

# Microbial pathogenesis & host response

Cold Spring Harbor Laboratory Meeting, September 15–19, 2007

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The «Microbial pathogenesis & host response» meeting was organized by Brendan Cormack (Johns Hopkins University School of Medicine), Theresa Koehler (University of Texas, Houston Medical School) and James Slauch (University of Illinois, Urbana-Champaign) for the Cold Spring Harbor Laboratory Meetings and Course program. The meeting took place at the Cold Spring Harbor Laboratories (Cold Spring Harbor, New York, USA) and focused on interdisciplinary approaches to study infectious disease in animal and plant hosts by integrating the disciplines of molecular microbiology, eukaryotic cell biology, immunology and genomics. Many outstanding scientists are associated with the history of the laboratory. For example Barbara Clintock received the Nobel Prize for identifying transposons. Another Nobel laureate scientist was Richard J. Roberts who discovered introns in eukaryotic DNA and the mechanism of gene-splicing. James D. Watson who co-discovered the double helix structure of DNA with Francis Crick was Laboratory's Director and President for many years.

Cold Spring Harbor meetings provide a platform for scientists from all over the world to present and discuss new data and ideas. The «Microbial pathogenesis & host response» meeting 2007 was divided in several sessions.

«Effector Delivery and Function» was hosted by Jorge Galan (Yale University) who demonstrated delivery of a *Salmonella typhi* exotoxin. W.D. Hardt presented dynamics of host cell manipulation by *Salmonella* TTSS effector proteins and how *Salmonella* uses inflammation to compete with the intestinal microbiota. V. Jaumouillé showed localization of *Shigella's* TTSS translocator at the bacterial poles and M. Collins described an enzyme of *S. pyogenes* that deglycosylates human IgGs.

Paula Sundstrom (Dartmouth Medical School) chaired the session «Regulation of Virulence», participating with a talk about actin cytoskeletal dynamics of *C. albicans*. V. DiRita showed *C. jejuni* colonization mechanisms and B. Klein talked about regulation of morphogenesis and virulence in dimorphic fungi. A. Camilli unraveled transitions of *V. cholerae* into and out of the host. A two-component regulatory system in *C. jejuni* was discussed by E. Gaynor and A. Sonenshein described a global regulator, CodY in gram-positive bacteria.

«Cell surfaces» combined talks about endocarditis and biofilm related pili of *E. faecalis* by the chairperson Barbara Murray (UT Houston Medical School), a study about a lantibiotic of *S. pyogenes* by M. Neely and adhesion mechanisms of enterotoxigenic *E. coli* analyzed by J. Fleckenstein. S. Forbes described a mechanism of IgA-mediated immunity to *Salmonella* and *Shigella*. Switching, mating and pathogenesis in *C. albicans* was presented by D. Soll.

«Microbial Communities» was chaired by Vanessa Sperandio (University of Texas) talking about inter-kingdom signaling in bacterial pathogenesis. L. Forney elucidated differences in the composition of vaginal microbial communities. Molecular dialogues with the microbiota in the zebrafish intestine were presented by K. Guillemin. D. Hogan investigated interactions within bacterial-fungal biofilms. J. Zhu identified a host factor that stimulates *V. cholerae* virulence gene expression.

Joseph Heitman (Duke University), chaired the session «Genomes and Evolution of Virulence» and participated by emphasizing the evolution of microbial pathogens. J. Berman discussed genome dynamics and drug resistance in *C. albicans* and M. Dorer analyzed natural competence of *H. pylori* stomach colonization.

Neil Gow (University of Aberdeen, UK), guided the session «Immune Response to Pathogens». V. Nizet discussed bacterial resistance mechanisms to innate host defenses. A. van der Velden showed

down-modulation of T cell receptor expression by *Salmonella*. L. Ramakrishnan applied a zebrafish model to investigate how mycobacteria induce tuberculosis granulomas. The *M. tuberculosis* proteasome and pathogenesis was discussed by H. Darwin.

David Russell (Cornell University), the chairperson of the last session «Microbial Trafficking in Cells and Tissues», presented life and death of *M. tuberculosis* in the phagosome. O. Steele-Mortimer investigated *Salmonella*-induced ruffles by quantitative fluorescence microscopy. M. Machner showed how *L. pneumophila* hijacks the small GTPase Rab1 during host cell infection. The role for microtubule dynamics in *Salmonella* infection was discussed by T. Schroer and K. Hybiske characterized the cellular exit mechanisms of *Chlamydia*. Signaling pathways involved in survival of *M. tuberculosis* within host cells were demonstrated by J. Pieters.

In addition to the seminars, two poster sessions with more than 200 participants were organized. Different aspects of microbial pathogenesis and microbial-host interactions were presented by people from all over the world and provided the basis of many interactions between scientists.

The highlight of the meeting was the talk by the keynote speaker John Mekalanos (Harvard University Medical School) who proposed that T6SS apparatus may assemble a «cell-puncturing device» analogous to phage tail spikes to deliver effector protein domains through membranes of target host cells.

In conclusion, most recent research findings at the cutting edge of science were discussed during the «Microbial pathogenesis & host response» meeting and provided many new concepts in order to elucidate the mechanisms of bacterial and fungal pathogenesis.

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