of maternal-cord pairs sera (not shown) showed a significant correlation (r=0.84, p<0.001) but no significant difference in geometric mean titres (antibody transfer ratio = 0.99) providing no evidence of active placental transfer.

Figure 3b. A broad range of antibody levels is seen in adults which may result from a rapid decay in titres following infection. Mean antibody titres in seropositive 1 to 10 year olds (n=119, x=2.47 log units) was significantly lower than in individuals aged 20 years and above (n=50, x= 2.61, t=1.97, p=0.026).

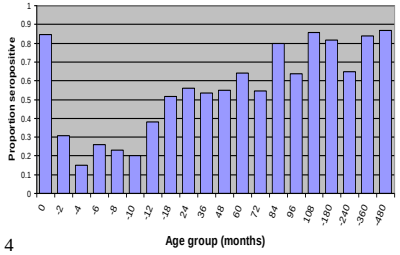


Figure 4. There was a rapid decay in the proportion seropositive following birth then an increase with age as infants were infected such that 60% had evidence of infection by 5 years of age then 80% throughout adulthood.

Seropositivity is defined as being 10% or more of the positive control as has been used previously.

Summary

• The recombinant cp23 ELISA appears a more sensitive method of detecting antibody in human sera compared to the use of sporozoite proteins in a Western. Further studies are required to evaluate these assay systems for seropeidemiological purposes.

• The broad range of antibody levels observed supports some previous observations that the response to the 27kDa antigen maybe short-lived and thus there may be false negatives. However, there appears to be a boosting effect upon re-exposure as baseline antibody levels increase with age.

•There is some evidence to suggest that maternal antibody is not actively transferred across the placenta, not seen before in Cryptosporidium and only seen previously for Streptococcal capsular antigen and *H.influenza*.

•Serological studies such as these can provide an insight into the dynamics of Cryptosporidium infection within populations.

Acknowledgements

We thank F.Floyd and T. Muller for sporozoite antigen, positive control serum as well as helpful discussion and comments on the script. We also thank J.Priest for the recombinant cp23 antigen and monoclonal antibody and V. Williams and S. Tompsett for technical assistance. Serum collection was funded by FAPESP, Sao Paulo.

References

Neto RSD, Silveira ASB, Nokes DJ, *et al* (1994): Rubella Seroepidemiology in a Nonimmunized Population of Sao- Paulo State, Brazil. *Epidemiology and Infection* 113:161-173

Frost FJ, Muller T, Craun GF, *et al* (2000): Serological analysis of a cryptosporidiosis epidemic. *International Journal Of Epidemiology* 29: 376-379.

Priest JW, Kwon JP, Moss DM, *et al* (1999): Detection by enzyme immunoassay of serum immunoglobulin G antibodies that recognize specific Cryptosporidium parvum

Think about how to select and present data from your chosen sources… always acknowledge sources

http://jcm.asm.org/cgi/reprint/40/12/4493.pdf - Microsoft Internet Explorer

Previously, antibodies to HEV were detected in rodents in the Central Asian regions of the former Soviet Union, where hepatitis E is endemic, and in the United States, where hepatitis E is not endemic (20, 21, 26). These observations suggested that rodents were infected by HEV; nevertheless, the

breaks, one can speculate that excreta from infected rodents also can contaminate water (or foodstuffs) with the virus, providing a vehicle for enteric transmission to other susceptible rodents, humans, or other species such as swine.

The 13 to 21% prevalence of antibody to HEV among *Rattus*

TABLE 3. DNA sequence homology between the Nepalese rodent HEV and other HEV isolates used for phylogenetic analysis

Isolate[a]	GenBank accession no.	Source	Nucleotide identity (%)	Amino acid identity (%)	Reference
87-Nepal	AF020495	Human	96	98	14
94-Nepal	AF020497	Human	95	98	14
90-India	U22532	Human	94	96	27
87-China-D	D11093	Human	93	97	Unpublished
92-Fulminant (India)	X98292	Human	93	96	30
87-Pakistan-Sar	M80581	Human	92	96	34
80-Algeria	U40046	Human	89	97	36
84-Chad	U62121	Human	88	97	36
94-Egypt	AF051352	Human	89	97	33
93-Egypt	AF051351	Human	87	97	33
83-Namibia	AF105021	Human	88	98	17
96-USA	AF082843	Swine	80	91	25
95-USA	AF060669	Human	79	91	31
87-Mexico	M74506	Human	77	88	19

[a] Numeral in each isolate designation indicates year of isolation.

Think about how to select and present data from your chosen sources… can use images but avoid copying legends. Check image clarity…

JCM -- He et al. 40 (12): 4493 Figure 2 - Microsoft Internet Explorer

Click on image to view larger version.

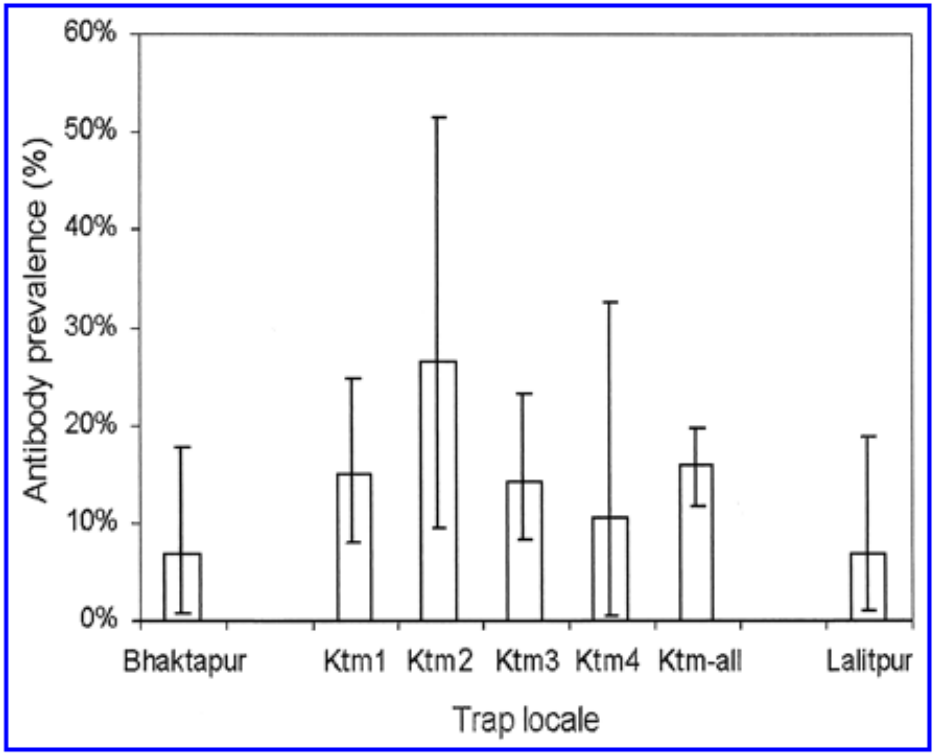


FIG. 2. Prevalence of IgG to HEV among *Rattus* and *Bandicota* in the cities of Bhaktapur, Kathmandu, and Lalitpur. Kathmandu results are shown for the whole city (Ktm-all) and for four neighborhoods where more than 18 animals were trapped (Ktm1, Kalmati; Ktm2,

Citing references

- **<u>Coventry University Harvard format</u> MUST be used**

- **Both <u>within</u> the text and a <u>reference section</u> at the end**

- Ensure that ALL publication details are given in the reference section
- Take care with Web site references – address only is not the correct format

So…to do now....

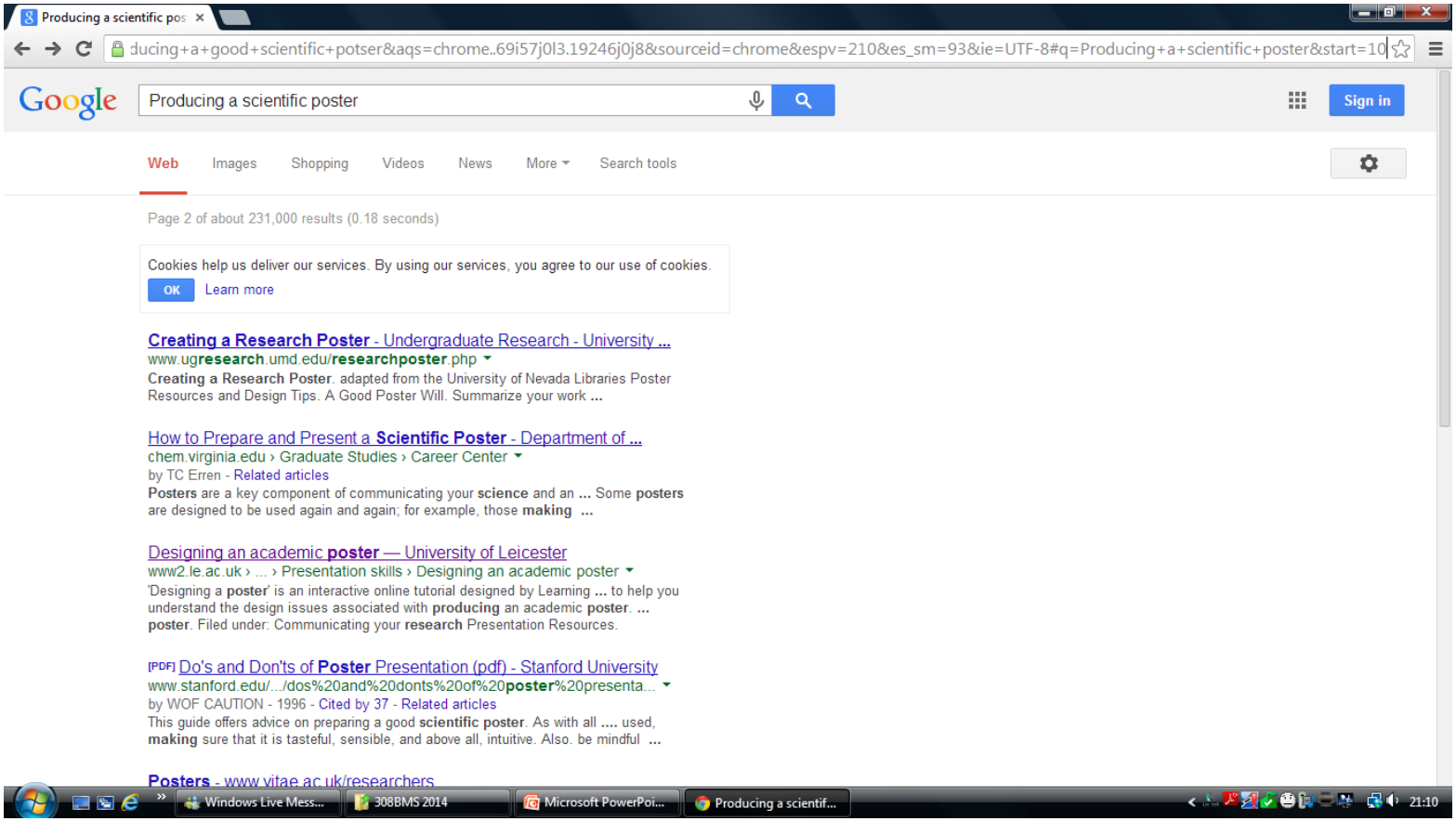
- **Start searching for journal papers**

- **Make sure that you sort out your <u>precise topic</u> about the microbial pathogen that you have been allocated**
  - **YOU CHOOSE <u>either</u> pathogenicity/virulence <u>or</u> epidemiology/outbreaks**

- **Start planning your poster – main points, integrating material from different sources etc.**

- **Look at advice on poster displays – good chapter in Practical Skills in Biomolecular Sciences**

Look at advice on the presentation of scientific posters



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