Microbial pathogenesis & host response

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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 Slack (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 pil 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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