



## Exceptional Researchers and LI-COR Imaging Systems Driving Results

### Spotlight on Dr. Wendy L. Picking

Dr. Wendy L. Picking, Associate Professor in the Department of Microbiology and Molecular Genetics at Oklahoma State University, studies enteric pathogenic bacteria, with a specific focus on *Shigella flexneri*.

Her work with *Shigella* reaches far beyond an understanding of this pathogen, but to other pathogenic organisms with type III secretion systems as well, such as *E. coli*, *Salmonella*, *Yersinia*, *Pseudomonas*, and *Burkholderia*. Her lab's research on the type III secretion system (TTSS) has the ultimate goal of preventing infection by these pathogens via drug therapy or vaccines.

Dr. Picking's lab collaborates closely to the adjacent lab, that of her husband and Department Head, Dr. Bill Picking. Combined, the two labs have 10-15 personnel including post doctoral researchers, graduate students and undergraduate students contributing to this research.

The *Shigella* bacterium is not often seen in the U.S., but outbreaks are seen in daycares and adult centers. *Shigella* is a problem in third world countries where water isn't purified or in the case of disaster, such as military intervention, or after some natural events, such as after the recent Haiti earthquake. *Shigella* causes shigellosis, which is an important cause of



*“The ability to quantitate those bands is just amazing!”*

*- Dr. Wendy L Picking*

childhood mortality throughout the developing world. Other pathogens with type III secretion systems, such as *Salmonella* and *E. coli* are a problem in the U.S., however. *Pseudomonas* is an important pathogen in burn victims and people with cystic fibrosis. *Burkholderia* is deadly to those with cystic fibrosis.

The type III secretion system is a molecular needle and syringe that is embedded in the membranes of many gram-negative pathogens. Dr. Picking's lab is currently investigating the proteins that localize to the tip of that needle. They have found that invasion plasmid antigen D (IpaD) resides at the tip and have found ways to localize IpaB (a translocator protein), another key virulent, and finally IpaC. They are working towards understanding the type III secretion systems because these systems are

common virulent mechanisms in gram-negative bacteria to transport effector proteins from the cytoplasm of host cells towards the benefit of the bacterium, and in *Shigella's* case, it causes phagocytosis of the *Shigella*, and *Salmonella* as well. Dr. Picking believes that through the understanding of the type III secretion system, new antimicrobial drugs and vaccine therapies can be developed. Dr. Picking described that not only is quantification good for deciding in which di-

## LINKS

For more information about Dr. Picking's work, visit the links below:

<http://microbiology.okstate.edu/index.php?option=content&task=view&id=48>

rection to take her research, but important for publication purposes as well. In referring to her manuscript "Liposomes Recruit IpaC to the *Shigella flexneri* Type III Secretion Apparatus Needle as a Final Step in Secretion Induction" (Epler et al.), she explains:

"Based on the image of the Western blot, you don't see a great deal of difference between some of the bands; but, if you quantify it and put it on a graph, you see that there are substantial differences between those bands. So that is important to us to be able to quantify that amount. And it was especially important for that particular experiment because that experiment is not a trivial experiment to do... you don't get too many chances to do that experiment right very often."

Dr. Picking acknowledges that the results in this manuscript couldn't have been attained without the Odyssey. Chemiluminescence cannot give legitimate quantification, and since she approaches her research area as a biochemist, legitimate quantification is very important.

*Dr. Picking's appreciation of the Odyssey's capabilities, her commitment to her research, and the publications that have come as a result, are just some of the reasons she is considered one of LI-COR's Odyssey Experts.*

## PUBLICATIONS

### Publications resulting from work on the Odyssey:

1. Marianela Espina, Andrew J. Olive, Roma Kenjale, David S. Moore, S. Fernando Ausar, Robert W. Kaminski, Edwin V. Oaks, C. Russell Middaugh, William D. Picking, and Wendy L. Picking; IpaD Localizes to the Tip of the Type III Secretion System Needle of *Shigella flexneri*; *Infect. Immun.*, Aug 2006; 74: 4391 - 4400.
2. Chelsea R. Epler, Nicholas E. Dickenson, Andrew J. Olive, Wendy L. Picking, and William D. Picking; Liposomes Recruit IpaC to the *Shigella flexneri* Type III Secretion Apparatus Needle as a Final Step in Secretion Induction; *Infect. Immun.*, Jul 2009; 77: 2754 - 2761.
3. Andrew J. Olive, Roma Kenjale, Marianela Espina, David S. Moore, Wendy L. Picking, and William D. Picking; Bile Salts Stimulate Recruitment of IpaB to the *Shigella flexneri* Surface, Where It Colocalizes with IpaD at the Tip of the Type III Secretion Needle; *Infect. Immun.*, May 2007; 75: 2626 - 2629.

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