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Award Number: DAMD17-01-1-0747

TITLE: Third Biannual International Meeting on Microbial Pathogenesis and Host Response

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REPORT DATE: February 2002

TYPE OF REPORT: Final Proceedings

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release;
Distribution Unlimited

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 074-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	February 2002	Final Proceedings (1 Sep 01 - 28 Feb 02)

4. TITLE AND SUBTITLE
Third Biannual International Meeting on Microbial Pathogenesis and Host Response

5. FUNDING NUMBERS
DAMD17-01-1-0747

6. AUTHOR(S)
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8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT ***(Maximum 200 Words)***

14. SUBJECT TERMS

15. NUMBER OF PAGES
7

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

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COLD SPRING HARBOR LABORATORY CONFERNECE ON

MICROBIAL PATHOGENESIS AND HOST RESPONSE

October 10 –14, 2001

ORGANIZED BY:

Stanley Maloy, University of Illinois
Paula Sumdstrom, Ohio State University
Ronald Taylor, Dartmouth Medical School

(268 participants in 1999) – 170 participants in 2001

Throughout recorded history microbial pathogens have been a major cause of human disease and mortality. However, with the advent of effective antibiotics it seemed like the war on microbes had been won. Hence, for several decades health-related research shifted to topics like cancer, heart disease, and genetic diseases. While research in microbial pathogenesis slowed, the microbes continued to evolve. Microbial resistance to antibiotics developed faster than new antibiotics could be made available, and the resistance spread throughout the microbial world. The global expansion of food distribution networks increased the rapid dissemination of microbial pathogens. Simultaneously, emerging microbial pathogens filled new ecological niches, such as indwelling medical devices that provide a surface for biofilms and the growing population of patients who are immunocompromised due to primary infections such as HIV or due to therapies for chronic diseases. Furthermore, recent discoveries have demonstrated that some diseases (e.g. ulcers and coronary heart disease) previously believed to be caused by a genetic predisposition or environmental conditions are actually caused by or are strongly associated with microbes. Finally, humans have facilitated the development of microbial pathogens as agents of bioterrorism.

This microbial offensive has summoned a renewed counter-attack on microbial pathogens that has intensified during the last several years. A variety of new tools have become available that make it possible to dissect the molecular basis of pathogenesis both from the microbial and host perspectives. This has yielded exciting rapid advances in understanding the basis of pathogenesis for several important infectious diseases. Insight into the molecular mechanisms of pathogenesis has predicted new ways to control infection, including the identification of novel targets for antimicrobials and novel approaches for vaccine development. Nevertheless, many more questions remain unanswered and many pathogens are still poorly understood. Understanding microbial pathogenesis demands a detailed knowledge of the host response as well as the pathogen itself. Both of these perspectives provide potential strategies for solving important clinical problems.

To elucidate these distinct aspects of microbial pathogenesis requires an interdisciplinary approach, integrating the fields of microbiology, eukaryotic cell biology, and immunology. To facilitate such interactions the third Cold Spring Harbor meeting on Microbial Pathogenesis and Host Defense was planned to begin on September 12-16, 2001. Due to the events of September

11, the meeting was rescheduled for October 10-14. Rescheduling the meeting on such short notice had a major impact on the meeting. Many of the speakers and participants who had planned to attend in September were unable to attend the meeting in October. Nevertheless, a revised program was rapidly prepared and the rescheduled meeting was well attended. The revised program included a Keynote Address by Ron Atlas, an international expert on bioterrorism, presented to an overflowing audience that included news media. The timeliness of the Keynote Address and the need for new approaches to combat microbial pathogens was sadly highlighted by the distribution of Anthrax spores in the U.S. mail.

The meeting attracted a diverse group of international scientists who approach the study of bacterial and fungal pathogens from a broad range of perspectives. Sessions focused on how genomic DNA sequences and functional genomic approaches can be used to identify gene products involved in pathogenesis; how environmental reservoirs of pathogens, genetic exchange between pathogens, and mutation allows pathogens to rapidly evolve new traits; how pathogens enter eukaryotic hosts; how pathogens manipulate the host response; how the host responds to ward off infections (or sometimes to inadvertently promote infections); and how recent insights into pathogenesis is being used to facilitate the development of novel antibiotics and vaccines. The talks and poster sessions generated lively, interactive discussions. Many presentations describing the use of a new method to solve a complex problem led to animated discourse about how the approach could be applied to answer recalcitrant questions about other host-pathogen interactions. Some of these interactions have already produced fruitful scientific collaborations.

Despite the active scientific research on microbial pathogenesis and the impressive progress in this field, it is clear that as one problem is solved, another microbial pathogen will rapidly take its place. Hence, there will be a continual need for the free, interactive exchange of ideas like that stimulated by this meeting.

This meeting was partially supported by funds from the National Institute of Allergy and Infectious Diseases, the National Institute of Dental Research, and the U.S. Army.

PROGRAM

WEDNESDAY, September 12—7:30 PM

SESSION 1 GENOMIC ANALYSIS OF PATHOGENS

Chairperson: S. Maloy, University of Illinois, Urbana

THURSDAY, September 13—9:00 AM

SESSION 2 EVOLUTION OF PATHOGENS

Chairperson: M. Neely, Wayne State University School of Medicine, Detroit, Michigan

THURSDAY, September 13—2:00 PM

SESSION 3 POSTER SESSION I

THURSDAY, September 13—7:00 PM

SESSION 4 ADHESION AND ENTRY

Chairperson: J. Puente, Universidad Nacional Autónoma de México

FRIDAY, September 14—9:00 AM

SESSION 5 EXPORT

Chairperson: R. DeVinney, University of Calgary Health Science Center, Canada

FRIDAY, September 14—2:00 PM

SESSION 6 POSTER SESSION II

FRIDAY, September 14—7:00 PM

SESSION 7 HOST RESPONSES

Chairperson: B. Cookson, University of Washington, Seattle

SATURDAY, September 15—9:00 AM

SESSION 8 TOXINS

Chairperson: N. Freitag, Seattle Biomedical Research Institute, Washington

SATURDAY, September 15—1:30 PM

SESSION 9 ANTIBIOTICS AND VACCINES

Chairperson: L. Miesel, Schering Plough Research Institute, Kenilworth, New Jersey

SATURDAY, September 15—4:30 PM

SESSION 10 KEYNOTE SPEAKER

SUNDAY, September 16—9:00 AM

SESSION 11 RESERVOIRS OF PATHOGENS IN THE ENVIRONMENT

Chairperson: P. Small, University of Tennessee, Knoxville