

Student Presentation Background Information

This sheet is due one week before your presentation. Include good quality copies of all papers listed in part 2.

1. What is your name? What is the title of your presentation?

Brian Ernstring "The Yersinia Virulence Factor YpkA Mimics Host Rho-family GTPases"

2. What are the titles of the papers you will be presenting? How are these papers related?

A. Characterization of the Operon Encoding the YpkA Ser/Thr Protein Kinase and the YopJ Protein of *Y. pseudotuberculosis*

B. The Yersinia Protein Kinase A is a Host Factor Inducible RhoA/Rac-binding Virulence Factor

C. Yersinia Virulence Depends on Mimicry of Host Rho-family Nucleotide Dissociation Inhibitors

Paper A describes the initial mutational analysis of YpkA and its operon, while paper B demonstrates an interaction with RhoA. Paper C reports a structure for the Rac-YpkA complex and tests several hypotheses suggested by this structure, verifying that Ypk acts as a GDI.

3. How will you introduce your topic? Suggestion: reference a section in Campbell or other general text.

I will use figures from a Nature Microbiology review of Yersinia virulence

4. What question do your data address? Why is it important?

These papers investigate the mechanism of action and role in virulence of the YpkA protein kinase. Specifically, the questions are "Is YpkA a virulence factor?" and "What is the nature of the YpkA-Rho/Rac interaction?". Pathogens commonly use proteins evolved from eukaryotic signal transduction factors to disable/subvert host cells. Yersinia is a model system for this type of regulation, and the role of the YpkA protein is poorly understood.

5. Which experiments will you present? Attach additional sheets if necessary.

A. Paper A, Initial analysis of the YpkA operon, including mutational analysis of virulence - Figures 1, 3, 4, Table 2.

B. Paper B, Separation of Morphological Effect and Localization - Figures 1, 2, 3

C. Paper B, YpkA-Rho interaction, Negative GDI Results - Figures 4, 6, 7, 8.

D. Paper C, YpkA-Rac structure. Figures 1, 2, 4.

E. Paper C, Tests of structural predictions - Figures 3, 5, 6, 7

6. What are your conclusions based on the experiments from part 5?

YpkA is a virulence factor, although it is not required for virulence. YpkA kinase activity is not required for its effect of cell morphology. YpkA binds RhoA and Rac, and acts as a GDI.

7. Do you feel adequately prepared to present background, research questions, methods, results and conclusions for this work? If not where do you need help and what are you doing about it?

I am adequately prepared, but if I weren't I would seek help from a nearby professor.